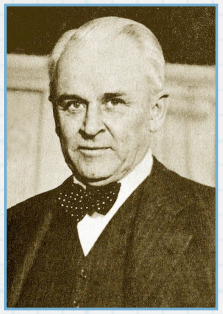
modern day alchemy

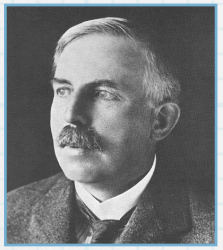
"Cold Fusion is a pariah field, cast out by the scientific establishment. Between Cold Fusion and respectable science there is virtually no communication at all ... because the Cold-Fusioners see themselves as a community under siege, there is little internal criticism ... In these circumstances, crackpots flourish, making matters worse for those who believe that there is serious science going on here."

Dr. David Goodstein (1994)

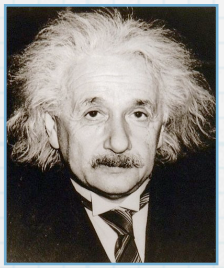
http://www.its.caltech.edu/~dg/fusion_art.html



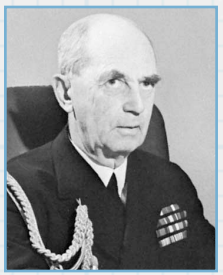
There is no likelihood man can ever tap the power of the atom. The glib supposition of utilizing atomic energy when our coal has run out is a completely unscientific Utopian dream, a childish bug-a-boo. Nature has introduced a few fool-proof devices into the great majority of elements that constitute the bulk of the world, and they have no energy to give up in the process of disintegration.
- Robert A. Millikan (1863-1953) [1928 speech to the Chemists' Club (New York)]



...any one who expects a source of power from the transformation of these atoms is talking moonshine...
- Ernest Rutherford (1871-1937) [1933]



There is not the slightest indication that [nuclear energy] will ever be obtainable. It would mean that the atom would have to be shattered at will.
- Albert Einstein, 1932.

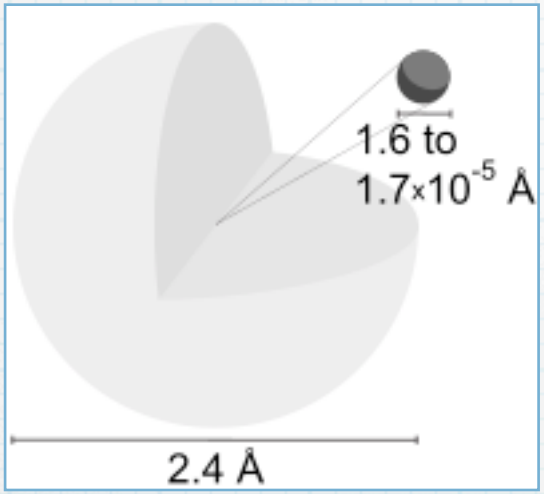


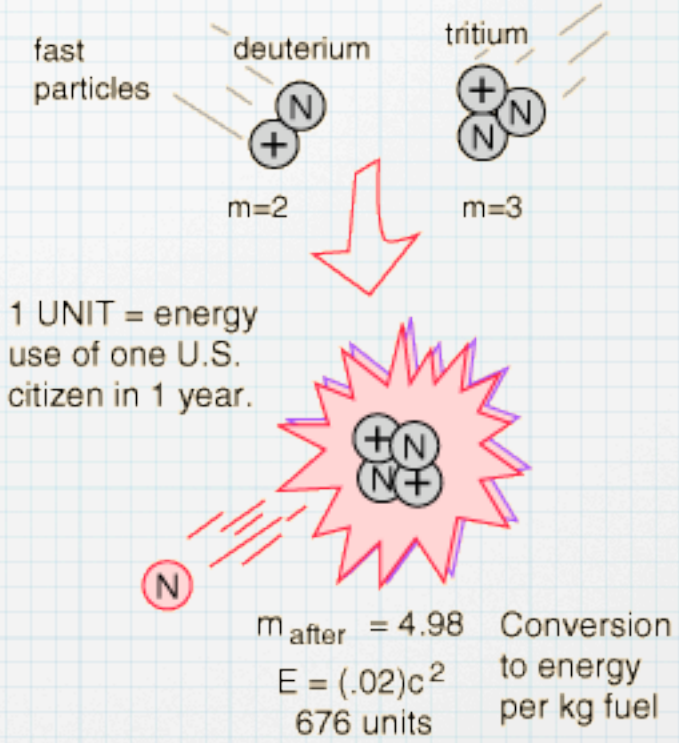
That is the biggest fool thing we have ever done. The bomb will never go off, and I speak as an expert in explosives.
- Admiral William Leahy. [Advice to President Truman, when asked his opinion of the atomic bomb project.]

There is little doubt that the most significant event affecting energy is the advent of nuclear power...a few decades hence, energy may be free—just like the unmetered air....
- John von Neumann, scientist and member of the Atomic Energy Commission, 1955.

http://www.lhup.edu/~dsimanek/neverwrk.htm

primer on fusion

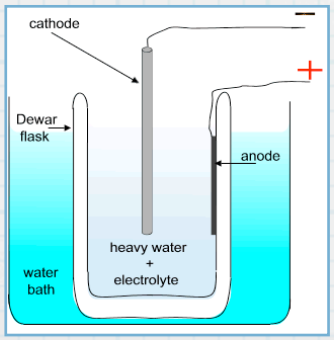


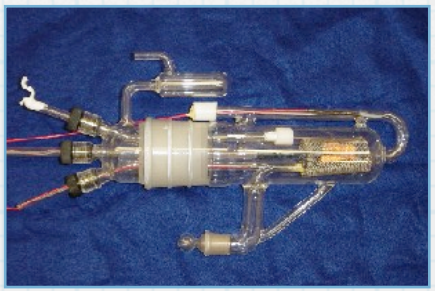


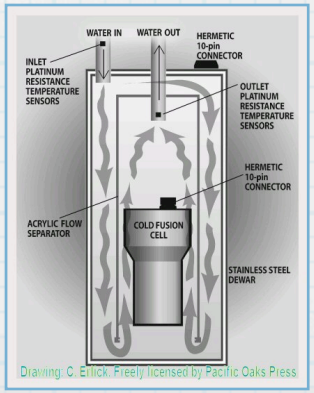
http://hyperphysics.phy-astr.gsu.edu/hbase/nucene/fusion.html

the recipe for cold fusion

- electrolysis of heavy water separates the deuterium atoms from the oxygen
- do this in a calorimeter and all energy exchanges should be accounted for by chemical, electrical and thermal processes.
- the cathode plate is made of palladium, a metal known to absorb H (or D), to bring D atoms close together.
- if the D nuclei tunnel through their Coulomb barrier and fuse, nuclear energy is released and excess heat would be released, along with fusion products; He, neutrons etc..

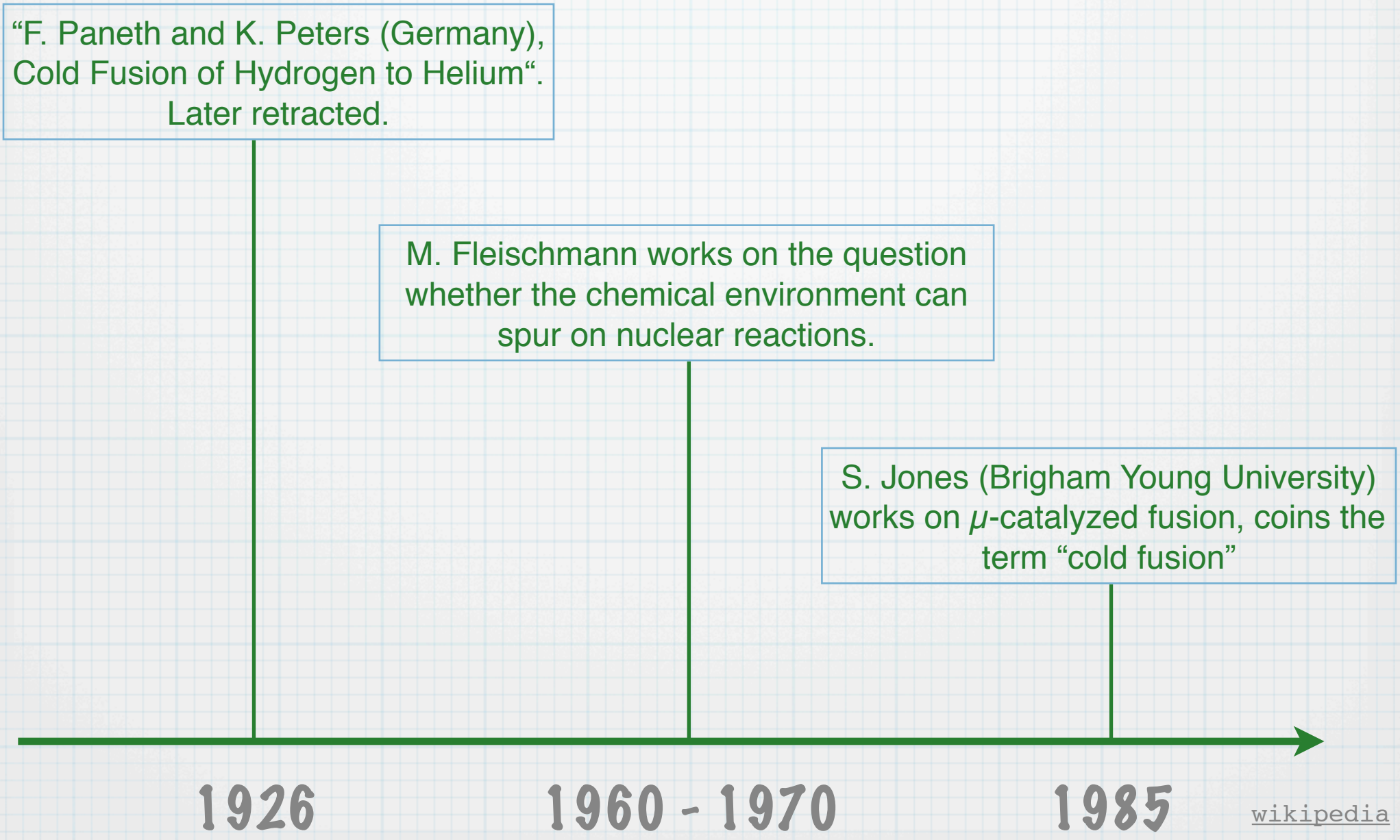






wikipedia

early history



wikipedia

before the big day

Fleischman and Pons (University of Utah) apply for a grant for cold fusion research, Jones is a reviewer. A collaboration between the teams begins.

F&P visit BYU labs. an agreement to publish simultaneously on March 24th is allegedly made.

November — 1988

March 6th — 1989

wikipedia

the big day

Fleischman and Pons (Utah) hold their famous press conference announcing successfully extracting energy via Cold Fusion. Details of the experimental setup are kept secret. A a full report is expected in May.

S. Jones et al. (Brigham Young University) reports observing a burst of neutrons from a similar setup. He submits his paper to *Nature* by fax.

March 23rd

1989

wikipedia

the day after the big day

CLAIMS OF "COLD FUSION" EMPHASIZE THE NEED FOR REFEREES. The remarkable report by the University of Utah that researchers had achieved deuterium fusion in an electrolysis cell was initially provided to the Financial Times of London and the Wall Street Journal ... Whatever the technical merits of the Utah claim, however, serious questions of scientific accountability will certainly be raised.

March 24th

1989

http://www.bobpark.org/

the case for cold fusion grows

Fleischmann and Pons: 8-page "preliminary note" in the *Journal of Electroanalytical Chemistry.*

Researchers at Texas A&M University report excess heat in their replication experiment.

Researchers at Georgia Institute of Technology announced neutron bursts in their replication.

April 10th

1989

wikipedia

at the meeting of the American Chemical Society

Pons receives a **standing ovation**.

H. Furth (Princeton): “What happens, if the heavy water is replaced with ordinary water?”

Pons said he hadn't tried that.

April 12th

1989

verifications retracted

Texas A&M University team retracts.

Georgia Institute of Technology retracts.

mid april

1989

http://www.bobpark.org/

Meanwhile, in Italy

Scarramuzzi (ENEA) reports detecting a couple of bursts of neutron emission from dry cells and becomes a national hero. He later gets tangled in controversy. *La Repubblica* goes so far as to call him and F&P frauds.

April 18th

1989

http://www.its.caltech.edu/~dg/fusion_art.html

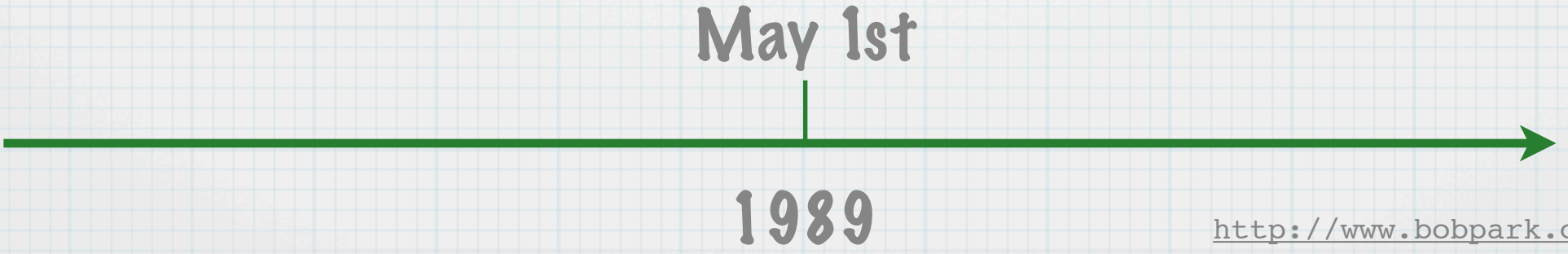
American Physical Society meeting in Baltimore

Pons and Fleischmann are absent but Jones attends.

Jones Points out how his results disagrees with Fleischmann and Pons' in magnitude.

Lewis, Barnes and Koonin of Caltech demonstrate not only that their results were negative, but also why other researchers who reported positive results were in error.

Specifically, Koonin blames "the incompetence and delusion of Pons and Fleischmann".



The corpse of cold fusion will probably continue to twitch for awhile, even after two nights of unrelenting assaults at the APS Baltimore Meeting.

May 5th

1989

http://www.bobpark.org/

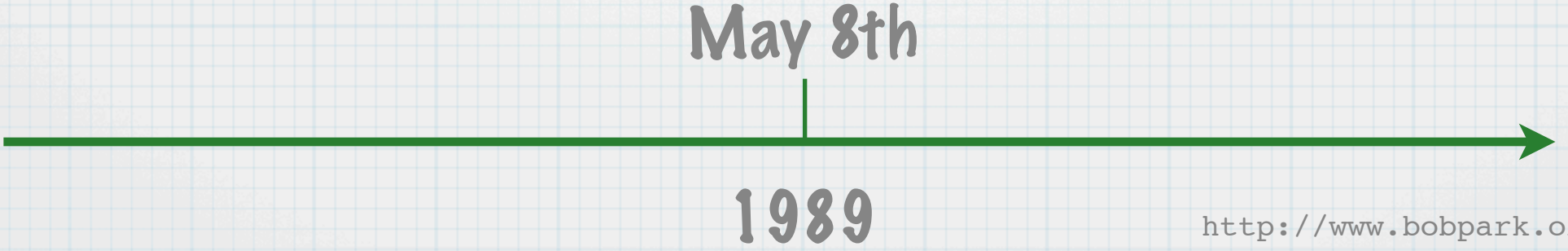
Electrochemical Society's session on cold fusion

Pons and Fleischmann are featured speakers followed by Jones. Pons admits error in the gamma peak and presents a corrected graph with the peak shifted.

The invite reads: “Afterward, research groups *who have verified* the initial reports of Professors Fleischmann and Pons, or Professor Jones, are invited to present ... summaries of their work.”

Several laboratories offer to study pieces of the Utah cathodes for fusion products, but F&P refuse, citing "other arrangements."

The Caltech teams acts as surrogate for all “negative results” researchers.



A joke making the rounds at the Cold Fusion Institute asks: Why is it that neutrons, tritium and heat are never seen in the same experiment?

Answer: No one could make that many mistakes.

Santa Fe Workshop on Cold Fusion

F&P cancel a scheduled presence.

At the workshop, University of Texax A&M team reports excess heat, but no helium was found on their palladium cathode plates.

the University of Texax A&M team also reports neutron detection as do two teams from Italy and a team from Los Alamos.

late May

1989

The Last Straw

Fleischmann and Pons receive results of He analysis of their palladium plates. The refuse to make the findings public.

September

1989

U.S. Department of Energy Panel on Cold Fusion

"Nuclear fusion at room temperature, of the type discussed in this report, would be **contrary to all understanding** gained of nuclear reactions in the last half century; it would require the invention of an **entirely new nuclear process**"

The Panel recommends **against any special funding** for the investigation of phenomena attributed to cold fusion.

A shortcoming of most experiments reporting **excess heat** is that they are not accompanied in the same cell by simultaneous monitoring for the **production of fusion products**.

The Panel is **sympathetic** toward modest **support** for carefully **focused** and cooperative experiments **within the present funding system**.

November

1989

wikipedia

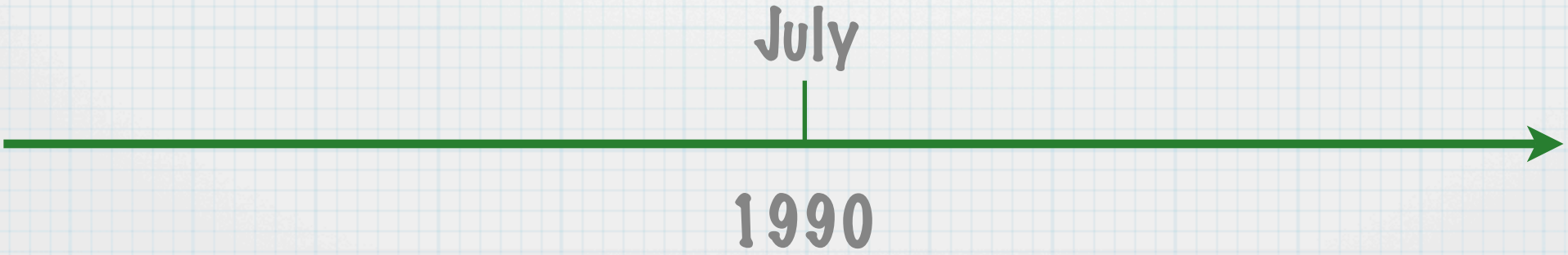
Fleischmann, M., et al., *Calorimetry of the palladium-deuterium-heavy water system*. J. Electroanal. Chem., 1990. **287**: p. 293.

Calorimetry of the palladium-deuterium-heavy water system

Martin Fleischmann [*], Stanley Pons, Mark W. Anderson [**], Lian Jun Li [***] and Marvin Hawkins [***]
Department of Chemistry, University of Utah, Salt Lake City, UT 84109 (U.S.A.)
(Received 21 December 1989; in revised form 28 March 1990)

ABSTRACT

It is shown that accurate values of the rates of enthalpy generation in the electrolysis of light and heavy water can be obtained from measurements in simple, single compartment Dewar type calorimeter cells. This precise evaluation of the rate of enthalpy generation relies on the non-linear regression fitting of the "black-box" model of the calorimeter to an extensive set of temperature time measurements. The method of data analysis gives a systematic underestimate of the enthalpy output and, in consequence, a slightly negative excess rate of enthalpy generation for an extensive set of blank experiments using both light and heavy water. By contrast, the electrolysis of heavy water at palladium electrodes shows a positive excess rate of enthalpy generation; this rate increases markedly with current density, reaching values of approximately



Fleischmann, M., et al., *Calorim*
287: p. 293.

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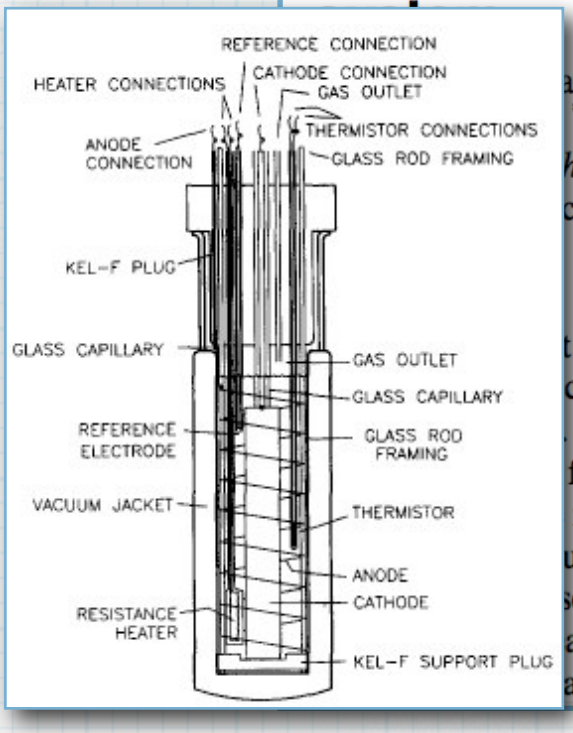

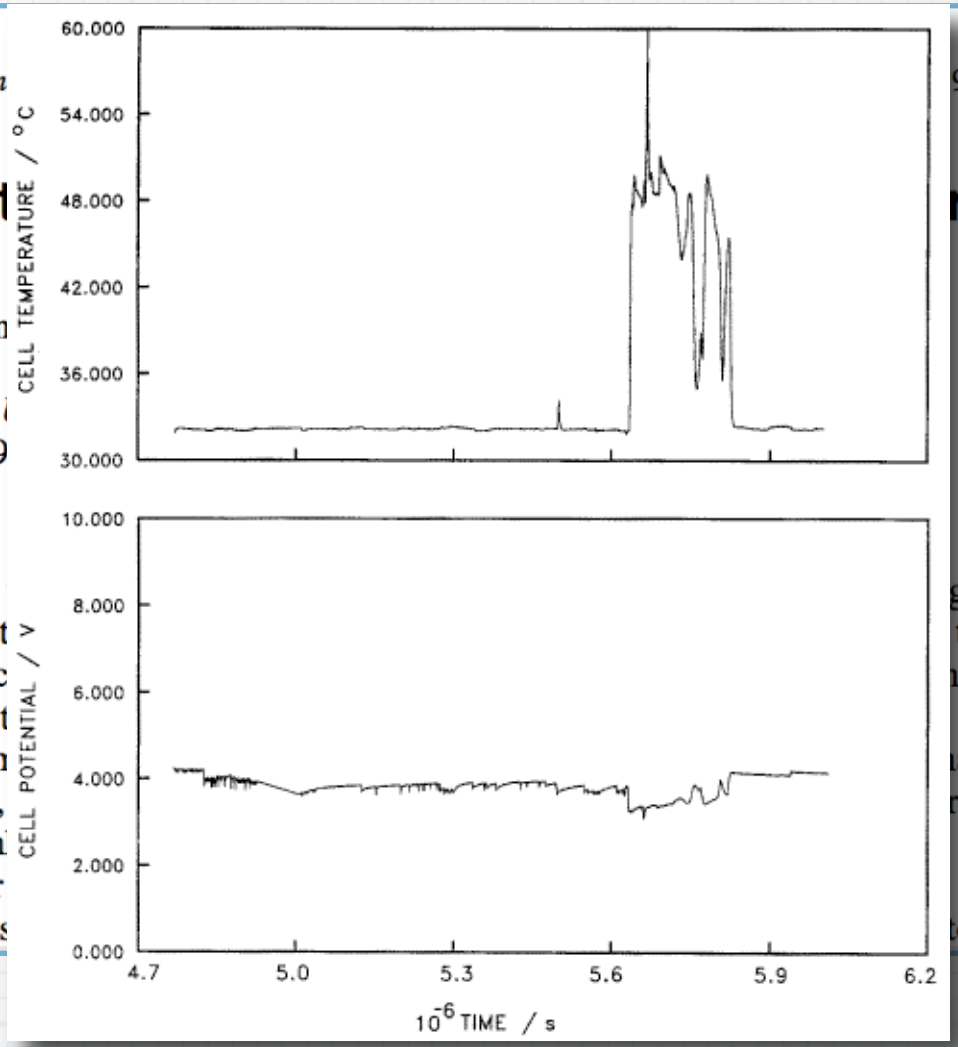

Fig. 8A. Cell temperature vs. time (upper) and cell potential vs. time (lower) plots for a 0.4 × 1.25 cm Pd rod electrode in 0.1 M LiOD solution. Current density 64 mA cm^{-2}, bath temperature 29.87°C.

July

1990

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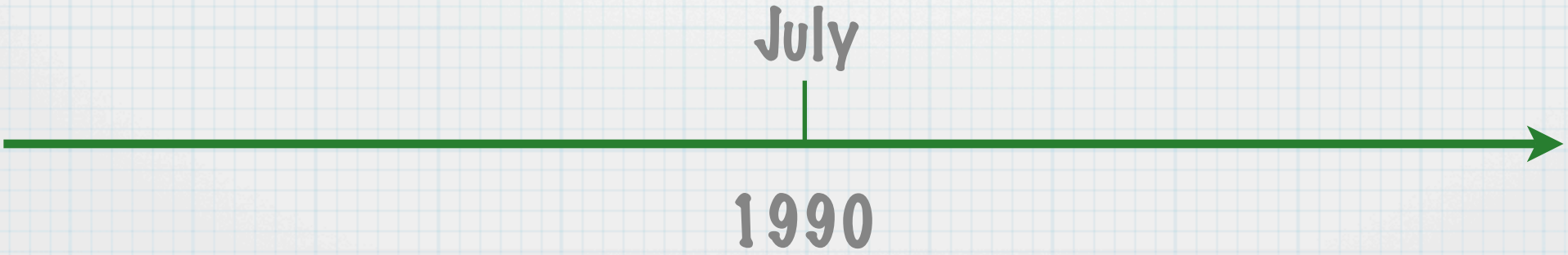

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Calorimetry of the palladium-deuterium-heavy water system

Martin Fleischmann [*], Stanley Pons, Mark W. Anderson [**], Lian Jun Li [***] and

The contents of this report have been restricted to the calorimetric results and other data will be discussed elsewhere [19]. Nevertheless we close this paper with some further comments and speculations. The preliminary note was to have been published under the title "Electrochemically Induced Fusion of Deuterium?" but the all important question mark was omitted. It is our view that there can be little doubt that one must invoke nuclear processes to account for the magnitudes of the enthalpy releases, although the nature of these processes is an open question at this stage. [*] It should be apparent to unbiased readers that, contrary to what has been stated

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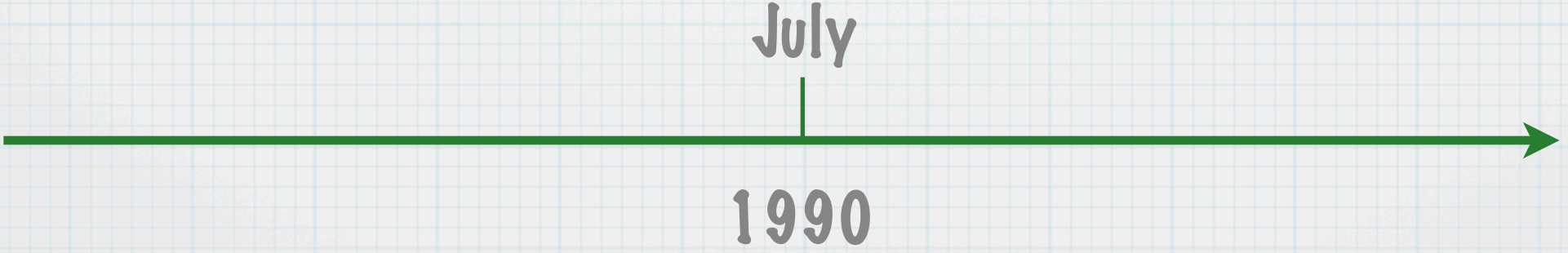
[*] It is hardly tenable that the substantial number of confirmations of the calorimetric data using a variety of techniques can be explained by a collection of different systematic errors nor that tritium generation can be accounted for by any but nuclear processes.



In *Fusion Technology*, Richard Oriani reports excess heat found with his calorimeter experiment. He becomes the first to support Fleischmann and Pons' excess heat claim.

Summer

1990

Oriani, R.A., et al., *Calorimetric measurements of excess power output during the cathodic charging of deuterium into palladium.* Fusion Technol., 1990. **18**: p. 652.

CALORIMETRIC MEASUREMENTS OF EXCESS POWER OUTPUT DURING THE CATHODIC CHARGING OF DEUTERIUM INTO PALLADIUM

R. A. ORIANI, JOHN C. NELSON, SUNG-KYU LEE, and J. H. BROADHURST
University of Minnesota, Minneapolis, Minnesota 55455

COLD FUSION Technical Note

KEYWORDS: anomalous power, calorimetry, cathodic charging
Received May 14, 1990
Accepted for Publication July 26, 1990

A Seebeck-effect calorimeter was used to establish that generation of energy, in excess of the electrical energy input, can occur during the electrolysis of D_2O. The magnitude of the excess power is measured with respect to the electrolysis of H_2O as the baseline. The excess power levels of >60 W/cm^3 palladium and excess energies of 74 kJ cannot be understood in terms of recombination of D_2 and O_2 within the calorimeter, other chemical reactions, or a storage-and-relaxation mechanism.

The claim by Fleischmann and Pons[1] of heat generation over and above the power put into the electrolysis of heavy water, D_2O, and its attribution to nuclear fusion have met with much justified skepticism. Although a few investigators, e.g., Huggins[2] and Appleby et al.,[3] have also reported observing the unexpected heat production, many

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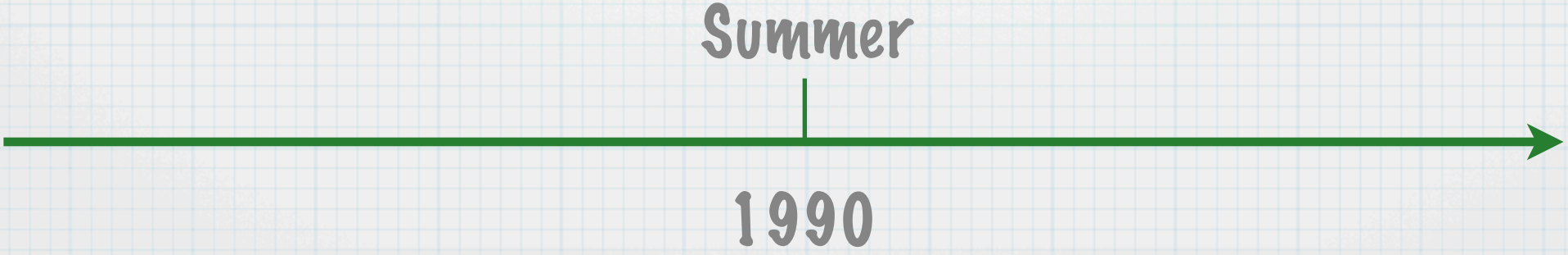

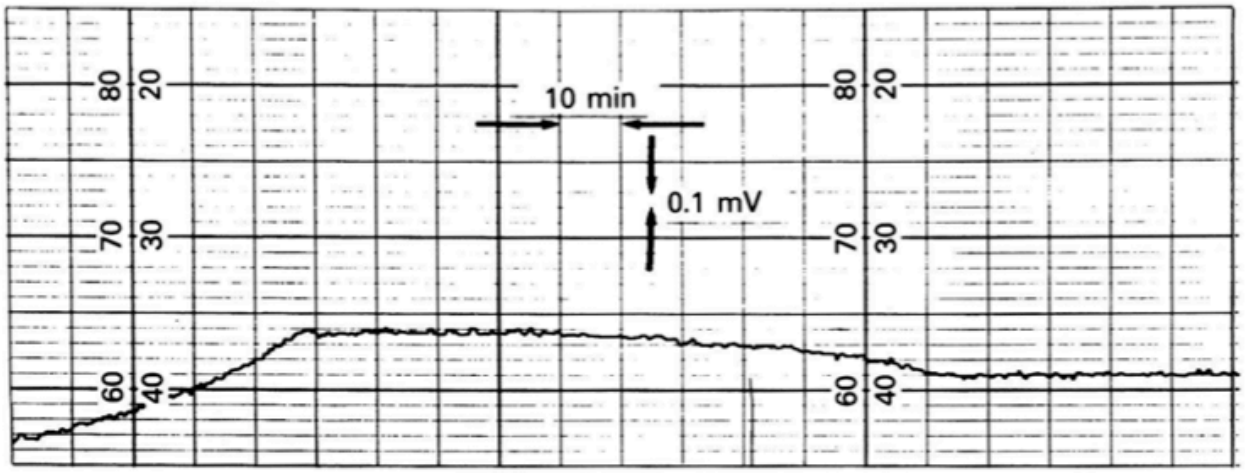

Fig. 6. Section of strip-chart record showing rise of calorimeter signal after a long quasi-steady state, all at constant input power. Time advances from right to left.

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Summer

1990

a second review

DoE asked by active cold fusion researchers to review their latest experimental evidence.

fall 2003

wikipedia

2nd review

Warming Up to Cold Fusion

Peter Hagelstein is trying to revive hope for a future of clean, inexhaustible, inexpensive energy. Fifteen years after the scientific embarrassment of the century, is this the beginning of something

By Sharon Weinberger
Sunday, November 21, 2004; Page W22

"The Department of Energy went to great lengths to cloak the meeting from public view. No announcement, no reporters. None of the names of the people attending that day was disclosed. The DOE made sure to inform the panel's members that they were to provide their conclusions individually rather than as a group, which under a loophole in federal law allowed the agency to close the meeting to the public."

2004

washingtonpost.com

choice quotes

2004

wikipedia

choice quotes

"The evidence **does not demonstrate** that a new phenomenon is occurring."

"... there appears to be **rather convincing evidence** for the production of **excess heat** and for the production of 4He in metal deuterides. ... There is **no convincing** evidence for the occurrence of **nuclear reactions** in condensed matter associated with the reports of excess heat production."

"I find in summary that, even after all of the work that has been done, **the case is spotty** for the existence of the cold fusion phenomenon. I am **not convinced** by the evidence that I have seen ..."

"... the **evidence strongly suggests** a **nuclear origin** for the excess heat observed in palladium rods highly loaded with deuterium.."

"... one can never **disprove** something and this is my feeling about 'cold fusion'."

2004

wikipedia

FT.com
FINANCIAL TIMES

SCIENCE & HEALTH: Cold fusion 'cannot be dismissed'

By Clive Cookson and Victoria Griffith
Financial Times, Dec 03, 2004

December

2004

the final word

23/03/2007

On this day 18 years ago, the University of Utah announced the discovery of cold fusion without giving any technical details.

The peak came three weeks later when Stanley Pons received a standing ovation at the annual ACS Meeting in Dallas, but by June it was over.

The Utah research was exposed as a pitiful embarrassment. For years the faithful sulked at their own annual meetings held at swank resorts around the world. There they could congratulate each other on their progress. Each year another experiment would be hailed as proof, but never survived replication.

A few years ago, however, the bolder of the faithful began to reemerge from the dark, giving papers at professional society meetings. They now prefer to call their field Low-Energy Nuclear Reactions (LENR), and they held a session at the APS March Meeting in Denver.

Next week they will hold a session at the ACS Meeting in Chicago. Once again, there is a new experiment that is being hailed as proof-at-last. Who knows, maybe this will be the one.