The "Innovation Recession"

A new worry about the U.S. economy: the decline in R. and D.

While the devaluation of the dollar may be the most dramatic measure of the U.S.'s reduced clout in world commerce, another event may ultimately have a greater impact on the nation's economic health. It is the shocking decline of good old Yankee ingenuity, otherwise known as research and development.

The U.S. has always prided itself on being the world's undisputed leader in technological innovation. Since World War II foreign demand for aircraft, computers, automated tools and other products of American labs and workshops could be relied on to provide a fat surplus in the nation's balance of trade. No more. Though the U.S. still retains an overall lead in total amounts spent on R. and D. and in numbers of new inventions, its chief economic rivals are expanding their research efforts at much faster rates. One consequence is becoming dramatically clear this year: because the U.S. no longer commands such a high share of the world's high-technology market, it no longer can offset its large imports of low-technology items such as shoes and clothing. As a result, in 1978 the country will import substantially more manufactured goods than it will export. The deficit for the first half of 1978 was $14.9 billion, which will do more damage to the trade balance this year than anything but the $40 billion in oil that the U.S. will import. By contrast, West Germany and Japan are expected to run surpluses in manufactured goods of $49 billion and $63 billion respectively.

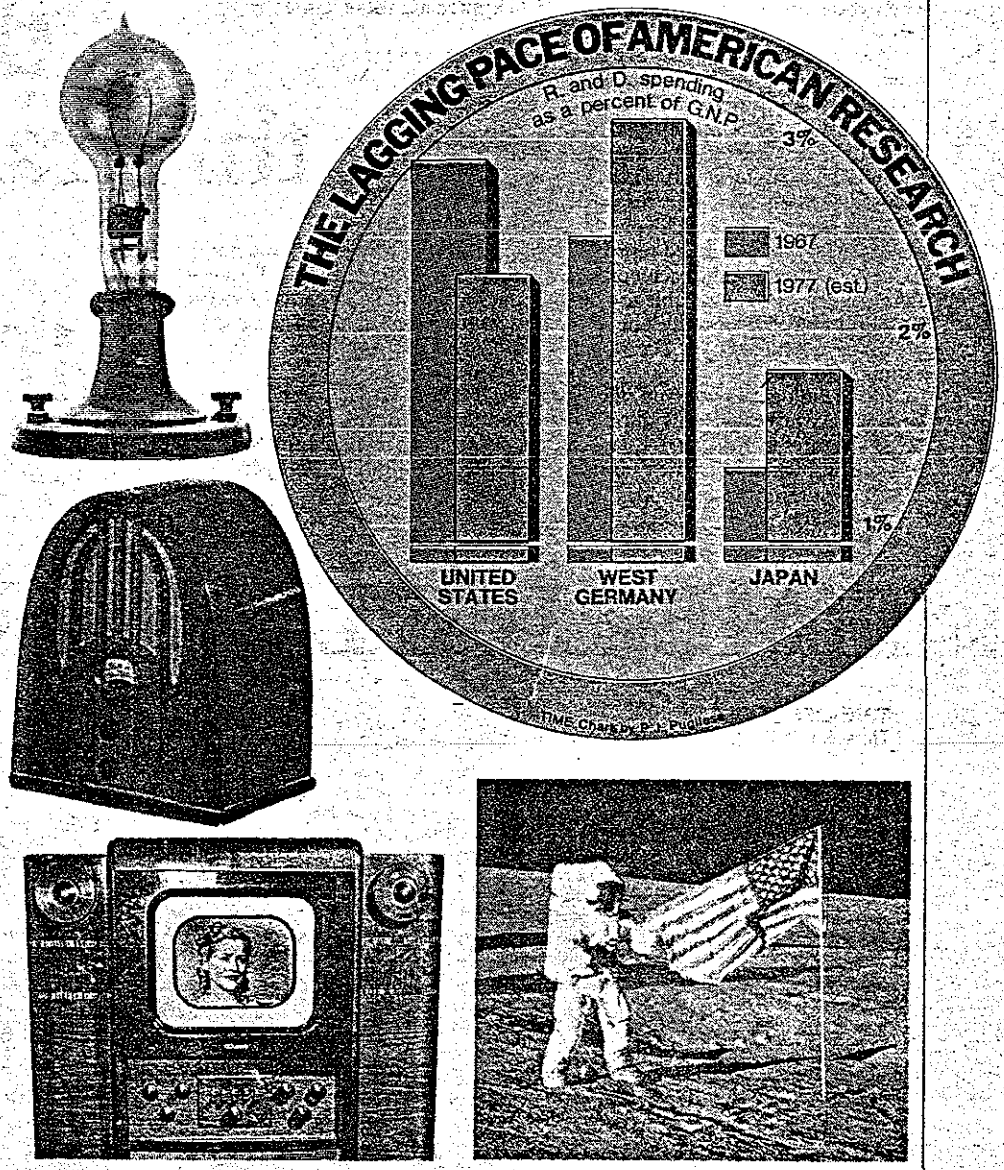
According to the National Science Foundation, in the years 1953 through 1955 the U.S. introduced 63 "major" technological innovations. West Germany, Japan, Britain and France had together only 20. But now foreign competitors are bringing out as many new products and processes as the U.S.—or more. In the category of new patents, a key measure of R. and D. vitality, American inventors were granted 45,633 patents by major trading partners in 1966, while the U.S. gave only 9,567 to non-Americans that year. By 1976, however, the so-called patent balance had shifted radically. The number of U.S. inventors granted patents abroad dropped by more than 25%, to 33,181, while the number of foreigners gaining U.S. patents had almost doubled, to 18,744. Says Frank Press, the chief White House science adviser: "It is the trends that are important, and the percentage increases in some countries are growing faster than here."

Why did the trends begin to shift? Arthur M. Bueche, senior vice president for R. and D. at General Electric, which remains the most research-oriented of big U.S. companies (862 patents won last year), is concerned about a change in the American character. Says he: "We've gone from an expansive, gung-ho attitude to a defensive, 'What's in it for me?' attitude." Faced with a challenge, Americans are now more likely to say, "Let's not risk it." Among factors behind the U.S.'s "innovation recession":

THE MONEY DROUGHT. Since the post-Sputnik days of 1964, when public and private spending on R. and D. reached a peak of 3% of the gross national product, such spending has slipped to just 2.3% of G.N.P. That is appreciably lower than West Germany's 3.1%, and uncomfortably close to Japan's 1.8% and even France's 1.5%. Furthermore, while foreign countries spend very little on military research, the U.S. dedicates almost 50% of its R. and D. expenditures to defense-related projects. At the same time, federal spending on basic research has fallen in constant dollars from $2.8 billion in 1967 to $2.6 billion in 1977. Yet industry's R. and D. investment has risen from $8.1 billion in 1967 to $19.4 billion ten years later, although inflation has eroded the impact of that increase.

BURGEONING BUREAUCRACY. Government sponsorship of R. and D. has become increasingly stultifying and counterproductive. Research scientists complain that they spend more time dealing with the red tape that goes with Government support than in the lab. The Department of Energy, to cite just one example, requires seven approvals prior to the start of a research contract. Another fear expressed by many scientists: a growing share of Government-sponsored R. and D. is not true research at all but only the quest for instant remedies to satisfy the rising numbers of regulations on safety, health and environmental protection flowing from Washington.

THE QUICK-RETURN SYNDROME. Partly because more and more stock in companies is held by pension funds and other large institutions that are both conservative and concerned with ever improving



Some milestones in American ingenuity: Thomas Edison's electric light; an early radio; a Philco television set; an Apollo astronaut on the moon in 1969

bottom-line performance, managers in private industry have become more interested in merely improving existing products than going to the trouble and expense of devising new ones. Vague research projects, whose benefits may be far off, are even less likely to get boardroom backing. But in such situations, asks Lowell W. Steele, GE's manager of R. and D. planning, "how do we compete against a country like Japan, which considers ten or 15 years a perfectly acceptable lead time for development?"

RISK-CAPITAL SHORTAGE. Although many of the most successful companies in computer technology and semiconductors were founded as modest operations only a decade or so ago, the scientist with a brilliant idea is hard put to find financial backing these days in the equity markets. As recently as 1972, 104 small R. and D.-oriented firms were able to raise seed money on the stock exchanges. At last tabulation, only four had done so. One reason for the drying up of venture capital: the maximum tax on capital gains was raised from 25% in 1969 to the present 49% rate. For investors, this had the effect of cutting, say, a 25% gain on a high-risk investment to an effective return of about 12%. Congress will roll the capital-gains rate back to about 35% this year, but the damage may take long to repair. Says Ray Stata, founder of Analog Devices Inc., a successful Massachusetts semiconductor firm: "The single most important factor retarding innovation is Government policy on investment. You can't avoid it."

In addition to throwing the U.S. balance of payments into even deeper deficits, the decline in research and development is bound to have a dampening effect on the domestic economy, especially since small companies based on new ideas tend to grow faster and create more jobs than older firms. A five-year study by the Commerce Department of six "mature" corporations (such as General Motors and Bethlehem Steel), five "innovative" companies (including Polaroid and IBM) and five "young high-technology" firms (among them, Marion Labs and Digital Equipment) turned up some telling figures. The mature firms, which had combined annual sales of $36 billion, added only 25,000 workers during the five years; the innovative companies, with a $21 billion sales total, had a net gain of 106,000 employees; the high technology outfits, with $857 million in sales, created 35,000 new jobs.

The dividends the U.S. gets from these high-technology firms extend far beyond jobs. As economic engines of astonishing vitality, they are also churning out the export sales and tax revenues that the nation urgently needs. A recent survey of high-technology companies founded in the early 1970s showed that for every $100 originally invested in them, each firm on the average now returns each year $70 in sales abroad, $15 in federal corporate tax, $15 in personal income tax and $5 in state and local revenues.

Concerned about the R. and D. retreat, President Carter has ordered a Cabinet-level task force headed by Commerce Secretary Juanita Kreps to give him some recommendations for turning it around by next June. One of the task force's main goals: to find ways to reduce the discouraging effects of Government regulation on R. and D.

One idea that has already surfaced is to copy the Japanese by establishing research institutes within the various branches of American industry that could supply information on basic research to participating companies. Thinking along that line, the Canadians, who have also been suffering from an R. and D. lag, plan to set up five innovation centers at universities, which will supply help to industry. In the U.S., such research-sharing schemes generally have been discouraged by antitrust law. But the Commerce Department is now consulting with Justice officials about devising programs that would further the cause of American R. and D. without violating the precepts of antitrust legislation. ■