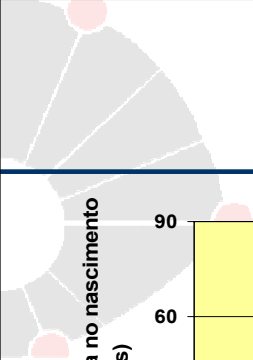




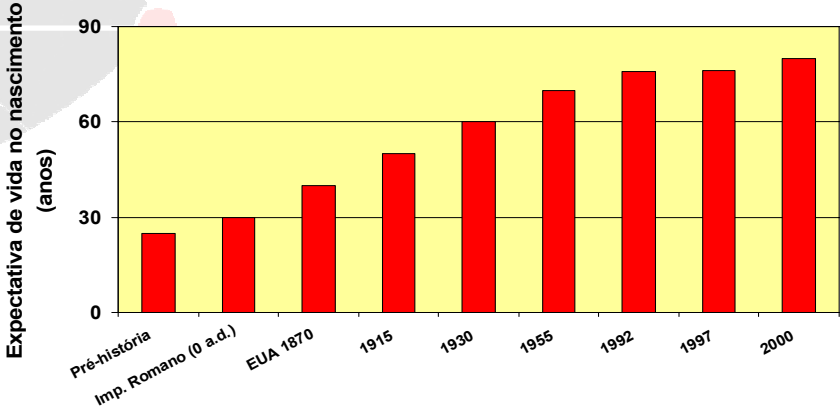
Conhecimento no mundo moderno e no Brasil

Carlos H. de Brito Cruz
Reitor, Unicamp
<http://www.ifi.unicamp.br/~brito/>

11/8/2004 aula_inaug_ita_032004.ppt 1



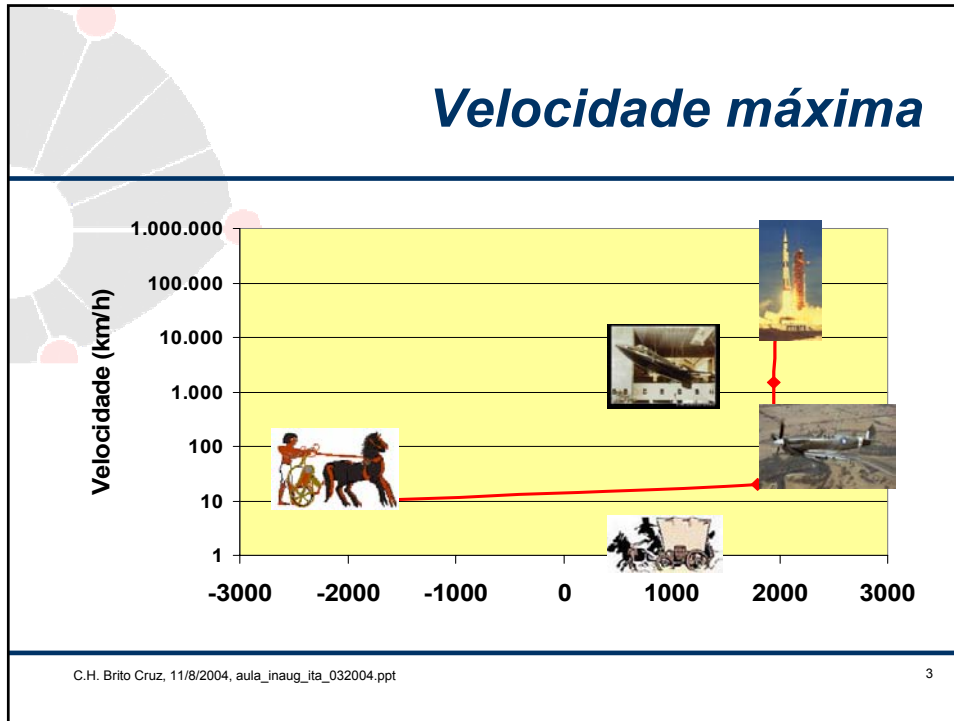
Expectativa de vida no nascimento




Período	Expectativa de vida no nascimento (anos)
Pré-história	~25
Imp. Romano (0 a.d.)	~30
EUA 1870	~40
1915	~50
1930	~60
1955	~70
1992	~75
1997	~75
2000	~80

Fonte: <http://www.grg.org/>

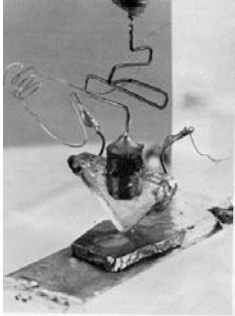
C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 2



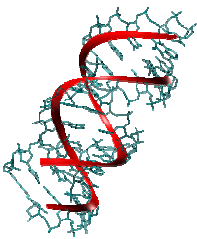
Ciência mudou o mundo



Energia nuclear
política, medicina, agricultura



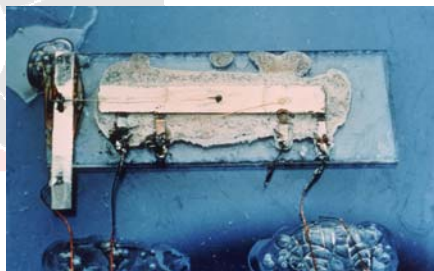
Transistor
microcircuitos, computadores,
Internet, Web



DNA
medicina, biotecnologia

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 4

Circuito Integrado Jack Kilby, 1958



Circuito Integrado, 1958
Pat 3.138.743

Calculadora, 1967
Pat 3.819.921



Porque este homem está rindo?



O presidente do Federal Reserve (Fed, o banco central dos Estados Unidos), Alan Greenspan, elogiou ontem os **avanços tecnológicos** dos últimos anos, que permitiram às indústrias norte-americanas operar com maior produtividade, contribuindo para a "maior prosperidade já experimentada pelo mundo". (O Estado de S. Paulo, 9/9/99)

(<http://www.bog.frb.fed.us/boarddocs/speeches/1999/19990908.htm>)

Teoria do Desenvolvimento Econômico

- Adam Smith, Josef Schumpeter
- R. Solow (MIT)
 - Prêmio Nobel 1987
 - Determinantes do Crescimento Econômico
 - Capital
 - Trabalho
 - “Mais alguma coisa”: o resíduo de Solow
- P. Romer, Nova Teoria do Crescimento
 - Conhecimento como fator explícito

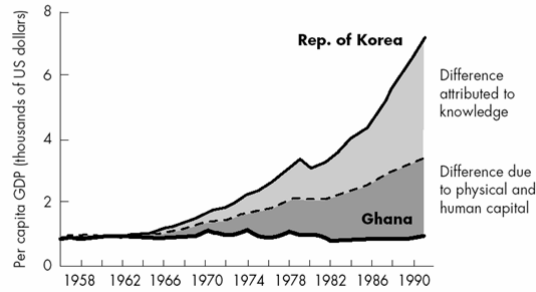
Crescimento: Capital, Trabalho e Conhecimento

Período	Crescimento anual do PIB	Crescimento anual do PIB devido a		
		Capital	Trabalho	Produtividade Total de Fatores
1960-1970	4,0%	0,8%	1,2%	1,9%
1970-1980	2,7%	0,9%	1,5%	0,2%
1980-1990	2,6%	0,8%	0,7%	1,0%
1960-1990	3,1%	0,9%	1,2%	1,1%

Fonte: C.I. Jones, “Introdução à Teoria do Desenvolvimento Econômico”, p. 39, Editora Campus (2000)

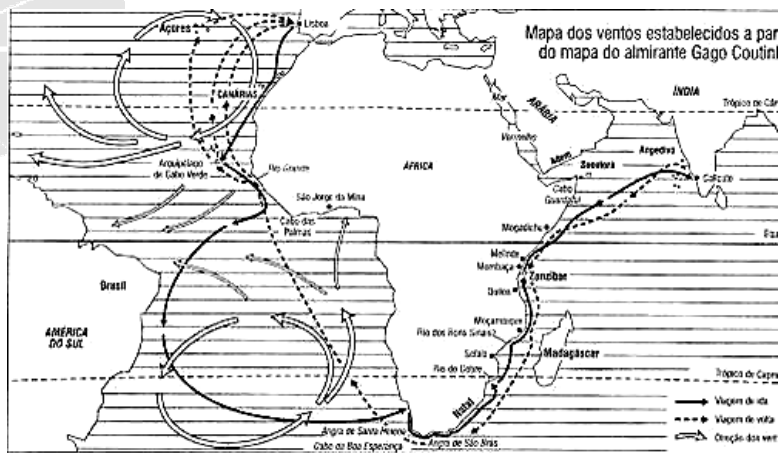
Conhecimento, além de Capital e trabalho

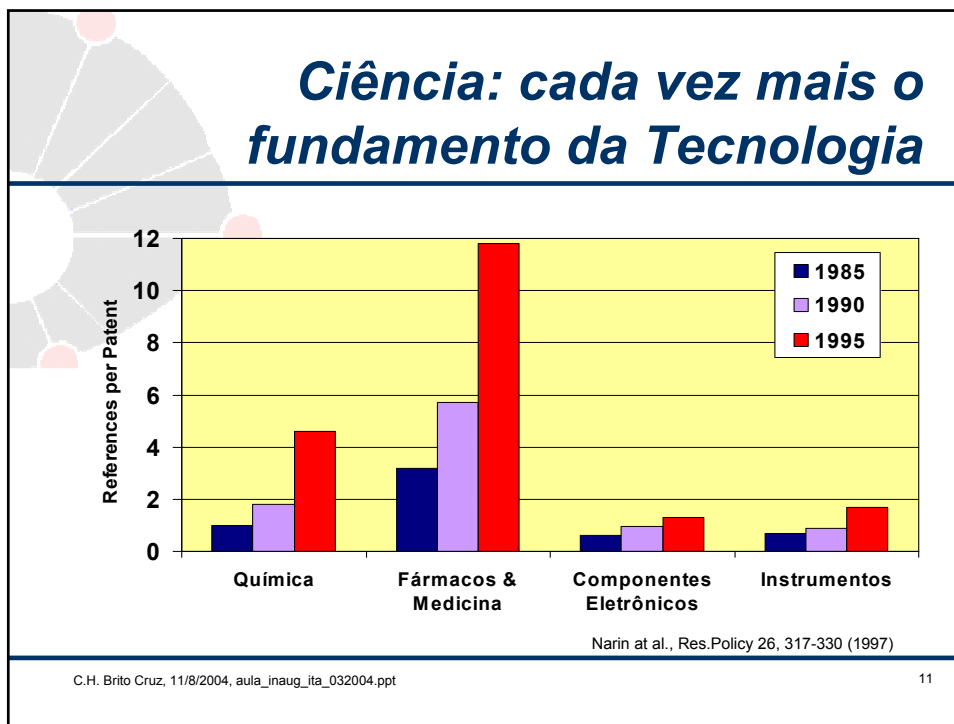
Figure 1.1 Knowledge as a Factor in Income Differences between Countries: Ghana and the Republic of Korea, 1956–90



Source: World Bank (1999c): 22.

Navegações: Conhecimento e Segredo do Negócio





Pesquisa na Universidade e na Empresa

■ **Universidade**

- Educação
- Avanço das fronteiras do conhecimento humano

■ **Empresa**

- Pesquisa aplicada a seus objetivos
- Inovação tecnológica

■ **EUA, 2001**

- Pesquisa em universidades: US\$ 27 bilhões
- Pesquisa em empresas: US\$ 187 bilhões

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 12

Brasil P&D na Empresa

- Economia que já se beneficia do conhecimento
 - Capacidade manufatureira
 - ↓
 - Capacidade Inovativa
 - Salto já em curso
 - Pauta de exportações
 - Aviões: US\$ 2 bi
 - Soja (e deriv.): US\$ 3 bi
- Jato ERJ 145: Embraer
 - Embrapa
 - Petrobrás
 - Trópico Promon-CPqD
 - Fibras Ópticas no Brasil
 - Itautec
 - Siemens, Villares, Mectron, AsGa, Opto, SMAR, Alellyx,

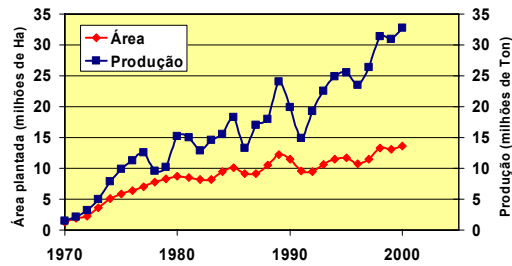
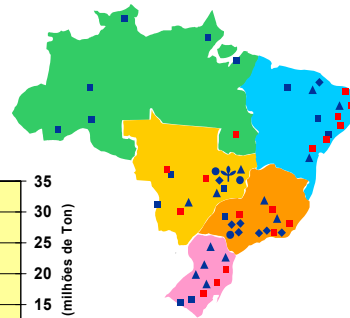
EMB145: jato de 50 lugares



1º item na pauta de exportações brasileira
US\$ 2 bilhões em 2000

Embrapa: pesquisa agropecuária

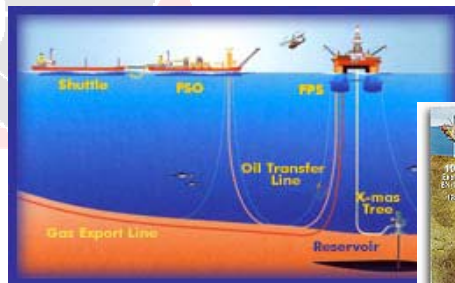
Soja e derivados
 US\$ 3 bilhões em 2000
 2º produtor mundial
 Maior produtividade do mundo



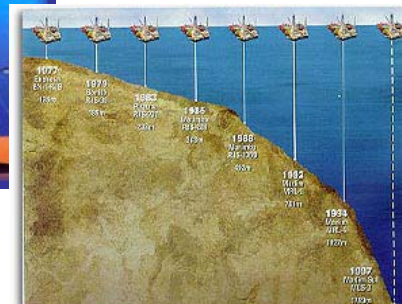
C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

15

Petrobrás: extração em águas profundas

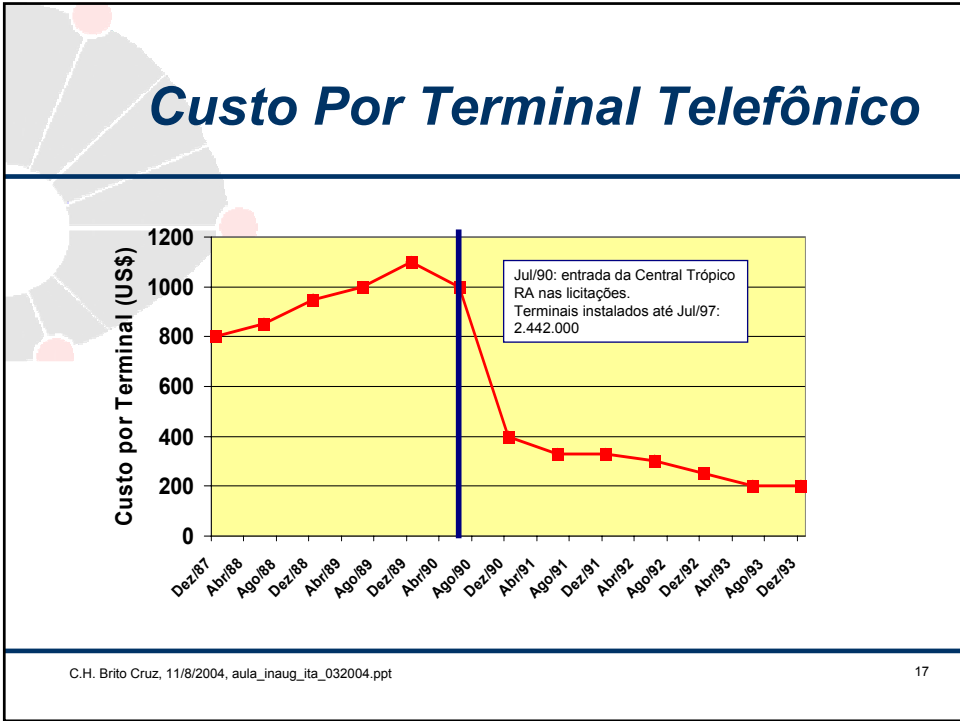


Marlim Sul 3B – 1.709 m



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Unicamp e Empresas Comunicações ópticas no Brasil

1971: pesquisa em Comunicações Ópticas começa na Unicamp: prof. J.E. Ripper

1973: contrato Unicamp-Telebrás: Estudo de Sistemas de Comunicações Ópticas

1976: Centro de P&D Telebrás

1982: ABC Xtal (agora XTal FCore)

1986: AsGa Microeletrônica




2000: Centro de Pq em Óptica e Fotônica; + 10 companies



Today: the spin-off companies born from the Physics Institute at Unicamp have revenues in excess to US\$ PPP 300 million

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 18

Brasil Pesquisa Acadêmica

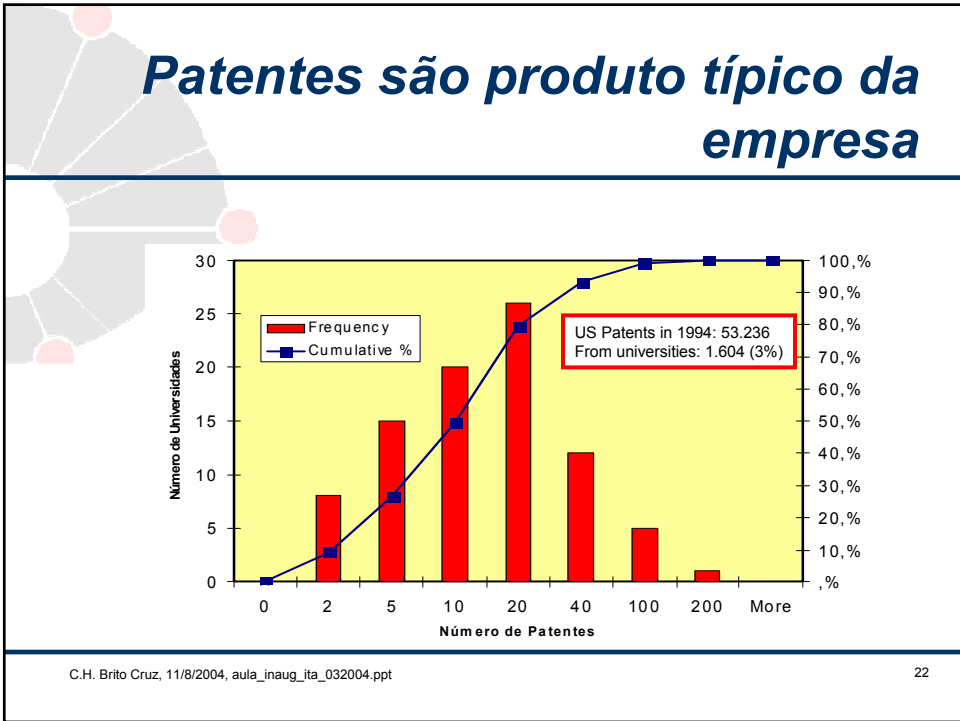
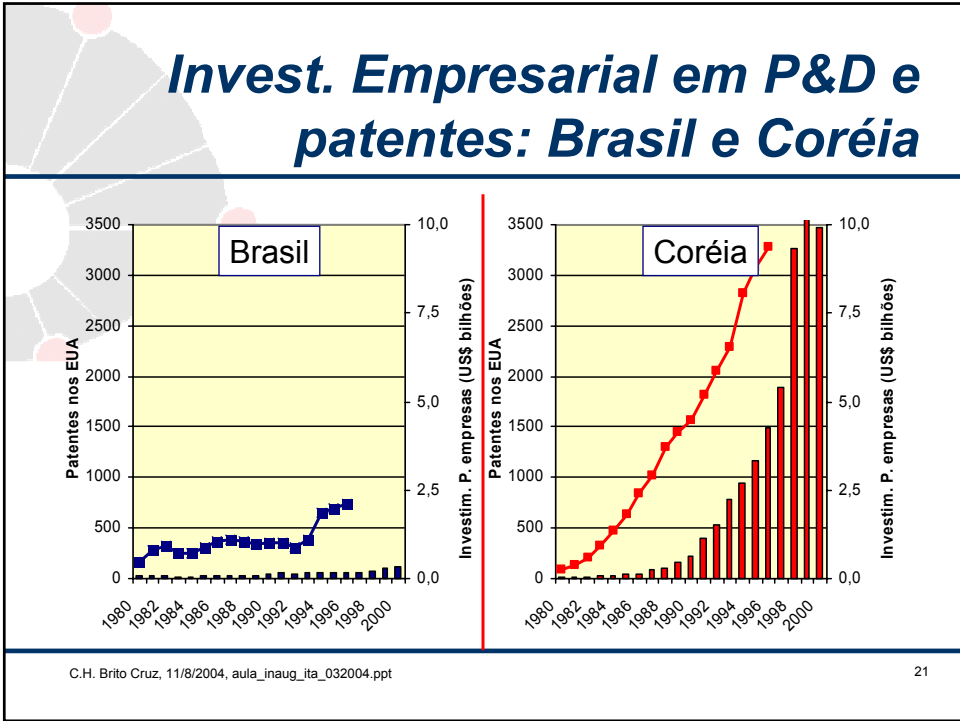




C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 19

Doutorados em São Paulo

Brasil	EUA	Doutorados
USP		2.013
	U. CA Berkeley	799
Unicamp		702
	U. WI-Madison	649
	U. CA Los Angeles	642
	U. TX at Austin, The	637
	OH State U.-Main Carr	616
	U. MI-Ann Arbor	607
	U. IL at Urbana-Cham	603
	U. MN-Twin Cities	565
	Harvard U.	552
Unesp		540
	PA State U.-Main Carr	539
	Stanford U.	526
	MA Institute of Techno	501

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 20



Transistor

Patented Sept. 25, 1951 2,569,347

UNITED STATES PATENT OFFICE

2,569,347
CIRCUIT ELEMENT UTILIZING SEMICONDUCTIVE MATERIAL

William Shockley, Madison, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application June 26, 1948, Serial No. 35,423

34 Claims. (Cl. 332-52)

1

This invention relates to means for and methods of translating or controlling electrical signals and more particularly to circuit elements utilizing semiconductors and to systems including such elements.

2

ductive material comprising two zones of material of opposite conductivity type separated by a barrier, means for making external electrical connections respectively to each zone and means for making a third connection to the body at the barrier.

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 23

United States Patent [19] [11] 4,332,102

Caffrey [43] Jun. 1, 1982

[54] SUPERIOR PERFORMANCE YO-YO

[76] Inventor: Michael S. Caffrey, 1801 S. Kevin Dr., Tucson, Ariz. 85710

[21] Appl. No.: 201,180

[22] Filed: Oct. 27, 1980

[31] Int. Cl.: A62H 27/12

[52] U.S. Cl.: 46/61

[58] Field of Search: 46/61, 60, 47, 228

[56] References Cited

U.S. PATENT DOCUMENTS

3,173,326	3/1965	Issance	46/61
3,296,022	6/1968	Radovan	46/61
3,263,361	8/1966	Rowden	46/61
3,644,664	2/1969	Seyden	46/61
3,643,373	2/1972	Rumel	46/61
3,998,974	2/1976	Blum	46/61
3,853,936	5/1978	Emm	46/61
4,081,824	4/1978	Fabricant	46/61
4,130,962	12/1978	Emm	46/61

Primary Examiner—Robert Prahock
Assistant Examiner—Mickey Yu
Attorney, Agent, or Firm—J. Michael McClamahan

[57] **ABSTRACT**

A superior yo-yo toy exhibiting characteristics of a lengthened spinning time for performing tricks while retaining characteristic of returning to the hand of the operator when desired, and automatic return to the operator when the yo-yo rotational rate has slowed to a predetermined rate. The yo-yo string is attached to a free-spinning bearing surrounding the axle, the bearing operably connected to a centrifugal actuated spring loaded clutch mechanism so that when the yo-yo rotational rate slows to a pre-determined rate, the clutch mechanism engages the bearing, coupling the free-spinning bearing to the yo-yo and causing the yo-yo to return to the operator.

12 Claims, 7 Drawing Figures

C.H. Brito Cruz 24

(12) **United States Patent**
Trevino

(54) **TRAP FOR A MOUSE**

(76) Inventor: **Jose Trevino**, 7556 Alameda Ave., El Paso, TX (US) 79915

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/197,061

(22) Filed: **Jul. 17, 2002**

(51) Int. Cl. **A01M 23/00**

(53) U.S. Cl. **43/81; 43/81.5**

(58) Field of Search **43/81, 81.5, 88, 43/92, 82, 83.5, 97, 58**

(56) **References Cited**
U.S. PATENT DOCUMENTS

1,167,493 A * 1/1916 Grubbs 43/81
1,223,271 A * 4/1917 Grubbs 43/81
1,922,941 A * 4/1932 King 43/81
1,799,323 A * 4/1931 Ross et al. 43/81
2,198,207 A * 1/1940 Graybill 43/81
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2,231,984 A * 2/1941 Anderson 43/81
2,581,628 A * 1/1952 Darwell 43/81
2,616,211 A * 11/1952 Johnson 43/81
3,968,589 A * 7/1975 Busham 43/81
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4,245,423 A 1/1981 Souza et al.
4,574,519 A 3/1986 Eckerbecht

(10) Patent No.: **US 6,655,077 B1**

(45) Date of Patent: **Dec. 2, 2003**

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4,714,049 A 12/1987 Kaus 43/81
5,001,857 A * 3/1991 McDaniel et al. 43/81
5,486,626 A 9/1992 Schmidt 43/81
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6,157,415 A * 10/2000 Rant 43/81
6,199,314 B1 3/2001 Bellard 43/81
6,282,832 B1 9/2001 Manno

FOREIGN PATENT DOCUMENTS

GB 2209113 A * 5/1989 A01M23/24
* cited by examiner

Primary Examiner—Peter M. Poon
Assistant Examiner—Joan M. Olszewski
(74) Attorney, Agent, or Firm—Richard L. Miller

ABSTRACT
(57)
An improved trap for a mouse of the type having a baseboard, a U-shaped jaw member that is pivotally mounted on the baseboard for pivotal movement from a cocked position to a sprung position, a bait pedal that is attached to the baseboard, and a trigger mechanism that has a longitudinal axis and which is operatively attached to the bait pedal and when the U-shaped jaw member is in the cocked position thereof the trigger mechanism is operatively connected to the U-shaped jaw member. The improvement includes the trigger mechanism allowing the U-shaped jaw member to achieve the sprung position thereof only when the trigger mechanism is rotated about the longitudinal axis thereof.

7 Claims, 1 Drawing Sheet

C.H. Brito Cruz, 11/8/20

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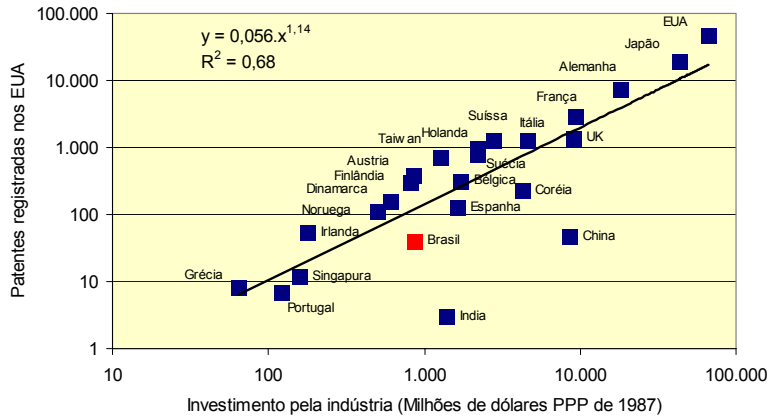
Principais patenteadores, 1997-2001 Brasil e Coréia - USPTO

First-Named Assignee	Total	First-Named Assignee	Total
PETROBRAS	55	SAMSUNG ELECTRONICS CO.	6.019
CARRIER CORPORATION	29	HYUNDAI ELECTRONICS IND.	1.430
EMBRACO	17	LG ELECTRONICS INC.	1.009
COMPANHIA VALE DO RIO DOCE	10	DAEWOO ELECTRONICS CO	980
METAGAL IND. E COM. LTDA.	10	LG SEMICON CO., LTD.	957
PRAXAIR TECHNOLOGY, INC.	8	ELECTRON. AND TEL.. RES. INST.	504
SMAR RESEARCH CORPORATION	6	HYUNDAI MOTOR CO., LTD.	416
TELEBRAS	5	SAMSUNG DISPLAY DEVICES CO	330

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

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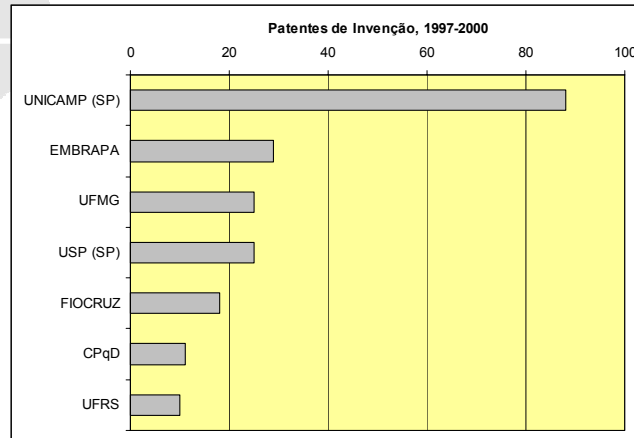
Investimento industrial em P&D e patentes



C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

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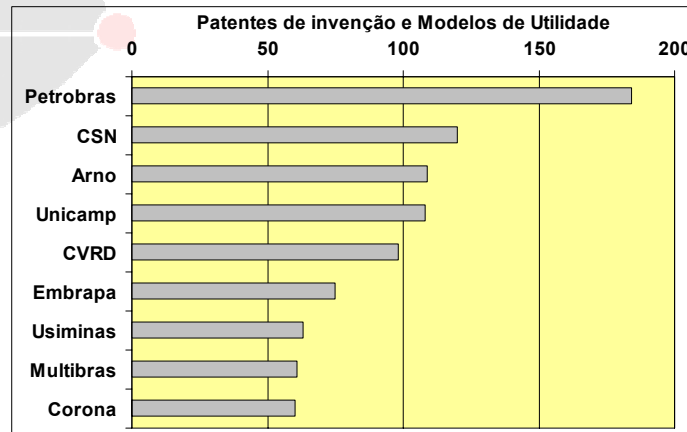
Patentes de invenção INPI, 1997 a 2000



C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

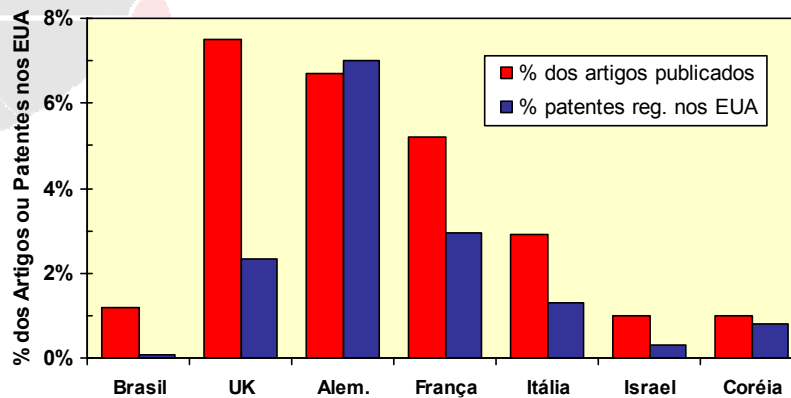
28

INPI, Brasil: Principais patenteadores, 1990-2000

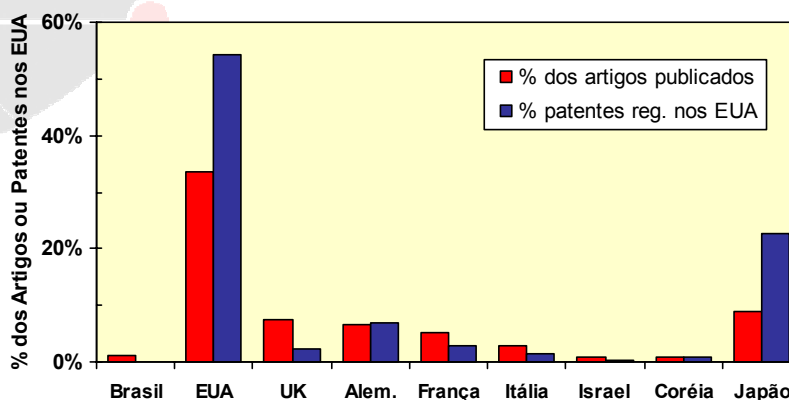


Fonte: Eduardo M e Albuquerque "Patentes e Atividades Inovativas: uma avaliação do caso brasileiro", 2003 (no prelo)

Artigos (SCI) e Patentes registradas nos EUA



Artigos (SCI) e Patentes registradas nos EUA



C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

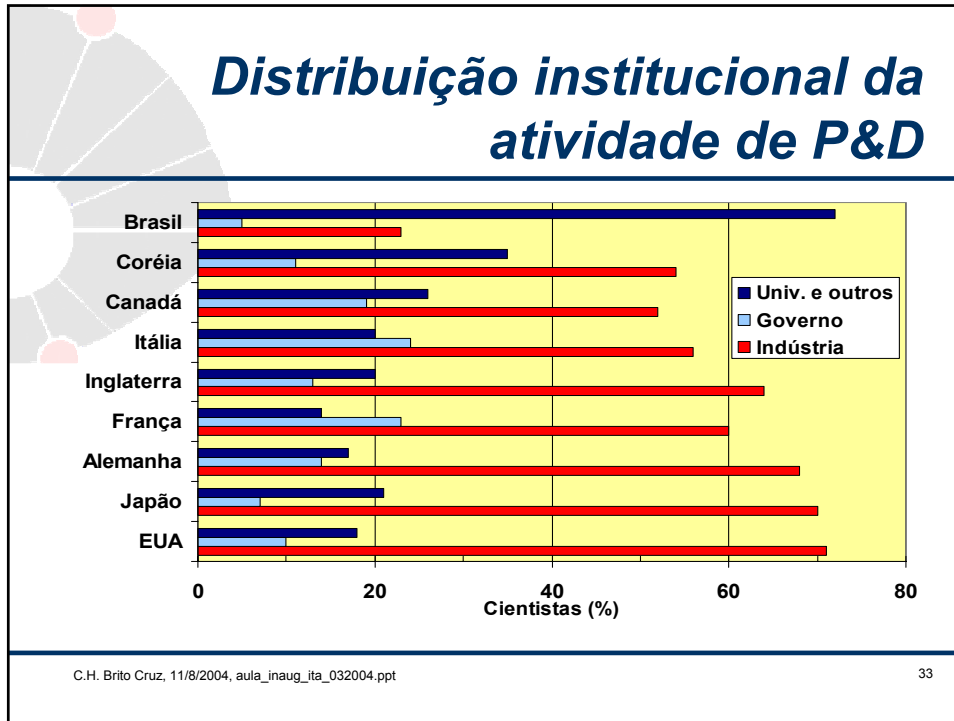
31

Distorção no Sistema Brasileiro de C&T

- Poucos C&E nas empresas
 - 23% dos cientistas brasileiros trabalham em empresas
 - Brasil: < 29.000, < 23% do total no país
 - Coréia: 94.000, 54% do total no país
 - EUA: 790.000, 80% do total no país
- Limitada conversão de conhecimento em desenvolvimento
 - empresas é que geram riqueza
 - o contribuinte não entende porque deve pagar por Ciência
 - a Ciência avança mais, a Competitividade menos


C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt

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Cientistas e Engenheiros tem valor

(Science, 281, 7 August 1998)

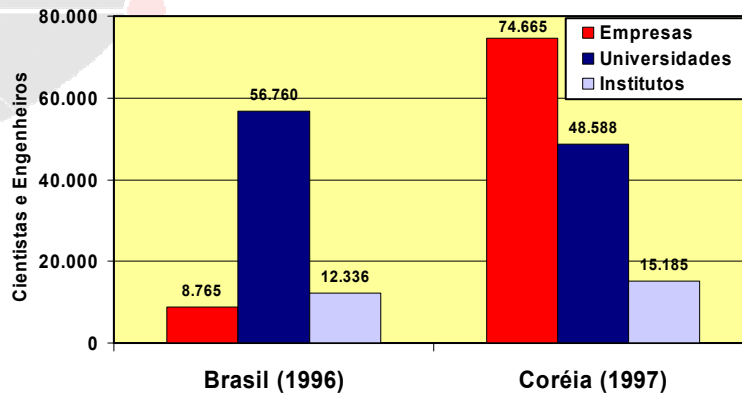


... BUT VISA FIGHT ON HOLD

Congress left town, however, before resolving a controversy over how many software-savvy foreigners should be allowed to work in the United States. U.S. high-tech companies, citing a booming economy and tight job market, are lobbying lawmakers to increase the number of visas granted to skilled overseas workers—such as computer programmers, engineers, and scientists—from 65,000 this year to 115,000 in 2001. The visas, which can be extended for up to 6 years, can be an important step for workers looking to settle permanently in the United States.

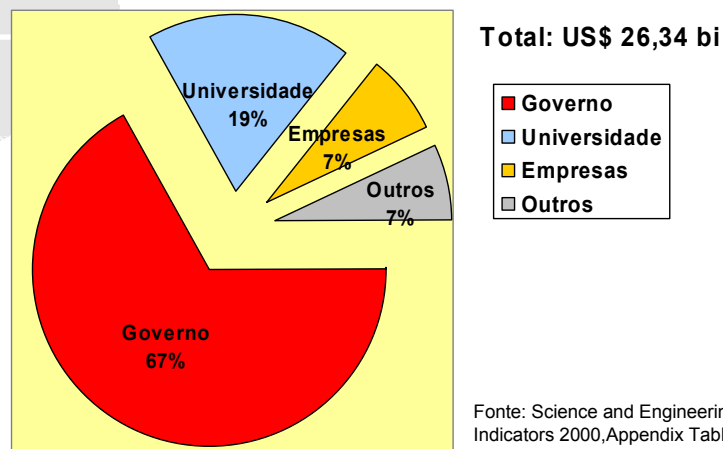
C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 34

Brasil e Coréia: Cientistas e Engenheiros



<http://www.most.go.kr/research-e/3-3.htm>

EUA: P&D na Universidade, 1997



O mito do investimento privado na universidade

	Total	Gov	Indus	Instit	Outro	%Indus
Total USA	27.489	18.075	2.048	5.366	2.000	7,5%
1. Univ of Michigan	509	339	34	103	32	6,7%
2. Univ of Washington	483	380	51	43	9	10,6%
3. UC Los Angeles	478	262	34	108	73	7,1%
4. Univ of Wisconsin	463	289	14	102	57	3,0%
5. UC-San Diego	462	314	31	72	45	6,7%
6. UC Berkeley	452	239	22	149	42	4,9%
7. Johns Hopkins	439	353	15	26	44	3,4%
8. J Hopkins App. P Lab	436	419	0	17	0	0,0%
9. Stanford University	427	357	32	19	19	7,5%
10. MIT	420	309	75	13	23	17,9%
13. Cornell	396	273	12	75	36	3,0%
19. Harvard University	326	268	12	0	46	3,7%
20. Columbia University	280	241	3	11	25	1,1%
42. CalTech	212	195	6	8	2	2,8%
79. Univ of New Mexico	116	87	3	22	4	2,6%

(fonte: NSF/SRS: Survey of Sci and Eng Expenditures at Universities, FY 1999)

Stanford, Silicon Valley, and the Students

Robert Byer, Stanford University / California Council on Science and Technology

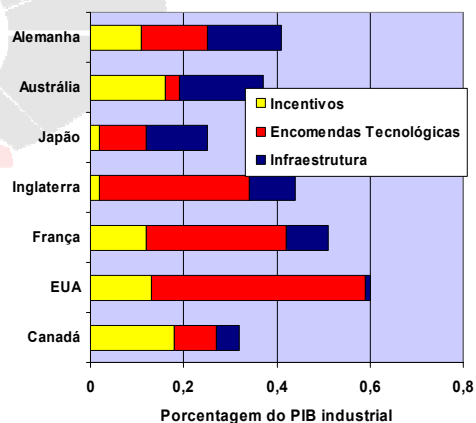
Q - What is Stanford Role on the Silicon Valley boom?

A - The myth is that Stanford's technology is what made Silicon Valley successful. However, a survey of 3000 small-company CEO's found only one in 20 companies used Stanford technology directly or indirectly in their start-up business. What Stanford contributed to Silicon Valley were educated, high talented students. It is in our interest as a private research university that the students educated at Stanford are successful in their chosen careers. (Photonics Spectra, p. 24-25, April 1999)

Limites da interação universidade-indústria

- Nos EUA: indústria financia menos de 7% da pesquisa na universidade
- Diferentes culturas e missões
 - sigilo
 - tempo disponível
 - pesquisar ensinando x pesquisar rápido
 - natureza da pesquisa
 - desenvolvimento, pq. aplicada e pq. básica

Apoio do governo à P&D industrial, OECD



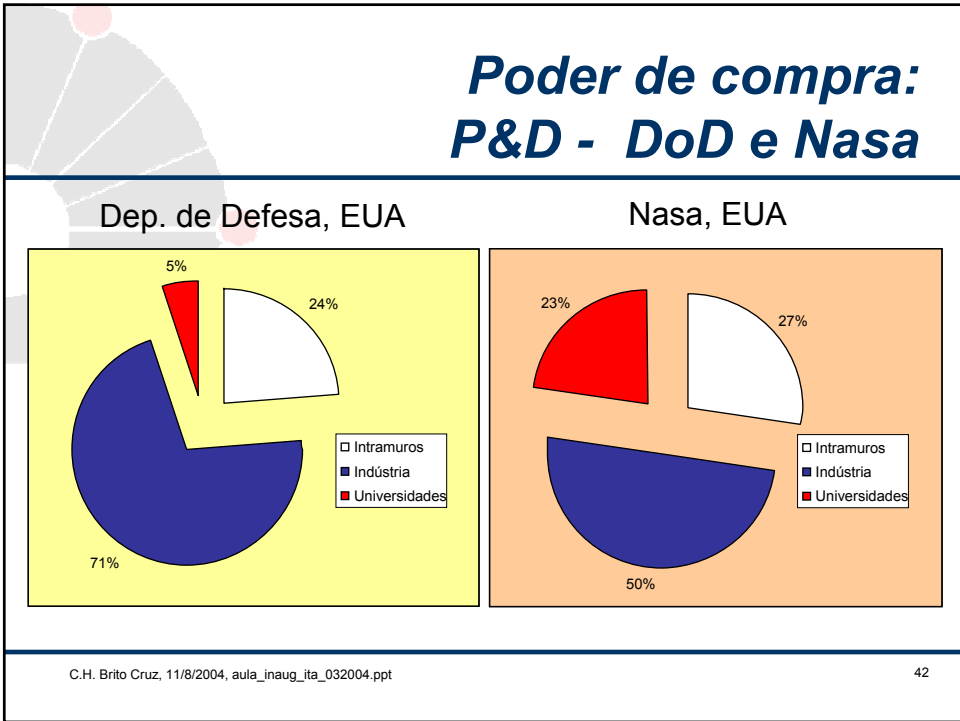
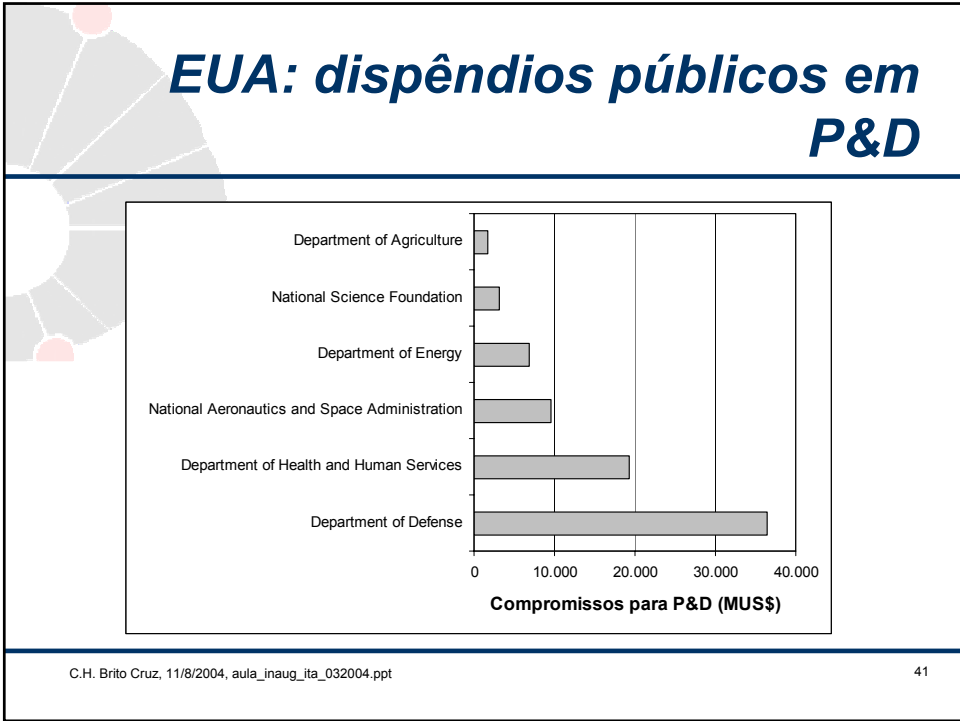
Média OCDE:

- 0,25 a 0,6% PIB industrial
- US\$ 1 gov x US\$ 9 empresa

Brasil

- PIB Industrial:
 - R\$ 400 bi
 - 0,25%: R\$ 1,0 bi
 - 0,6%: R\$ 2,4 bi
- Invest Empresarial P&D: R\$ 10 – 24 bi/ano

Fonte: S&T Industry Outlook, OECD 2000



Poder de Compra: Circuitos Integrados, EUA

Government Purchases of Integrated Circuits, 1962 - 1968

Year	Total Integrated Circuit Shipments (millions of dollars)	Shipments to Federal Government (millions of dollars)	Government Share of Total Shipments (percent)
1962	4 ^b	4 ^b	100 ^b
1963	16	15 ^b	94 ^b
1964	41	35 ^b	85 ^b
1965	79	57	72
1966	148	78	53
1967	228	98	43
1968	312	115	37

Source: Richard C. Levin, "The Semiconductor Industry," in Richard R. Nelson, ed., *Government*

^aIncludes circuits produced for Department of Defense, Atomic Energy Commission, Central Intelligence Agency, Federal Aviation Agency, and National Aeronautics and Space

^bEstimated by Tilton (1971).

Unicamp Spin-offs e associados

> 90 empresas

- IT: 40
- Biotech: 10
- Lasers & optics: 13
- Eng, Food, Cons.: 27

Ciência, Tecnologia e PIB

Francis Bacon
(séc. XVII)

Adam Smith
(séc. XVIII)

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt
45

Conhecimento e soberania

"A ciência está destinada a desempenhar um papel cada vez mais preponderante na produção industrial. E as nações que deixarem de entender essa lição hão inevitavelmente de ser relegadas à posição de nações escravas: cortadoras de lenha e carregadoras de água para os povos mais esclarecidos"

(Lord Rutherford, citado no documento "Ciência e Pesquisa – Contribuição de Homens do Laboratório e da Cátedra à Magna Assembléia Constituinte de São Paulo", que propôs a criação da Fapesp em 1947)

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt
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Pesquisa Básica ou Pesquisa Aplicada?

- Pesquisa Pura x Pesquisa Impura??!
- Pesquisa Básica não pode ter Aplicação??
- Pesquisa Aplicada não pode ser Básica??

Pesquisa Básica
Pesquisa Aplicada

C.H. Brito Cruz, 11/8/2004, aula_inaug_ita_032004.ppt 47

O Quadrante de Pasteur (D. Stokes, 1997)

Bohr (27%)	Pasteur (50%)
(Empty)	Edison (22%)

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