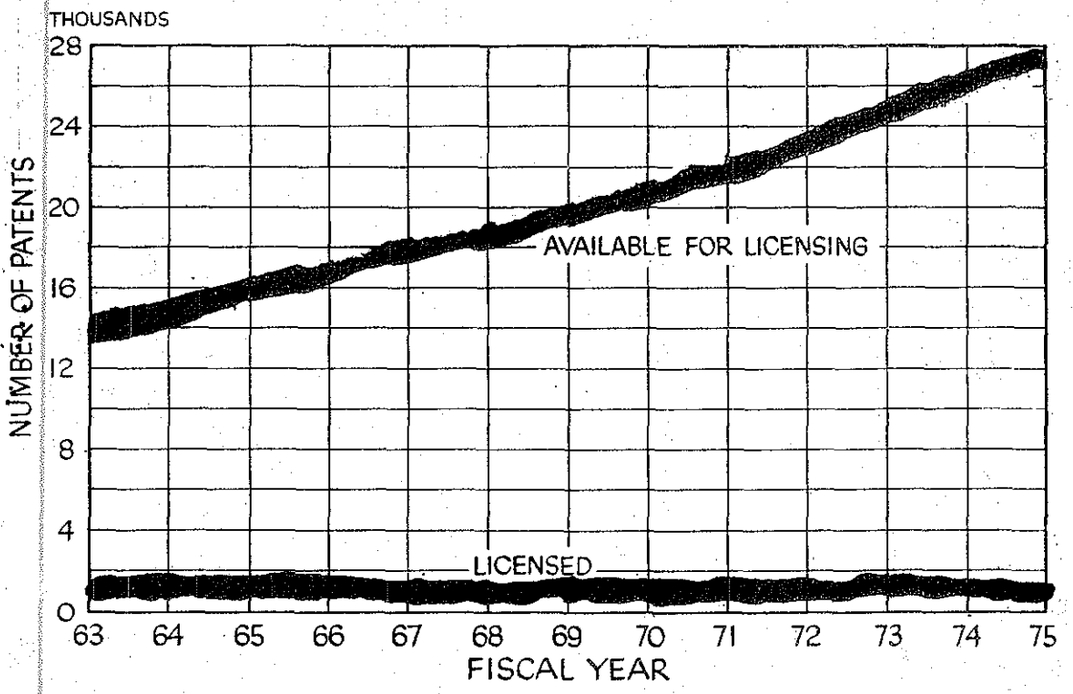
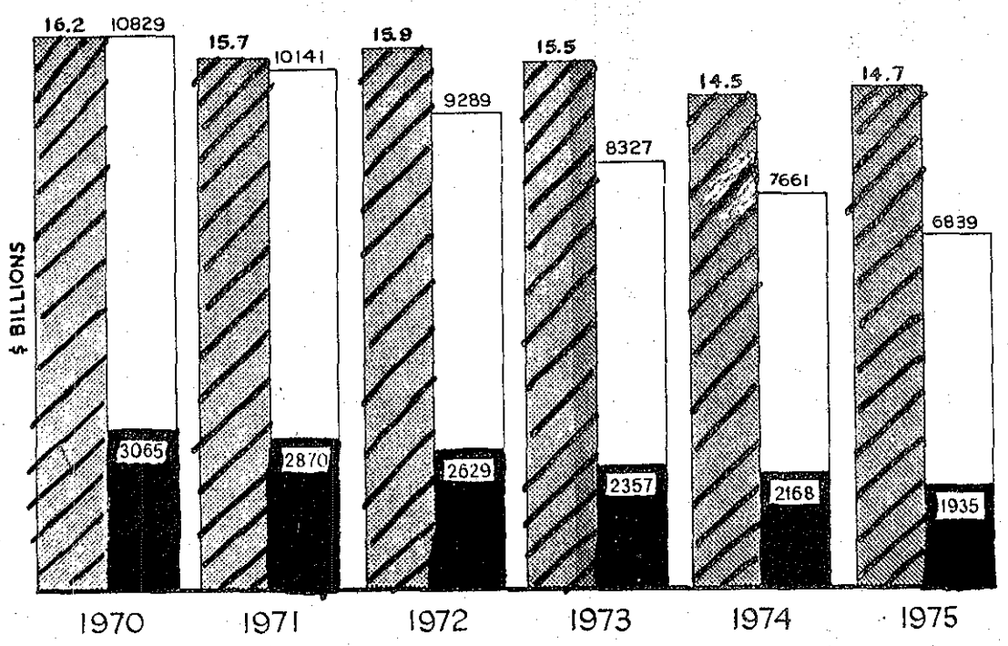
GOVERNMENT OWNED PATENTS



While the number of government patents available for licensing has increased, the percentage of those actually licensed has remained below 5 percent. Universities are estimated to license 33 percent of their patents.

INVENTION DISCLOSURES AND PATENTS RESULTING FROM FEDERALLY FUNDED R&D 1970-75



The number of patents arising out of federally funded research has been in a steady decline. Even in 1975 when research expenditures actually increased over the previous year, the number of patents filed continued to decline.

(Source: Testimony of Dr. Betsy Ancker-Johnson, former Assistant Secretary of Science and Technology, Department of Commerce before the House Subcommittee on Domestic and International Scientific Planning and Analysis, October 1, 1976.)

_____ CONGRESS
_____ SESSION

S. _____

(NOTE.—Fill in all blank lines except those provided for the date, number, and reference of bill.)

IN THE SENATE OF THE UNITED STATES

Mr. Dole, for himself and Mr. Bayh

introduced the following bill; which was read twice and referred to the Committee on _____

A BILL

To amend Title 35 of the United States Code; to establish a uniform Federal patent procedure for small businesses and nonprofit organizations; to create a consistent policy and procedure concerning patentability of inventions made with federal assistance; and for other related purposes.

(Insert title of bill here)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Small Business Nonprofit Organization Patent Procedures Act."

Sec. 2 Amendment of Title 35, United States Code, Patents. Title 35 of the United States Code is amended by adding after Chapter 17, a new chapter as follows:

CHAPTER 18 - PATENTABILITY OF INVENTIONS MADE WITH FEDERAL ASSISTANCE

Sec.

200. Policy and Objective
201. Definitions.
202. Disposition of Rights.
203. March-in Rights.
204. Return of Government Investment.
205. Preference for United States Industry.
206. Confidentiality.
207. Background Rights.
208. Relationship to Anti-trust Laws.
209. Uniform Clauses.
210. Foreign Patent Protection and Federally Owned Patents.
211. Regulations Governing Federal Licensing and Small Business Preference.
212. Coordination of Federal Licensing Practices.
213. Restrictions on Exclusive and Partially Exclusive Licenses of Federally Owned Patents.
214. Precedence of Chapter.
215. Effective Date.

(e) The term "practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or government regulations available to the public on reasonable terms from the subject inventor or licensee or assignee of the subject inventor.

(f) The term "made" when used in relation to any invention means the conception or first actual reduction to practice of such invention.

(g) The term "small business firm" means a small business concern as defined at section 2 of Public Law 85-536 (15 USC 632) and implementing regulations of the Administrator of the Small Business Administration.

(h) The term "nonprofit organization" means universities and other institutions of higher education and organizations of the type described in section 501 (c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501 (a) of the Internal Revenue Code (26 USC 501(a)).

Section 202. Disposition of Rights.

(a) Each nonprofit organization or small business firm may, within a reasonable time, elect to retain title to any subject invention; provided, however, that each Federal agency may promulgate regulations otherwise (i) when the subject invention is made under a contract for the operation of a Government-owned research or production facility, (ii) when such election to retain title might cause disclosure of classified information or otherwise impair national security; or (iii) in exceptional circumstances when it is determined by the agency that restriction or elimination of the right to retain title will better promote the policy and objective of this Chapter. The rights of the nonprofit organization or small business firm shall be subject to the provisions of paragraph (b) of this section and the other provisions of this Chapter.

practiced for or on behalf of the United States any subject invention throughout the world, and may, if provided in the funding agreement, have additional rights to sublicense any foreign government pursuant to foreign policy considerations or any existing or future treaty or agreement.

(5) The right of the Federal agency to require periodic reporting on the utilization or efforts at obtaining utilization that are being made by the subject inventor or his licensees or assignees; provided that any such information may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under the Freedom of Information Act.

(6) An obligation on the part of the subject inventor, in the event a United States patent application is filed by or on its behalf or by any assignee of the subject inventor, to include within the specification of such application and any patent issuing thereon, a statement specifying that the invention was made with Government support and that the Government has certain rights in the invention.

(7) In the case of a nonprofit organization, (a) a prohibition upon the assignment of rights to a subject invention in the United States without the approval of the Federal agency, except where such assignment is made to an organization having prior approval of the Federal agency which has as one of its primary functions the management of inventions and which is not, itself, engaged in the manufacture or sale of products or processes that might utilize the invention or be in competition with embodiments of the invention and provided that such assignment is made subject to regulations promulgated hereunder governing rights in inventions and assignments of subject inventions; (b) a prohibition against the granting of exclusive licenses under United States Letters Patent in a subject invention by the Contractor or by a person deriving rights directly or indirectly from the Contractor for a period in excess of the earlier

applicant or applicants, upon terms that are resonable under the circumstances, and if the contractor, assignee or exclusive licensee refuses such request, to grant such a license itself, if the Federal agency determines either --

(a) That such action is necessary because the subject inventor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use; or

(b) That such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the subject inventor, assignee, or their licensees; or

(c) That such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the contractor, assignee, or licensees.

Section 204. Return of Government Investment.

(a) If a nonprofit organization or small business firm receives $250,000 in after tax profits from the licensing of any subject invention, in a period of ten years following reporting of the invention the United States shall be entitled to a share, to be negotiated, of up to 50% of all net income during said period from licensing received by the contractor above $250,000; provided, however, that in no event shall the United States be entitled to an amount greater than that portion of the Federal funding under the funding agreement under which the subject invention was made which was expended on activities related to the making of the invention.

(b) In addition, if a nonprofit organization or small business firm receives after tax profits in excess of $2,000,000 on sales of products embodying or manufactured by a process employing a subject invention, during a period of ten years commencing with commercial exploitation of the subject invention, the Government shall be entitled to a share, to be negotiated, of all additional income accruing from such sales up to the amount of the portion of the Government funding under

application may be treated by the Federal agency as records exempt from disclosure pursuant to 5 USC 552 (b) (4)), (ii) a description of the invention has been published elsewhere by the inventor, (iii) the subject inventor has not elected to retain title and/or a subject inventor or inventor has not requested the retention of title or other commercial rights, or (iv) the subject inventor has not elected to retain title and/or the Federal agency has denied the request of the subject inventor or inventor to retain title or other commercial rights.

Section 207. Background Rights. Nothing in this Chapter shall be deemed to preclude a Federal agency from obtaining rights in any background invention of a subject inventor or other contractor.

Section 208. Relationship to Anti-trust Laws. Nothing in this Chapter shall be deemed to convey to any person immunity from civil or criminal liability, or to create any defenses to actions, under any antitrust law.

Section 209. Uniform Clauses. The Office of Federal Procurement Policy, after receiving recommendations of the Office of Science and Technology Policy, may issue regulations which may be made applicable to Federal agencies establishing standard funding agreement provisions required under this Chapter.

Section 210. Foreign Patent Protection and Federally Owned Patents. Each Federal agency is authorized to --

(1) apply for, obtain, and maintain patents or other forms of protection in the United States and in foreign countries on inventions in which the Federal Government owns a right, title, or interest;

(2) promote the licensing of inventions covered by federally owned patent applications, patents, or other forms of protection obtained with the objective of maximizing utilization by the public of the inventions covered thereby;

(3) grant nonexclusive, exclusive, or partially exclusive licenses under federally owned patent applications, patents, or other forms of protection obtained, royalty-free or for royalties or other consideration, and on such terms and conditions, including the grant to the licensee of the right of enforcement pursuant to the provisions of chapter 28 of title 35, United States Code, as determined appropriate in the public interests;

(3) evaluate inventions referred by Federal agencies, and patent applications filed thereon, in order to identify those inventions with the greatest commercial potential and to insure promotion and utilization by the public of inventions so identified;

(4) assist the Federal agencies in seeking and maintaining protection on inventions in the United States and in foreign countries, including the payment of fees and costs connected therewith;

(5) accept custody and administration, in whole or in part, of the right, title, and interest in any invention for the purposes set forth in paragraphs (1) through (4) of section 210, with the approval of the Federal agency concerned and without regard to the provisions of the Federal Property and Administrative Service Act of 1949 (40 U.S.C. 471);

(6) receive funds from fees, royalties, or other management of federally owned inventions authorized under this Chapter, but such funds shall be used only for the purposes of this Chapter; and

(7) undertake such other functions directly or through such contracts as are necessary and appropriate to accomplish the purposes of this title.

Section 213. Restrictions on Exclusive and Partially Exclusive Licenses of Federally Owned Patents. (a)(1) Each Federal agency may grant exclusive or partially exclusive licenses in any invention covered by a federally owned domestic patent or patent application only if, after public notice and opportunity for filing written objections, it is determined that--

(A) the interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(c) The Federal agency shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

(d) Any grant of an exclusive or partially exclusive license shall contain such terms and conditions as the Federal agency determines appropriate for the protection of the interests of the Federal Government and the public, including provisions for the following:

(1) periodic written reports at reasonable intervals including, when specifically requested by the Federal agency, the extent of the commercial or other use by the public that is being made or is intended to be made of the invention;

(2) a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for the Federal Government the licensed invention throughout the world by or on behalf of the Federal Government (including any Federal agency), and the additional right to sublicense any State or domestic local government or to sublicense any foreign government pursuant to foreign policy considerations, or any treaty or agreement if the Federal agency determines it would be in the national interest to retain such additional rights;

(3) the right of the Federal agency to terminate such license in whole or in part unless the licensee demonstrates to the satisfaction of the Federal agency that the licensee has taken effective steps, or within a reasonable time is expected to take such steps, to accomplish substantial commercial or other use of the invention by the public; and

(4) the right of the Federal agency, commencing three years after the grant of a license, to require the licensee to grant a nonexclusive or partially exclusive license to a responsible applicant, upon terms reasonable under the circumstances to terminate the license in whole or in part, after

(11) Subsection (e) of section 302 of the Appalachian Regional Development Act of 1965 (40 USC App. 302(e); 79 Stat. 5);

(12) Subsection (a)(2) of section 216 of title 38, United States Code;

(13) Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 USC 5901; 88 Stat. 1878);

(14) Section 3 of the Act of June 22, 1976 (42 USC 1959d, note; 90 Stat. 694);

(15) Subsection (d) of section 6 of The Saline Water Conversion Act of 1971 (42 USC 1959(d); 85 Stat. 161);

(16) Section 303 of the Water Resources Research Act of 1964 (42 USE 1961c-3; 78 Stat. 332);

(17) Section 5(d) of the Consumer Product Safety Act (15 USC 2054 (d); 88 Stat. 1211);

(18) Section 3 of the Act of April 5, 1944 (30 USC 323; 58 Stat. 191); and

(19) Section 8001 of the Solid Waste Disposal Act (42 USC 6981; 90 Stat. 2829).

The Act creating this Chapter shall be construed to take precedence over any future Act unless that Act specifically cites this Act and provides that it shall take precedence over this Act.

Section 215. Effective Date. This Chapter shall take effect 180 days after the date of enactment of this Chapter, except that the regulations referred to in Section 12, or other implementing regulations, may be issued prior to that time.

Sponsoring Institute (NIH)	Date sent to General Counsel 1978	Inventor and University	Invention
National Cancer Institute	1/27	POGELL/McCANN - Saint Louis University	Pamamycin - a new broad spectrum antibiotic
National Institute of Dental Research (NIDR) Division of Research Resources (DRR)	1/31	LATHAM/GEORGIADE - University of North Carolina	Appliance to be placed in the mouth of infants to correct bilateral cleft of the lip and palate
NIAID NHLBI	1/31	GOETZEL/AUSTIN - Harvard Univ.	Synthetic therapeutic agents for anaphylaxis, asthma, etc.
NHLBI	2/10	MAHONEY - University of Colorado	Device to examine hemoglobins to detect abnormalities
National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD)	2/13	WALSER - Johns Hopkins Univ.	Salts of Keto Acids for purpose of alleviating hyperammonemia due to liver damage caused by such disorders as cirrhosis, hepatitis or genetic liver damage
Employee	2/28	VUREK - NIH Employee	Measurement of Carbon dioxide in blood plasma for diagnostic purposes
Employee	4/5	WALKER - Employee NIH	Needle Valve Detent Attachment for controlling cuff deflation during the taking of blood pressure
NCI	4/7	APPLE/FORMICA - University of California	Anticancer drug - AZETOMICINS
NCI	4/11	SPIEGELMAN - Columbia Univ.	Method for detecting cancer
NIGMS	4/20	MARSHALL/RABINOWITZ - University of Miami	Synthetic Carbohydrate-Protein Conjugates for extending conditions under which enzyme can be used in biochemical processes
NCI	4/20	FARNSWORTH - University of Illinois	Anticancer drug - JACARANONE
NCI	5/1	TURCOTTE - University of Rhode Island	Anticancer drug

Sponsoring Institute	Date Sent to General Counsel 1978	Inventor and University	Invention
National Institute of Neurological and Communicative Disorders and Stroke	5/8	JOBSIS - Duke University	Method for non-invasive monitoring of oxygen sufficiency in human tissues and organs by infra-red radiation
NIGMS	5/24	MONTALVO - Gulf South Research Institute	An invention to selectively measure substances in the blood to diagnose blood disorders
NCI	5/26	PETTIT/ODE - Arizona State University	Anticancer drug
Employee	6/21	LEIGHTON - Employee	Intracranial pressure gauge
NCI	6/29	KUEHNE - University of Vermont	A method for synthetically preparing a useful naturally-occuring substance. The natural substance is used in making a drug for treatment of high blood pressure
NICHD	7/17	Gray - Illinois Institute of Technology	Prolong release of antifertility drugs
NCI	7/17	Gosalvez - University of Madrid	Novel Anti-Cancer compounds - Analogs of Adriamycin

PETITIONS FOR INVENTION RIGHTS

Sponsoring Institute (NIH)	Date Sent to General Counsel	Inventor and University	Invention
	1977		
Employee - Bureau of Standards	9/28	CETAS - University of Arizona	Birefringement Crystal Thermometer for measuring heat of cancerous tissue during electromagnetic-wave treatment
National Institute of Allergy and Infectious Diseases (NIAID)	10/6	REMERS/KUMAR - University of Arizona	New Mitomycin anticancer agents
National Institute of General Medical Sciences (NIGMS) National Heart, Lung and Blood Institute (NHLBI)	10/14	POWERS - Georgia Institute of Technology	Compounds to treat emphysema and arthritis
NIGMS	10/14	FOX - Columbia University	Aqueous Hypertonic Solution for treatment of burns
NIGMS	11/1	EVERETT - University of Houston	Apparatus and synthesis of film transfer characteristics
National Cancer Institute (NCI)	11/4	SELA/ARNON - Weizmann Institute	Test for diagnosing cancer
NHLBI	12/8	NORMANN - Baylor University	Remote monitoring of blood pumps
NCI	12/20	GOLDSTEIN - University of Texas	Hormone (thymosin) treatment of immune system diseases (cancer, arthritis, ~~muscular dystrophy~~)
NCI	12/29	SALMON/HAMBURGER - University of Arizona	Bioassay for the treatment of cancer
	1978		
NCI	1/26	TOWNSEND/EARL - University of Utah	Synthesis of anti-cancer compounds

SECTION-BY-SECTION ANALYSIS

Outlined below are a number of important features of the bill:

Section 202 provides that each nonprofit organization (defined in the bill to include universities) and small business shall have a reasonable amount of time to elect to retain title to subject inventions. The federal agency may retain title if the invention is made under a contract for operation of a government owned research or production facility, might cause the disclosure of classified information or imperil national security, or if granting patents would not be in the public interest in terms of the purpose to be served by this legislation.

Section 202(c) provides that each funding agreement shall contain provisions to: (1) insure the right of the federal government to receive title to any subject invention not reported to it within the prescribed times of the contract; (2) insure the government's right to receive title to inventions when the inventor does not intend to file for patent rights; and (3) provide that the agency shall have a nonexclusive, nontransferable, paid-up license to use the invention.

Section 202 (c) (7) prohibits nonprofit institutions from assigning rights without the approval of the federal agency; prohibits granting such rights in excess of the earlier of 5 years from the date of first commercial use or 8 years from the date of invention, whichever comes first; and provides that all proceeds shall be used to support scientific research or education.

Section 203 gives the federal agency the right to require the subject inventor or his assignee to grant additional licenses if the agency feels that sufficient steps are not being taken to achieve commercialization. Additional licensing may also be required to alleviate health and safety needs, or under provisions for public use as specified by federal regulations.

Section 204 provides that if the patent holder receives $250,000 in after tax profits from licensing any subject invention during a ten-year period, or receives in excess of $2,000,000 on the sales of products embodying or manufactured by a process employing the subject invention within the ten-year period, that the government shall be entitled to collect up to 50% of all net income above these figures until such time as the amount of government research money has been repaid.

Section 205 specifies that no foreign owned or controlled firm shall be eligible to receive patent rights under this Act unless the federal agency determines that this is the only available means of achieving commercialization; a similar provision covers licensing the invention outside the U.S.

Section 210 will allow federal agencies to grant exclusive, partially exclusive, or non-exclusive licenses on government owned patents to achieve commercialization; the Department of Commerce is authorized to receive patents held by other agencies and to make the necessary steps to determine the market potential of the patent and to receive any fees or royalties due to the government.

Section 211 authorizes the Administrator of GSA to issue regulations regarding such licenses and gives first preference in licensing federal patents to small businesses.

Section 213 specifies that federal licenses be issued only after public notification and opportunity for filing objections and that exclusive or partially exclusive licenses not be granted if the result would be a lessening of competition; the agency has the right to require more licensing if it feels that this is necessary after three years and to require periodic written reports on progress toward commercialization.

A COPY OF THE BILL IS INCLUDED IN THE PRESS PACKET.

STATEMENT BY ARTHUR G. HANSEN
PRESIDENT OF PURDUE UNIVERSITY
SEPTEMBER 13, 1978

Public universities have traditionally sought ways to put their scholarly research to practical use in the public interest. In many cases this can be done only through the patent system. For example, most academic institutions receiving federal funds for support of research have a well-defined patent policy that (1) stimulates creativity, (2) encourages industry to invest risk capital to bring a new concept into the marketplace, and (3) protects the public interest.

Most new inventions at universities are not ready for the market and, hence, for public use or consumption. To make this possible requires risk capital by an industry willing to undertake development. It is at this point that patent protection and a license are critical. Without patent protection and a license that will provide an opportunity for an industry to recover investment in an invention, the new idea will more likely than not lie dormant. What evidence do we have of this assertion? As one illustration, at the end of FY 1975, the United States Government had title to more than 27,000 patents but only 4.8 percent had been licensed. On the other hand, a recent survey of forty-eight universities by the Society of University Patent Administrators showed that fifty percent of the patents titled to those institutions were licensed.

This brings us to the intent of the new bill. The bill would permit universities to retain title to inventions and to license them under conditions that will attract the essential risk capital for the development of new technology. The rationale behind this approach to a patent policy is simple. The university, where the invention originated, is in a better position to transfer technology than the government. One reason is that the direct interaction of the inventor and the licensee is essential for development of the technology. Such interaction permits the inventor to work with the licensee and convey know-how, background and data essential to the development of the licensed invention. As the university invention is usually only at the embryonic stage of development, it requires constant attention, continuing interest and complete dedication to development by the inventor. This can best happen if title is vested in the university.

The increased technology transfer that can result from this legislation will lead to new products, new competition, job creation, and economic growth so essential for a strong America. Senators Bayh and Dole are to be commended for their foresight in sponsoring this legislation.

- 30 -

Jack White
[illegible]
452-8240

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 lion 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 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.

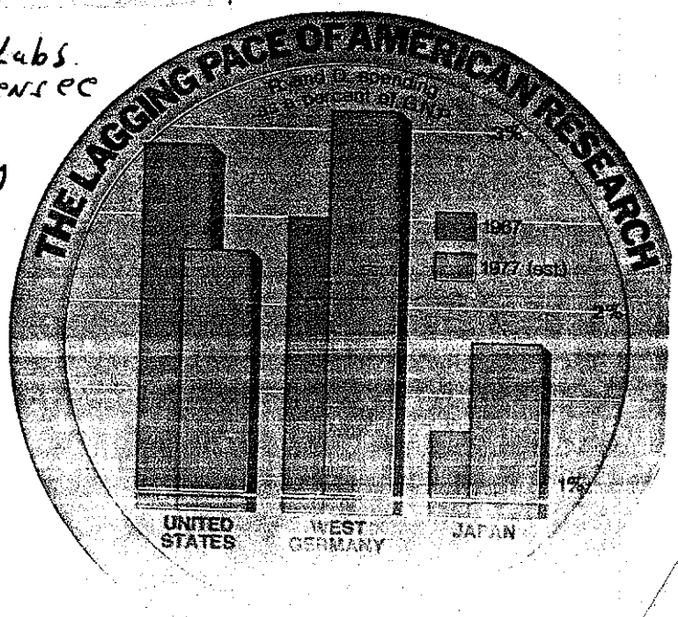
The dividends the U.S. gets from these high-technology firms extend far beyond jobs. As economic engines of astonishing vitality, they are also churning out the export sales and tax revenues that the nation urgently needs. A recent survey of high-technology companies founded in the early 1970s showed 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. ■

+ Marion Labs is a licensee of Gov't funded - University research

* This is primary purpose of S.3496



The "Innovation Recession"

TIME OCTOBER 2 1978

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 [illegible] of its R. and D. expenditures to defense-related projects. At the same time, [illegible] research has [illegible] lion 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 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. ■

† Marion Labs is a licensee of Gov't-funded university research

* This is primary purpose of S.3496

