VI Ciclo de conferencias “Increíble… pero falso”
Museo de la Ciencia de Valladolid
Martes, 12 de abril de 2016

El fraude en la ciencia. Un toque de autocrítica

Alfredo Marcos
Universidad de Valladolid
amarcos@fyl.uva.es
www.fyl.uva.es/~wfilosof/webMarcos

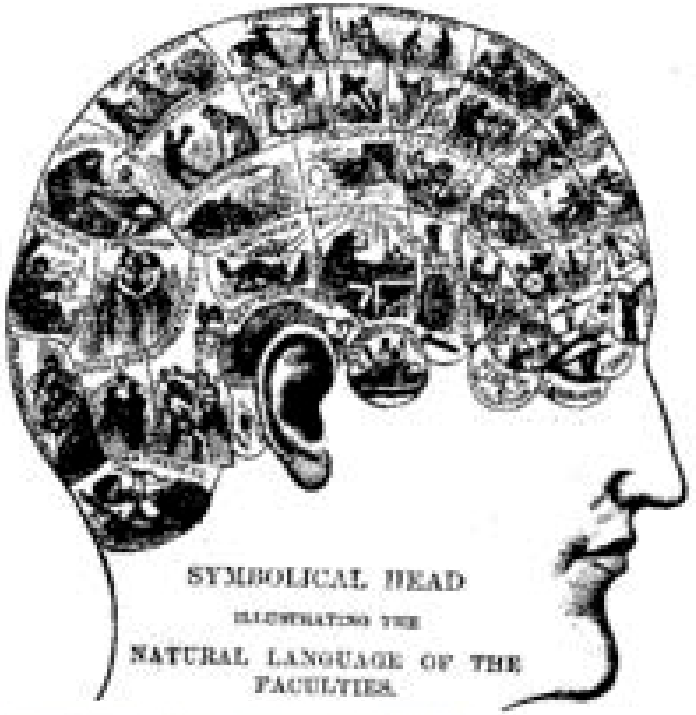
La frenología

- Joseph Gall (1796)

- 1820. Edinburgh Phrenological Society

- Predicción de los rasgos de personalidad por la forma del cráneo

- Ya a finales del siglo XIX fue considerada una PSEUDOCIENCIA





1843
American Phrenological Journal



Nueva York
American Institute of Phrenology

El hombre de Piltdown

- 1912

- El eslabón perdido, entre simio y humano

- Charles Dawson, arqueólogo aficionado

- Smith Woodward, paleontólogo del Museo Británico

- *Eoanthropus dawsoni*

- Museo de Historia Natural de Londres aceptó en 1953 que era un FRAUDE: la pieza se construyó con fragmentos de un cráneo humano, de una mandíbula de orangután y dientes de chimpancé.



El caso Lysenko

- Trofim Denísovich Lysenko (1898-1976)

- Desde los años 30 hasta los 60 impuso en la URSS una ciencia y una práctica agrícola errónea, contraria a la agricultura genética y selectiva

- Defendía una suerte de agricultura “lamarckista”, según la cual, enfriar la semilla del trigo antes de plantarla contribuía a que la planta resistiese mejor el frío

- *«[Lysenko] Es responsable del vergonzoso atraso de la biología y genética soviéticas, por la difusión de visiones pseudocientíficas, por el aventurismo, por la degradación del aprendizaje y por la difamación, despido, arresto y aún la muerte de muchos científicos genuinos»* (Andréi Sájarov, 1968)





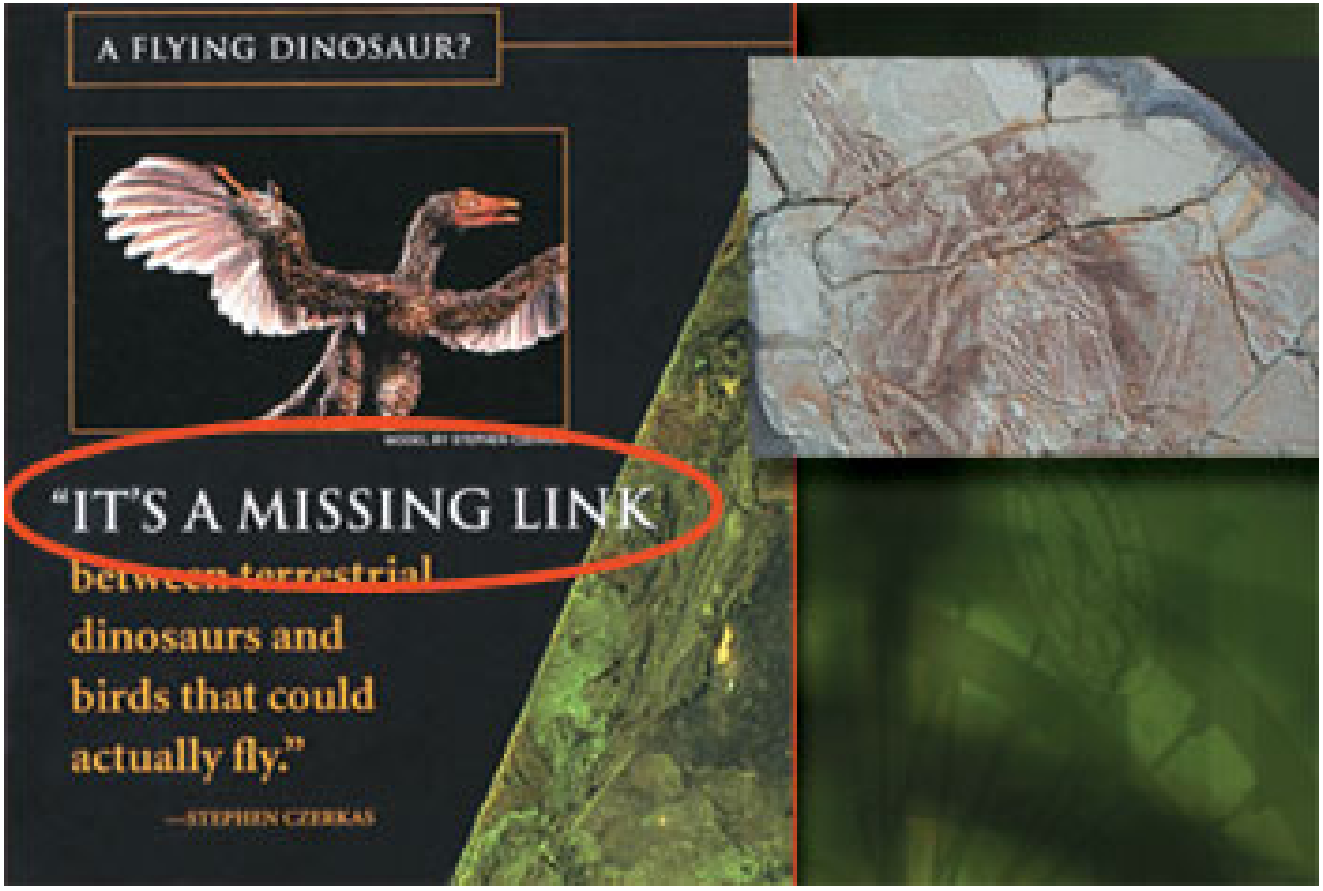
El Archaeoraptor

- El "eslabón perdido" entre las aves y los dinosaurios

- Fósil presuntamente encontrado en China

- Presentado en 1999 en un artículo de *National Geographic*

- El fósil era una FALSIFICACIÓN hecha con pedazos de varios fósiles verdaderos



Benveniste y la memoria del agua

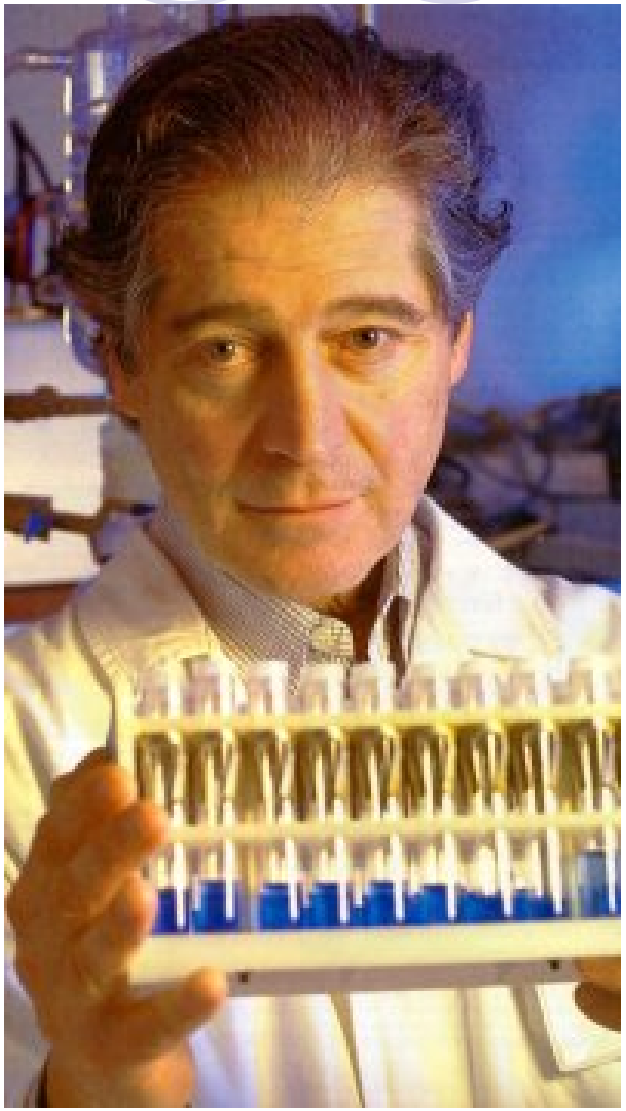
- *Nature* 1988

- Jacques Benveniste, inmunólogo del Instituto de Salud e Investigaciones Médicas (INSERM) francés.

- Afirma que el agua conserva memoria de los anticuerpos humanos disueltos en la misma hasta que no hay posibilidad de que permanezca alguno en la solución.

- John Maddox: "Hay muchos motivos por los que la gente prudente debería, por el momento, suspender el juicio"

- Necesidad de ensayos a doble ciego



La fusión fría

- Fusión fría: reacción nuclear de fusión producida a temperaturas y presiones cercanas a las condiciones ambiente ordinarias

- Martin Fleischmann y Stanley Pons, *Nature*, marzo de 1989 notifican fusión fría de deuterio a helio

- A finales del 1989, la mayoría de los científicos lo consideraba un Fraude

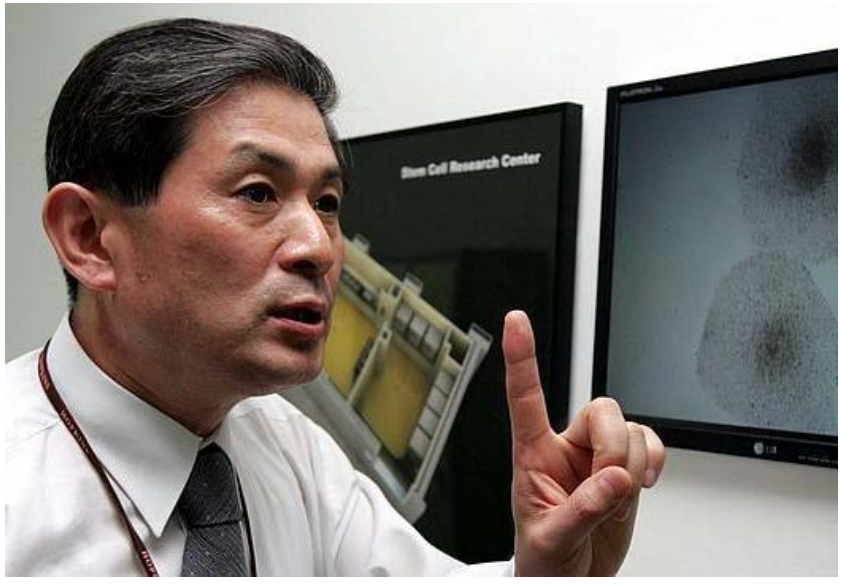


Times Magazine, 8 mayo 1989

El fraude de la clonación humana

- El científico coreano Woo Suk Hwang hizo creer al mundo en 2004 que había conseguido clonar embriones humanos por primera vez

- En diciembre de 2005 se comprobó que sus estudios en clonación, publicados en la revista *Science*, se basaron en datos falsificados





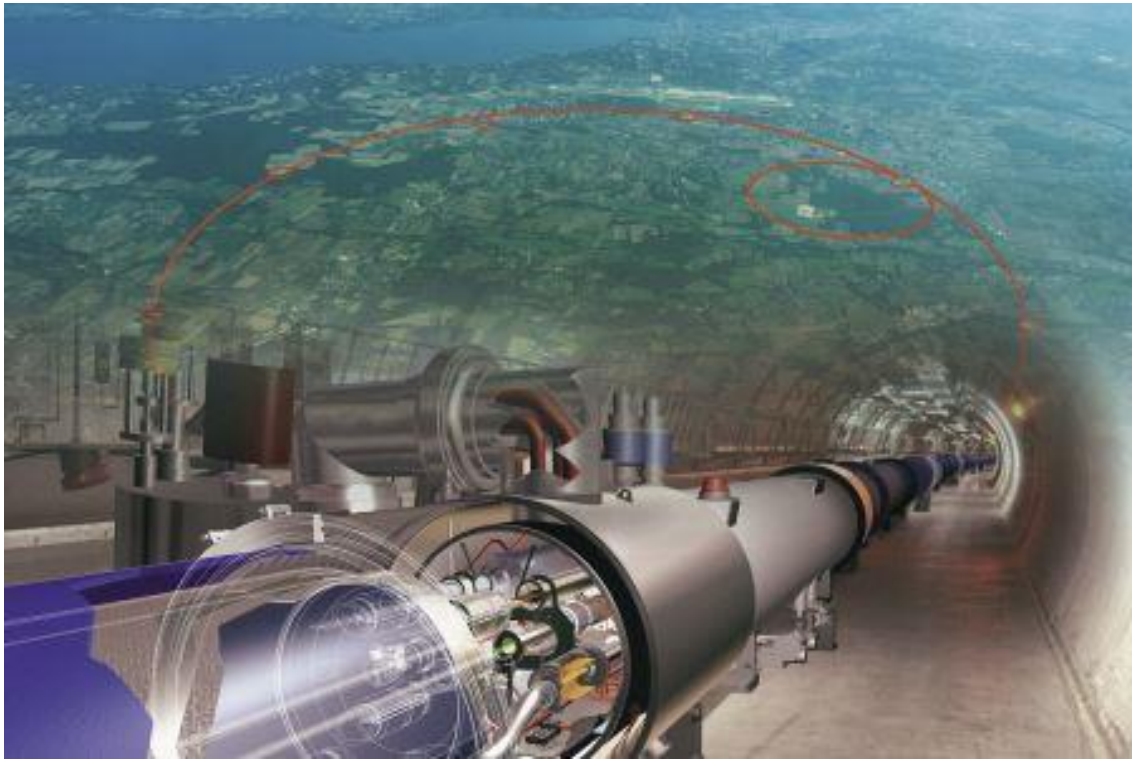
Mecanismos de control y crítica



- Repetición de experimentos
- Publicación / Divulgación
- Revisión por pares
- Publicación en acceso abierto (*open access*)



Problemas con los sistemas de control



- No todos los experimentos son repetibles por grupos independientes. Hay equipamientos singulares, como el *LHC*

- Debilidades del sistema de revisión por pares:

- Sokal (1996), Bogdanov (2002), Shön (2002), *SCIgen* (2005), Jones (2009)



Problemas con los sistemas de control

- “The case against science is straightforward: much of the scientific literature, perhaps half, may simply be untrue. Afflicted by studies with small sample sizes, tiny effects, invalid exploratory analyses, and flagrant conflicts of interest, together with an obsession for pursuing fashionable trends of dubious importance, science has taken a turn towards darkness.” (Richard Horton, editor de *The Lancet*)

- “It is simply no longer possible to believe much of the clinical research that is published […] I take no pleasure in this conclusion, which I reached slowly and reluctantly over my two decades as an editor of the New England Journal of Medicine” (Marcia Angell, ex-editora del *NEMJ*)

Offline: What is medicine's 5 sigma?



"A lot of what is published is incorrect." I'm not allowed to say who made this remark because we were asked to observe Chatham House rules. We were also asked not to take photographs of slides. Those who worked for government agencies pleaded that their comments especially remain unquoted, since the forthcoming UK election meant they were living in "purdah"—a chilling state where severe restrictions on freedom of speech are placed on anyone on the government's payroll. Why the paranoid concern for secrecy and non-attribution? Because this symposium—on the reproducibility and reliability of biomedical research, held at the Wellcome Trust in London last week—touched on one of the most sensitive issues in science today: the idea that something has gone fundamentally wrong with one of our greatest human creations.

*



The case against science is straightforward: much of the scientific literature, perhaps half, may simply be untrue. Afflicted by studies with small sample sizes, tiny effects, invalid exploratory analyses, and flagrant conflicts of interest, together with an obsession for pursuing fashionable trends of dubious importance, science has taken a turn towards darkness. As one participant put it, "poor methods get results". The Academy of Medical Sciences, Medical Research Council, and Biotechnology and Biological Sciences Research Council have now put their reputational weight behind an investigation into these questionable research practices. The apparent endemicity of bad research behaviour is alarming. In their quest for telling a compelling story, scientists too often sculpt data to fit their preferred theory of the world. Or they retrofit hypotheses to fit their data. Journal editors deserve their fair share of criticism too. We aid and abet the worst behaviours. Our acquiescence to the impact factor fuels an unhealthy competition to win a place in a select few journals. Our love of "significance" pollutes the literature with many a statistical fairy-tale. We reject important confirmations. Journals are not the only miscreants. Universities are in a perpetual struggle for money and talent, endpoints that foster reductive metrics, such as high-impact publication. National assessment procedures, such as the Research Excellence Framework, incentivise bad practices. And individual scientists, including their most senior leaders, do little to alter a research culture that occasionally veers close to misconduct.



*

Can bad scientific practices be fixed? Part of the problem is that no-one is incentivised to be right. Instead, scientists are incentivised to be productive and innovative. Would a Hippocratic Oath for science help? Certainly don't add more layers of research red-tape. Instead of changing incentives, perhaps one could remove incentives altogether. Or insist on replicability statements in grant applications and research papers. Or emphasise collaboration, not competition. Or insist on preregistration of protocols. Or reward better pre and post publication peer review. Or improve research training and mentorship. Or implement the recommendations from our Series on increasing research value, published last year. One of the most convincing proposals came from outside the biomedical community. Tony Weidberg is a Professor of Particle Physics at Oxford. Following several high-profile errors, the particle physics community now invests great effort into intensive checking and re-checking of data prior to publication. By filtering results through independent working groups, physicists are encouraged to criticise. Good criticism is rewarded. The goal is a reliable result, and the incentives for scientists are aligned around this goal. Weidberg worried we set the bar for results in biomedicine far too low. In particle physics, significance is set at 5 sigma—a p value of 3×10^{-7} or 1 in 3·5 million (if the result is not true, this is the probability that the data would have been as extreme as they are). The conclusion of the symposium was that something must be done. Indeed, all seemed to agree that it was within our power to do that something. But as to precisely what to do or how to do it, there were no firm answers. Those who have the power to act seem to think somebody else should act first. And every positive action (eg, funding well-powered replications) has a counterargument (science will become less creative). The good news is that science is beginning to take some of its worst failings very seriously. The bad news is that nobody is ready to take the first step to clean up the system.

Richard Horton
richard.horton@lancet.com

Problemas con los sistemas de control

- Presiones sobre los editores
- La dictadura del factor de impacto
- Posibles conflictos de intereses…

OPEN ACCESS Freely available online

PLoS MEDICINE

Perspective

Editors, Publishers, Impact Factors, and Reprint Income

Harvey Marcovitch*

Clinical Risk, RSM Press Ltd., London, United Kingdom

Editors under Pressure—Avoiding Conflicts

Editors would like to imagine they are simply gatekeepers who facilitate the interaction between authors who wish to impart information and people who want to read it. In fact, they are subject to a raft of external pressures that interfere with this core task. Coauthors are prone to disputes with each other and with reviewers; rejected authors may protest; readers may be dissatisfied; institutions may react inadequately to editors' concerns about probity; editorial freedom may be compromised by the demands of the learned society that owns the journal; and a commercial publisher might exert subtle—or unsubtle—pressure to increase profitability. All of these distractions increase the possibility of competing interests corrupting the editorial process.

Influence of the Impact Factor

Added to this toxic mixture is the impact factor (IF). Just as many clinicians claim that contacts by pharmaceutical company representatives do not affect their prescribing behaviour, so editors are likely to deny that thoughts of a rising IF might influence their acceptance rates. In their paper published this week in *PLoS Medicine*, Andreas Lundh and colleagues analysed randomised controlled trials published in six high-impact general medical journals during two time periods a decade apart; they calculated the putative fall in IF that would have occurred had publication been denied to papers that were commercially sponsored [1].

Unsurprisingly, they found the expected association, since IF depends in turn on recent citation rates, and a body of literature shows that industry-sponsored trials attract more citations than those funded by a nonprofit source [2,3]. There are reasons: for example, randomised controlled trials and meta-analyses are cited more frequently than clinical studies with less-rigorous design, regardless of funding, and high-impact journals are likely to attract the former [4]. There is "gamesmanship," with commercial sponsors and publishing companies skilled at obtaining publicity in the mass media, a known stimulant for citations [5,6]. Only slightly dubious is the habit of commercial companies disseminating papers favourable to their product to individual clinicians at conferences or through sponsorship of review papers—themselves a potent accelerator of IF [7]. More culpable is the fact that studies showing positive outcomes for a drug or device under consideration are more likely to be published than "negative" studies; editors are partly to blame for this but so are commercial sponsors, whose methodologically well-conducted studies with unfavourable results tended not to see the light of day, at least in the pretrial registration era [8].

Lundh and colleagues do not claim that their findings demonstrate that editors' judgment on acceptance or rejection is influenced by the paper's predicted effect on IF. Nonetheless, I have heard editors support a paper at a selection meeting by stating that it is likely to be well cited.

Publishers' Profits and Sponsored Studies

More intriguingly, the second aim of their study was to investigate the possible financial benefits to publishers of the journals they investigated. Their attempted method was to seek data on income from advertisements, reprints, and industry-supported supplements as a percentage of total income. The editors of the two UK-based journals, *BMJ* and *The Lancet*, provided the data. The editors of *JAMA* and *The New England Journal of Medicine (NEJM)* declined, as did the publisher of *Annals of Internal Medicine*. The owners of the latter confirmed the proxy data obtained from the US Internal Revenue Service but the publishers of the former two journals, the American Medical Association and the Massachusetts Medical Society, did not respond.

Again, the authors cannot infer the intentions of their nonrespondent editors. Editors are proud of their independence but independence goes only as far as an owner permits, as we know from the sorry history of dismissed editors of *NEJM* and the *Canadian Medical Association Journal*, amongst others.

Journals as Leaders: A Paradox

In many ways, JAMA has led the way in promoting publishing integrity—including its call for independent statistical analysis of submitted industry-sponsored trials [9] and its publication of best practice recommendations for professional medical associations [10]. The authors of the latter paper, who include the journal's editor-in-chief, state: "Professional medical associations have a duty to bring to their members the best scientific evidence on the efficacy and suitability of drugs and devices. These efforts must be separate

The Perspective section is for experts to discuss the clinical practice or public health implications of a published study that is freely available online.

Citation: Marcovitch H (2010) Editors, Publishers, Impact Factors, and Reprint Income. PLoS Med 7(10): e1000355. doi:10.1371/journal.pmed.1000355

Published October 26, 2010

Copyright: © 2010 Harvey Marcovitch. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: The author received no specific funding for this paper.

Competing Interests: The author declares no competing financial interests. He is employed by BMJ Publishing Group as a freelance associate editor. He is a director of the Council of Science Editors. The views expressed in this paper are his own.

Abbreviations: IF, impact factor.

* E-mail: h.marcovitch@btinternet.com

Provenance: Commissioned; not externally peer reviewed.

Problemas con los mecanismos de control… también en acceso abierto (*open access*)



INTERNATIONAL ARCHIVES OF MEDICINE

2015

Chocolate with high Cocoa content as a weight-loss accelerator

Johannes Bohannon[1], Diana Koch[1], Peter Hoover[1], Alexander Driehaus[1]

Abstract

Background: Although the focus of scientific studies on the beneficial properties of chocolate with a high cocoa content has increased in recent years, studies determining its importance for weight regulation, in particular within the context of a controlled dietary measure, have rarely been conducted.

Methodology: In a study consisting of several weeks, we divided men and women between the ages of 19-67 into three groups. One group was instructed to keep a low-carb diet and to consume an additional daily serving of 42 grams of chocolate with 85% cocoa content (chocolate group). Another group was instructed to follow the same low-carb diet as the chocolate group, but without the chocolate intervention (low-carb group). In addition, we asked a third group to eat all their own discretion, with unrestricted choice of food. At the beginning of the study, all participants received extensive medical advice and were thoroughly briefed on their respective diet. At the beginning and the end of the study, each participant gave a blood sample. Their weight, BMI, and waist-to-hip ratio were determined and noted. In addition to that, we evaluated the Giessen Subjective Complaints List. During the study, participants were encouraged to weigh themselves on a daily basis, assess the quality of their sleep as well as their mental state, and to use urine test strips.

Result: Subjects of the chocolate intervention group experienced the fastest and most successful weight loss. Even though the measurable effect of this diet occurred with a delay, the weight reduction of this group exceeded the results of the low-carb group by 10% after only three weeks ($p = 0.04$). While the weight cycling effect already occurred after a few weeks in the low-carb group, with resulting weight gain in the last fifth of the observation period, the chocolate group experienced a steady increase in weight loss. This is confirmed by the evaluation of the ketone reductions. Initially, ke-



International Journal of Advanced Computer Technology (Online)

http://www.ijact.org

Email:editor@ijact.org,submit_ijact@yahoo.in

REVIEW FORM

Paper ID	IJ0350030
Paper Title	Get me off Your Fucking Mailing List

NOTE: 1. Excellent 2.Very Good 3. Good 4.Fair 5. Very Poor

1. Appropriateness to publish in IJACT

Option:	Excellent

- http://journals.plos.org/plosone/s/publication-fees
- John Bohannon (2013, 2015)
- David Mazières y Eddie Kohler (2005)

La ciencia:
Una empresa humana limitada y falible

- *La actitud científica y el falibilimo* (C. S. Peirce). La ciencia como sentido común crítico (K. Popper)

- Un ejemplo: la medicina egipcia →

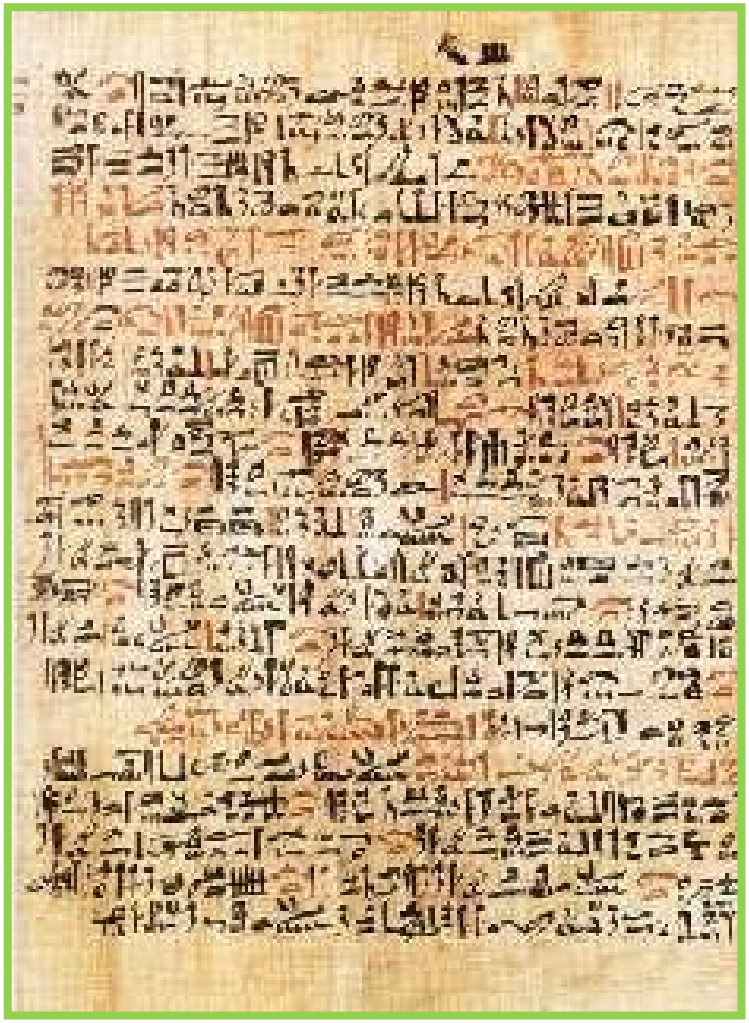
- Reconocimiento de los límites de la ciencia / la ciencia como límite

    - Teóricos, prácticos, límites por falibilidad (N. Rescher)

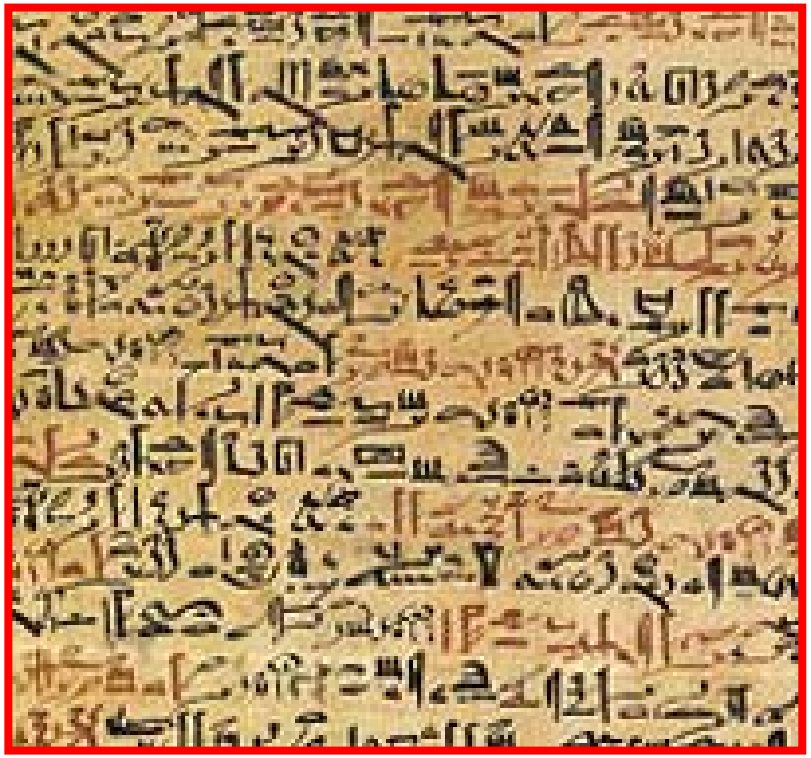
    - Axiología, sentido y subjetividad (H-G. Gadamer)

- Hay vida inteligente también fuera de la ciencia… y la ciencia se beneficia de ello: Necesidad de diálogo y respeto entre la ciencia y otros ámbitos de la vida humana (arte, literatura, filosofía, ética, derecho, experiencia cotidiana, sentido común, tradiciones sapienciales y religiosas…)

- Los límites y falibilidad de la ciencia han de ser reconocidos, para evitar actitudes que pueden ser tenidas por “enemigas” de la ciencia: la anti-ciencia, la pseudo-ciencia, la mala ciencia y el cientificismo.



"Si examinas a un hombre que tiene una luxación en una vértebra del cuello, y si encuentras que no gobierna ya sus dos brazos y sus dos piernas a causa de ello […] Dirás en este asunto: Un hombre que tiene una luxación en una vértebra de su cuello […] Una enfermedad a la cual no se puede hacer nada" (*Papiro de Smith*, nº 31)



"Remedio para hacer desaparecer *infaliblemente* el encanecimiento de los cabellos y para tratar la cabellera: sangre de un buey negro, poner en aceite y ungir la cabeza" (*Papiro de Ebers*, nº 459)



¡¡¡Muchas gracias!!!