

Libraries in the Information Age

Improving Library Feedback

Library Connect , November 2016
Ruarri Rogan, r.rogan@elsevier.com
Solutions Enablement

AGENDA

Introduction: Why feedback? 5 mins

Feedback for RESEARCHERS 8 mins

Feedback for PURCHASERS

Current Feedback Systems 8 mins

Future Developments 4 mins

What Feedback Tells Us

Trends in backfiles 8 mins

Possible explanations 4 mins

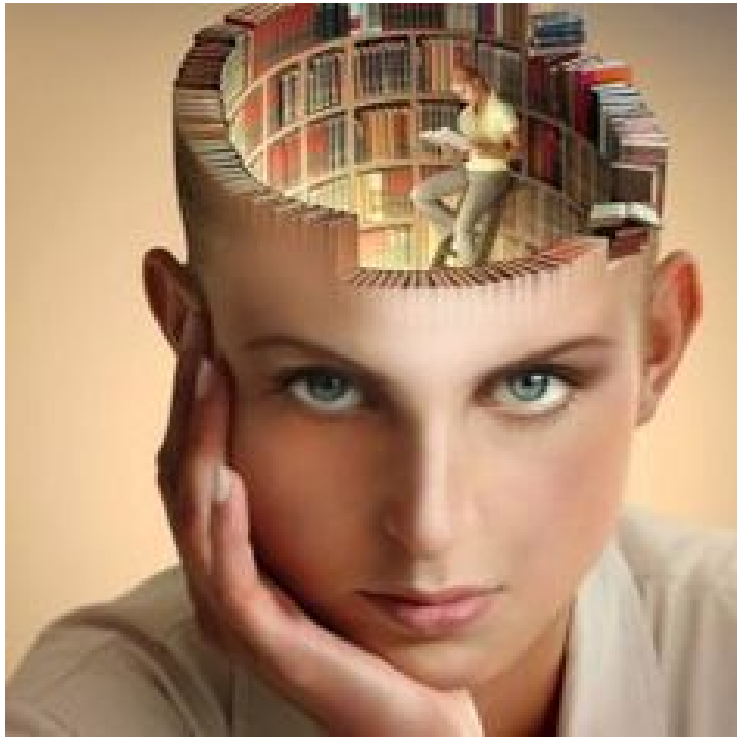
The role of the librarian 4 mins

Questions 10 mins

Part 1

Part 2

Feedback: the library as brain



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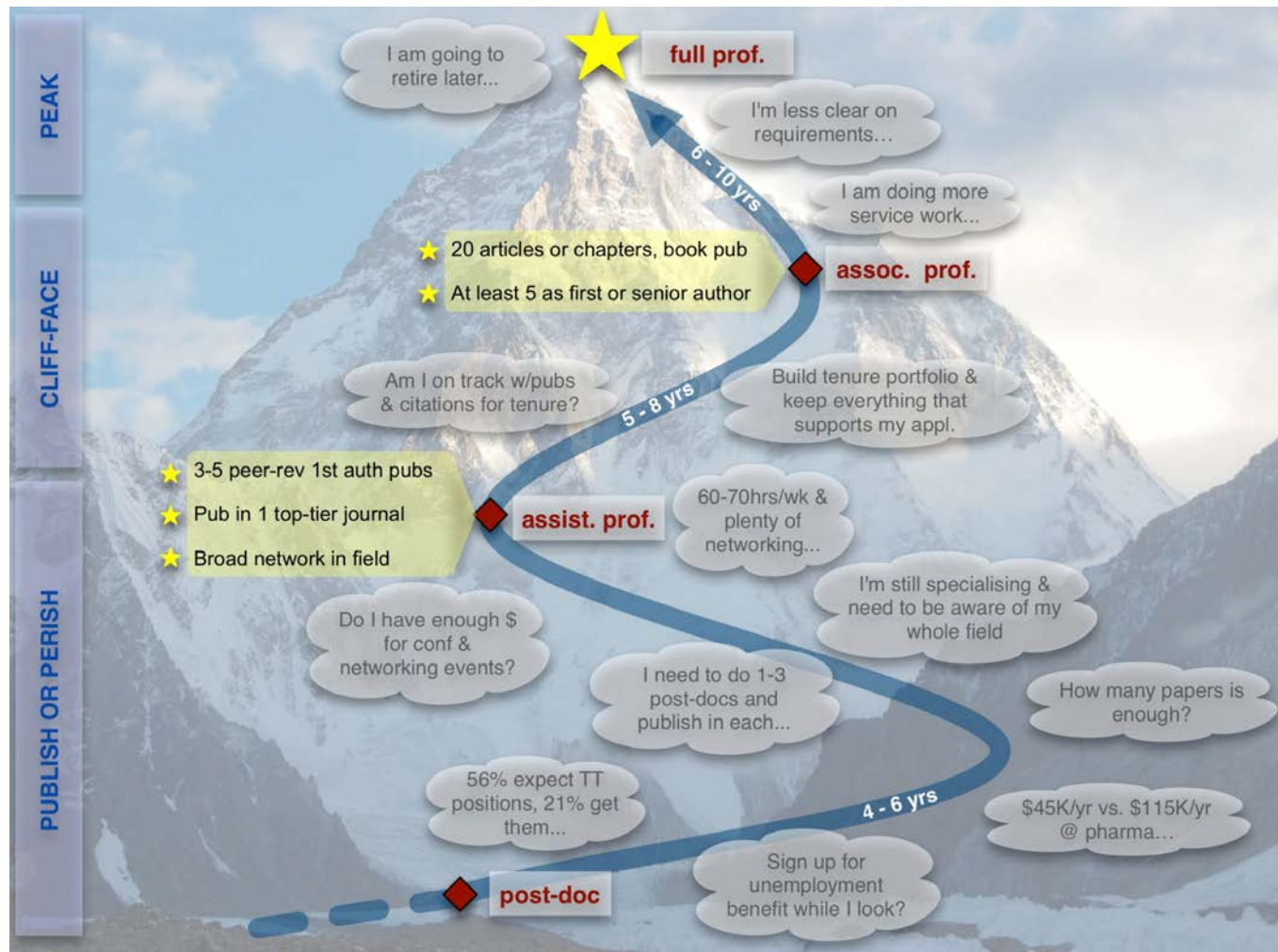
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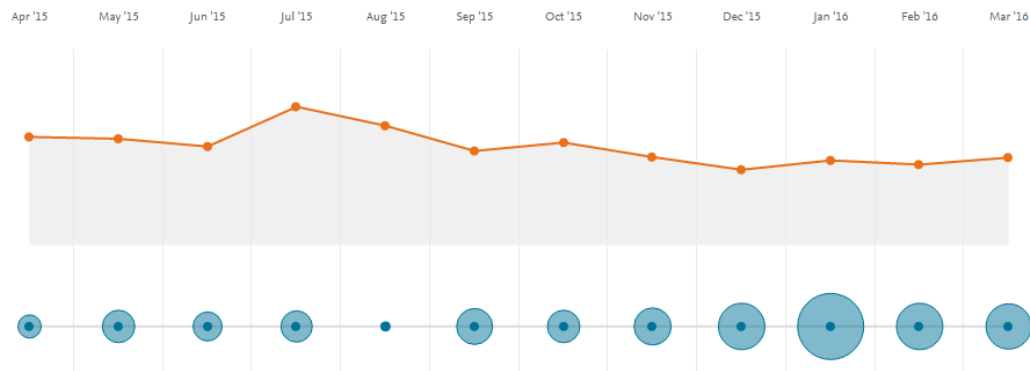
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Ross-Adams, H., Lamb, A.D., Dunning, M.J., Halim, S., Lindberg, J., (...), Brewer, D., et al.
EBioMedicine, vol. 2, issue 9 (2015) ELSEVIER

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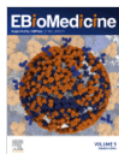
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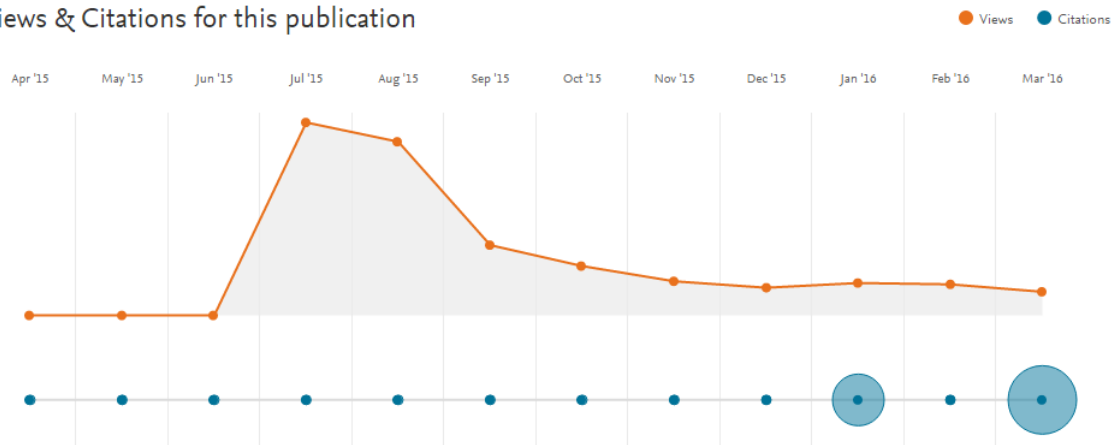
Integration of copy number and transcriptomics provides risk stratification in prostate cancer: A discovery and validation cohort study

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EBioMedicine, vol. 2, issue 9 (2015) ELSEVIER

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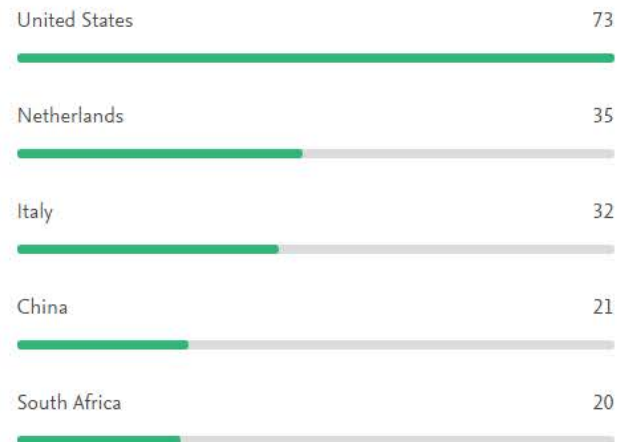
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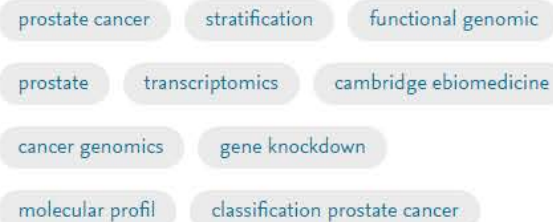
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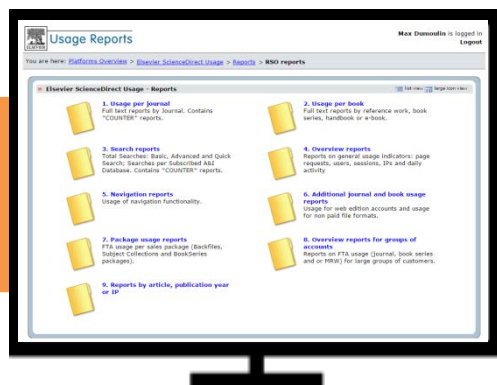
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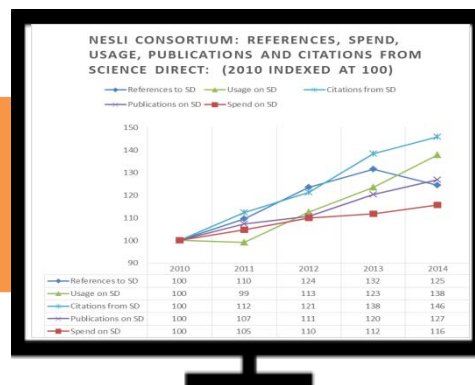
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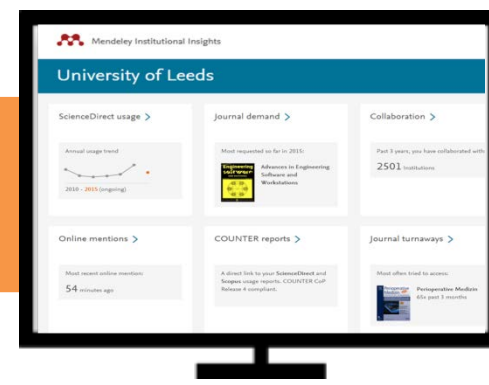
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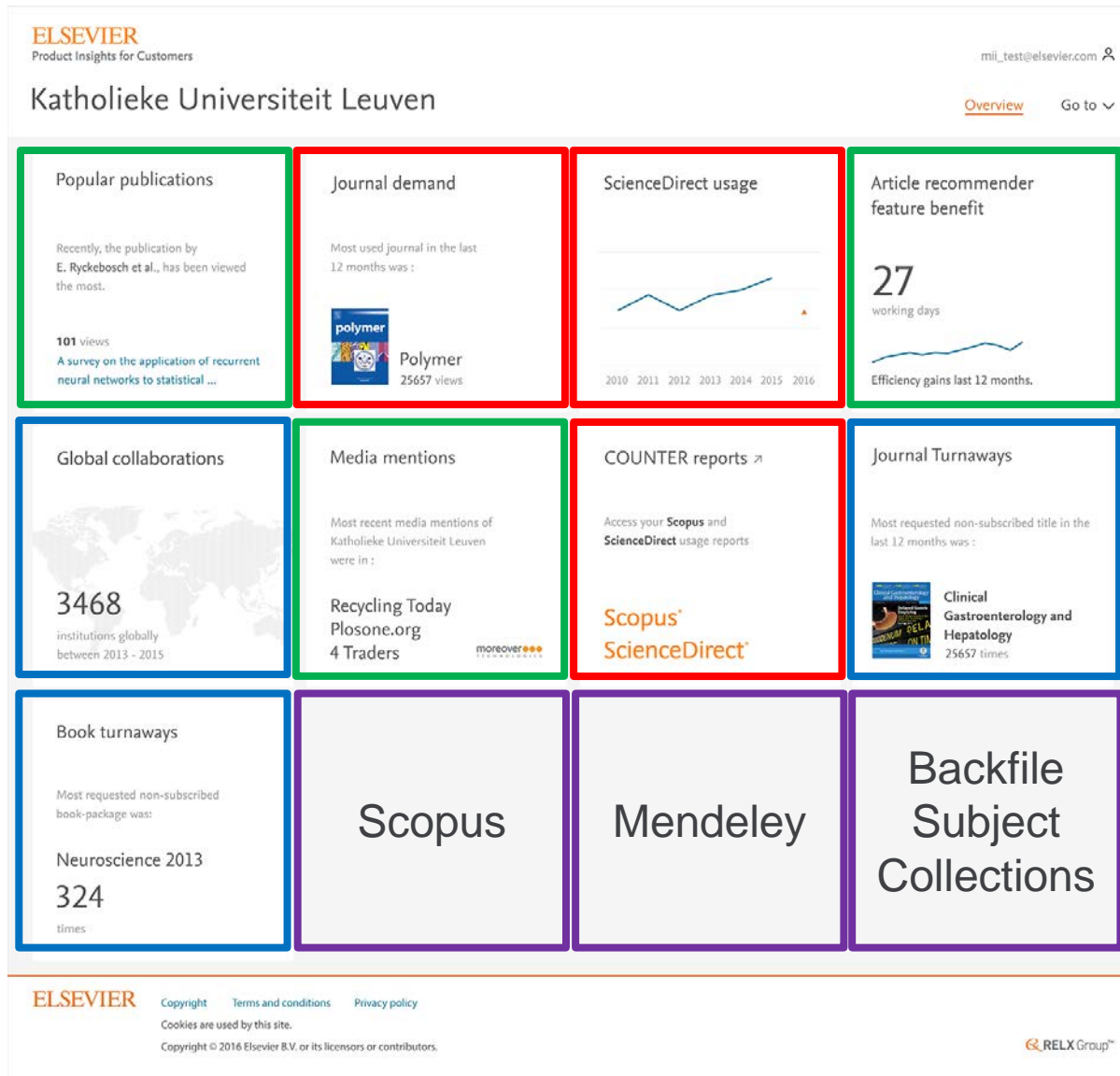
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Part 2

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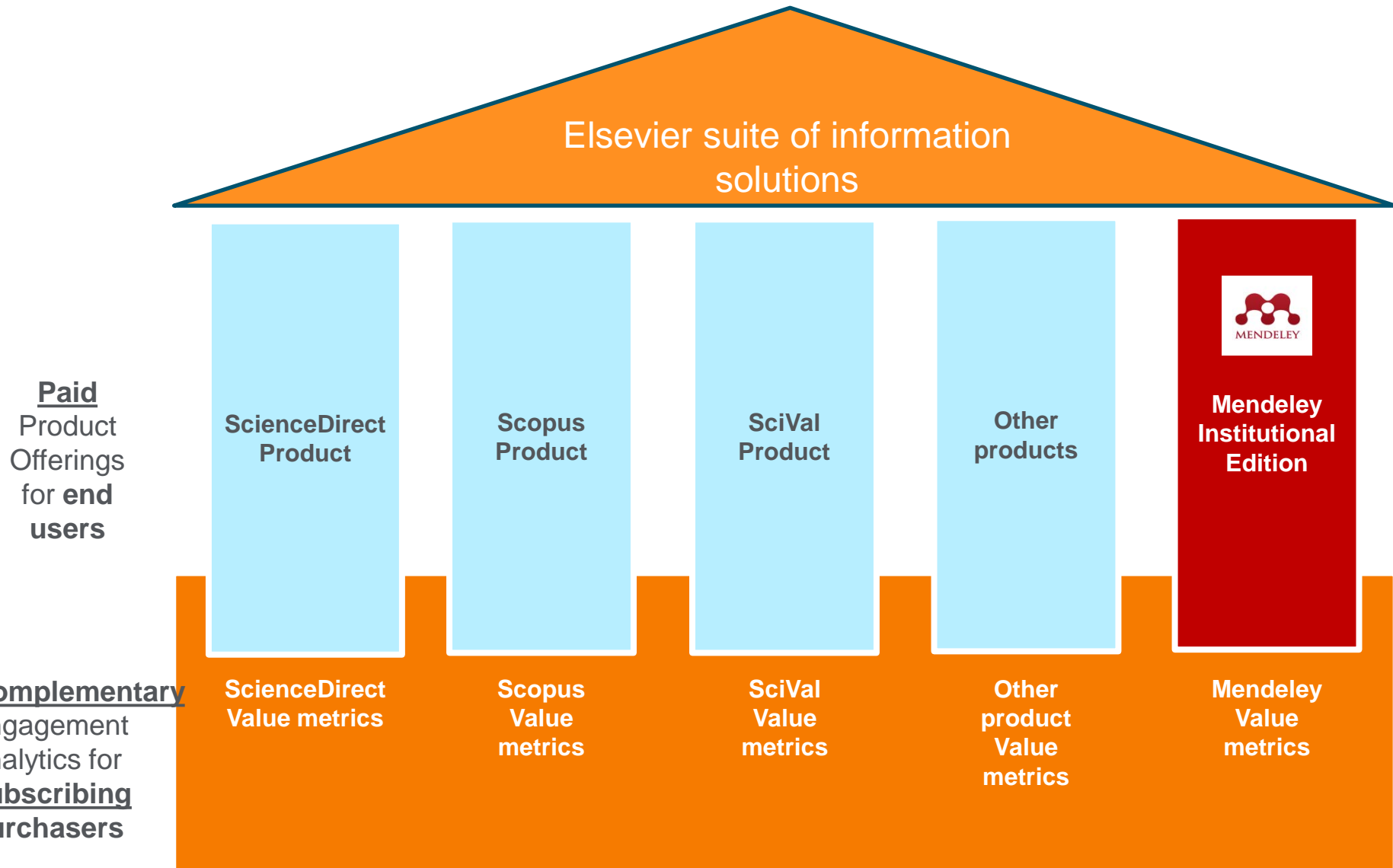
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Part 1

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Possible explanations 4 mins

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Part 2

Questions 10 mins

New technology opens up older content

“In 2013... 13% of citations were to articles ≥ 20 years old... an increase of 36% since 1990... Now that finding and reading relevant older articles is about as easy as finding and reading recently published articles, significant advances aren't getting lost on the shelves and are influencing work worldwide for years after.”

Google Inc., November 2014

On the Shoulders of Giants: The Growing Impact of Older Articles

Alex Verstak, Anurag Acharya, Helder Suzuki, Sean Henderson,
Mikhail Iakhiaev, Cliff Chiung Yu Lin, Namit Shetty

Google Inc.

November 4, 2014

Abstract

In this paper, we examine the evolution of the impact of older scholarly articles. We attempt to answer four questions. First, how often are older articles cited in scholarly papers and how has this changed over time. Second, how does the impact of older articles vary across different fields of scholarship. Third, is the change in the impact of older articles accelerating or slowing down. Fourth, are these trends different for much older articles.

To answer these questions, we studied citations from articles published in 1990-2013. We computed the fraction of citations to older articles from articles published each year as the measure of impact for the study. For this study, we considered articles that were published at least 10 years before the citing article as *older articles*. To explore how changes in citation

Trends in backfiles

"Literature Citations in the Internet Era"

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LETTERS

edited by Jennifer Sills

Literature Citations in the Internet Era

J. A. EVANS'S REPORT "ELECTRONIC PUBLICATION AND THE NARROWING OF SCIENCE AND scholarship" (18 July, p. 395) suggests that (i) the average age of citations to scientific papers dropped over the years as more electronic papers became accessible and (ii) the citations are concentrated on a smaller proportion of papers and journals. Such conclusions are not warranted by Evans's data.

To measure the evolution of the average (or median) age of the references contained in papers, one has to look at all the references in all published papers and observe the evolution of their age over time. As we have shown using Thomson Reuters's Web of Science data for the period 1900 to 2004 (for a total of 500 million references in 25 million papers), the average (and median) age of all references began to decrease in 1945 but has increased steadily since the mid-1960s. This trend is visible in all sciences, including the social sciences and the humanities (1, 2). The median age of references in fields of science and engineering moved from 4.5 years in 1955 to more than 7 years in 2004, and in medical sciences it increased from 4.5 to 5.5 during the same period (1). In fact, Evans's conclusions only reflect a transient phenomenon related to recent access to online publications and to the fact that the method used does not take into account time delays between citation year and publication year. Our data also show that in disciplines in which online access has been available the longest (such as nuclear physics and astrophysics), the age of references declines for a number of years in the 1990s but then increases from 2000 to 2007, the last available year of our data set. We have also measured the concentration of citations (and journals) by three different methods, including the one used by Evans. All three measures clearly show that concentration is in fact declining for papers as well as for journals (3). Although many factors affect citation practices, two things are clear: Researchers are increasingly relying on older science, and citations are increasingly dispersed across a larger proportion of papers and journals.



YVES GINGRAS,^{1*} VINCENT LARIVIÈRE,² ÉRIC ARCHAMBAULT³

¹Observatoire des Sciences et des Technologies (OST), Centre Interuniversitaire de Recherche sur la Science et la Technologie (ICRST), Université du Québec à Montréal, CP 8888, Succursale Centre-ville, Montréal, QC H3C 3P8, Canada.

²Science-Métrie, 1375A Avenue du Mont-Royal E., Montréal, QC H2J 1Y6, Canada.

*To whom correspondence should be addressed. E-mail: ygingras.yves@uqam.ca

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1. Y. Larivière, E. Archambault, Y. Gingras, *J. Am. Soc. Information Sci. Technol.* **59**, 288 (2008).
2. Y. Larivière, E. Archambault, Y. Gingras, in *Proceedings of ISI 2007*, D. Torres-Salinas, H. F. Boed, Eds., ICSH, Madrid, 2007, pp. 449-454.
3. Y. Larivière, Y. Gingras, E. Archambault, "The decline in the concentration of citations, 1900-2007" (<http://arxiv.org/pdf/0809.5250>).

Narrower Focus Be More Efficient

IN HIS REPORT "ELI and the narrowing of (18 July, p. 395), J.A. that electronic publication. He found this included fewer, more ever, Evans gives us this is actually detrimental he suggests that the the days of paper-on an unintended consequence. Contrary to what Evans that scientists' narrow is a good sign.

Science has frequent evolution by natural species, relatively fit. Similarly, in science affect subsequent norms that are emerging growth of electronic ing the scientific community. Scientists may be spending literature that is extr Before we bemoan the terms that Evans has examine more carefully of such changes.

Visiting Scholar, Department Studies, Cornell University, Ithaca, NY 14853-1301

Reference

1. D. L. Hull, *Science and Selection* (Cambridge Univ. Press, Cambridge, 2001).

To Each Citation, a Purpose

THE REPORT BY J. A. EVANS ("ELECTRONIC publication and the narrowing of science and scholarship," 18 July, p. 395) claims that electronic publication "may accelerate consensus and narrow the range of findings and ideas built upon." But do the currently available data support this chilling conclusion?

Evans's argument is based on evidence that with electronic access, fewer papers and fewer older papers are cited, and that cited papers are less broad and diverse. To understand these

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Older papers are increasingly remembered—and cited

By John Bohannon | Nov. 4, 2014, 12:00 PM

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science,

The decline in the concentration of citations, 1900-2007

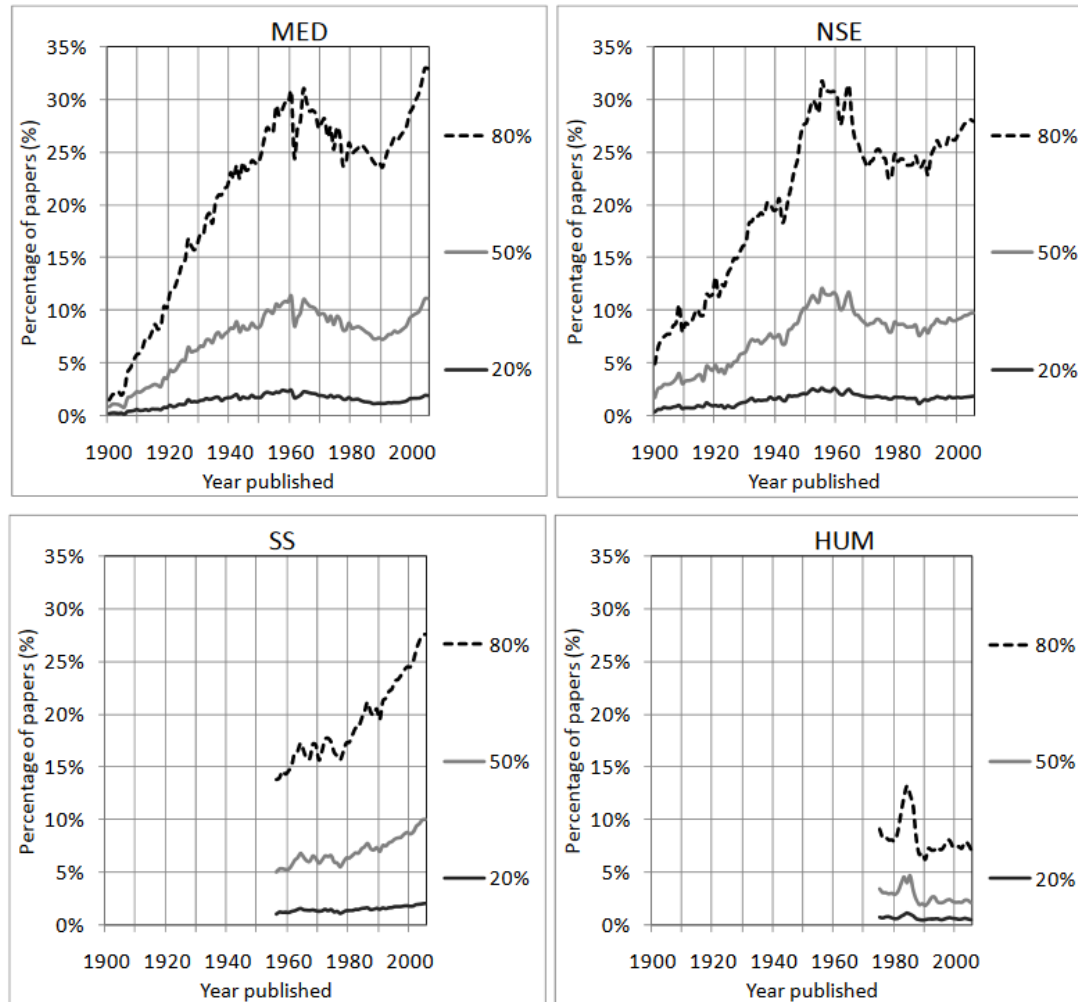
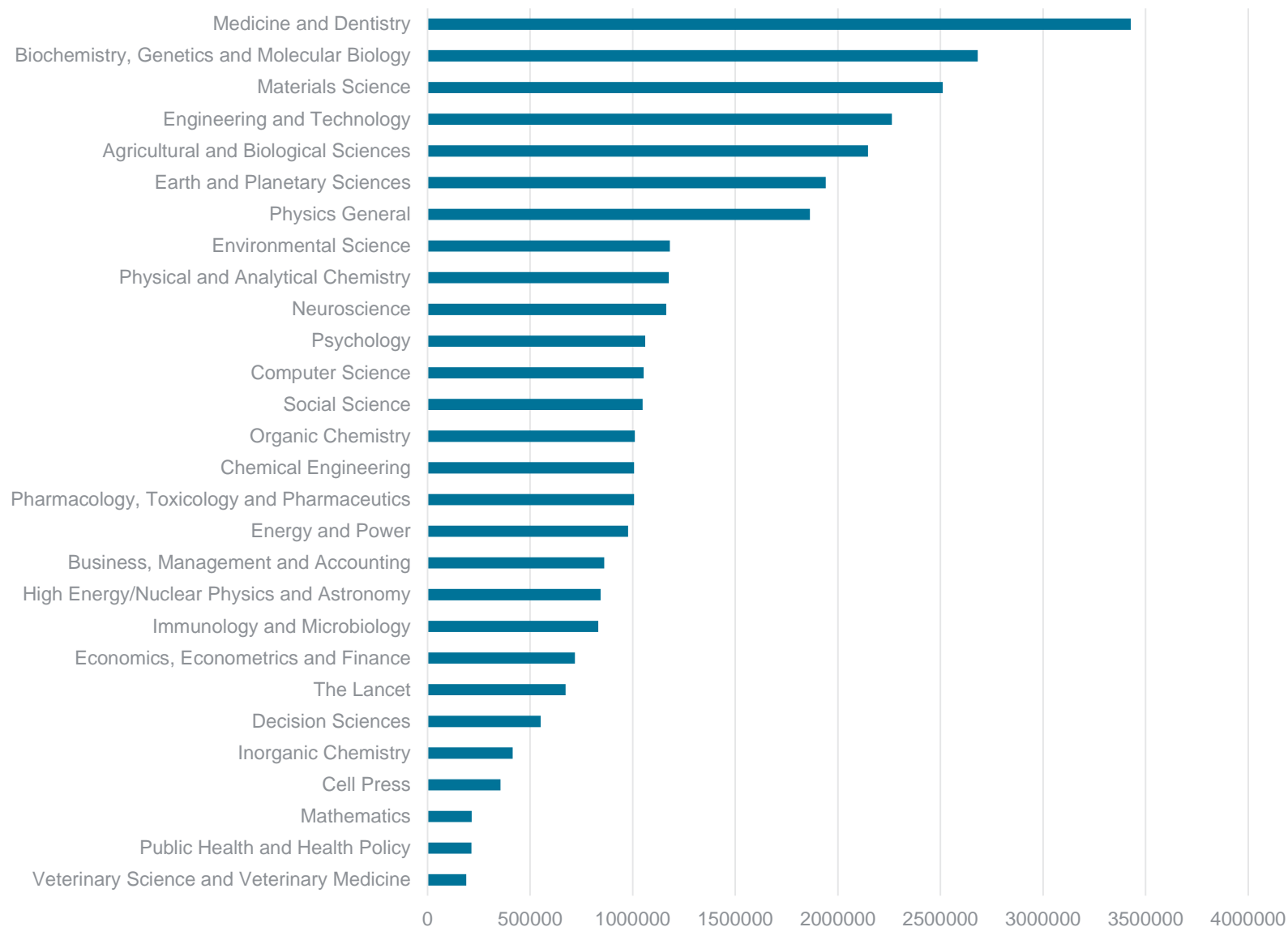


Figure 2. Percentage of papers needed to obtain 20%, 50% and 80% of the citations received using a two-year citation window, by field, 1900–2005

Trends in backfiles

Turnaways By Backfile Subject Package - Global - 2015



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Part 1

Part 2

Hypothesis 1: Technology has reinvigorated history

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 **Journal of Molecular Biology**
Volume 20, Issue 3, October 1966, Pages 483–496

Host specificity of DNA produced by *Escherichia coli* 9. Host-controlled modification of bacteriophage fd*

Werner Arber
Institute of Molecular Biology University of Geneva, Switzerland

Abstract

Host-controlled modification is shown to occur with four related male-specific bacteriophage strains containing single-stranded DNA: fd, f1, M13 and F12. All four phages are restricted and modified in bacteria with B host specificity, the first three also in P1-lysogenic cells. None of the phages is restricted in strains with K host specificity or carrying the episome RTF-2. The bacterial characters *hcr* which control the B host specificity of λ DNA, are also responsible for restriction and modification of phage fd. The apparent difference in K restriction, which is encountered by λ , but not by fd, is thought to find its explanation in the small molecular size of fd DNA, on which K specificity sites might be lacking. Indeed, restriction and modification act on the DNA of fd: DNA from fd phages which infect restricting host cells is partially broken down to acid-soluble products. On the other hand, one-cycle growth of fd.B on non-restricting and non-modifying *Kr⁺m⁻* bacteria yields, among a majority of progeny of fd *Kr⁺m⁻* phage, some phage particles with parental B host specificity, and they also have parental DNA as shown by density labelling of the infecting phage. The efficiency of such transfer of parental fd.B DNA was found to be 0.12 if measured after 18 minutes incubation of the infected cells. The implication of this transfer on the mechanism of phage DNA replication is discussed.

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Ann. Rev. Microbiol. 19 (1965), p. 365
[View Record in Scopus](#) | [Full Text via CrossRef](#) | [Cited By in Scopus](#) (21)

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J. Mol. Biol. 5 (1962), p. 18
[Article](#) | [PDF \(1185 K\)](#) | [View Record in Scopus](#) | [Cited By in Scopus](#) (45)

Arber and Lataste-Dorolle, 1961 W. Arber, C. Lataste-Dorolle
Path. Microbiol. 24 (1961), p. 1012

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J. Mol. Biol. (1966) 20, 483–496

Host Specificity of DNA produced by *Escherichia coli*

9. Host-controlled Modification of Bacteriophage fd

WERNER ARBER

Institute of Molecular Biology
University of Geneva, Switzerland

(Received 11 May 1966)

Host-controlled modification is shown to occur with four related male-specific bacteriophage strains containing single-stranded DNA: fd, f1, M13 and F12. All four phages are restricted and modified in bacteria with B host specificity, the first three also in P1-lysogenic cells. None of the phages is restricted in strains with K host specificity or carrying the episome RTF-2. The bacterial characters *hcr* which control the B host specificity of λ DNA, are also responsible for restriction and modification of phage fd. The apparent difference in K restriction, which is encountered by λ , but not by fd, is thought to find its explanation in the small molecular size of fd DNA, on which K specificity sites might be lacking. Indeed, restriction and modification act on the DNA of fd: DNA from fd phages which infect restricting host cells is partially broken down to acid-soluble products. On the other hand, one-cycle growth of fd.B on non-restricting and non-modifying *Kr⁺m⁻* bacteria yields, among a majority of progeny of fd *Kr⁺m⁻* phage, some phage particles with parental B host specificity, and they also have parental DNA as shown by density labelling of the infecting phage. The efficiency of such transfer of parental fd.B DNA was found to be 0.12 if measured after 18 minutes incubation of the infected cells. The implication of this transfer on the mechanism of phage DNA replication is discussed.

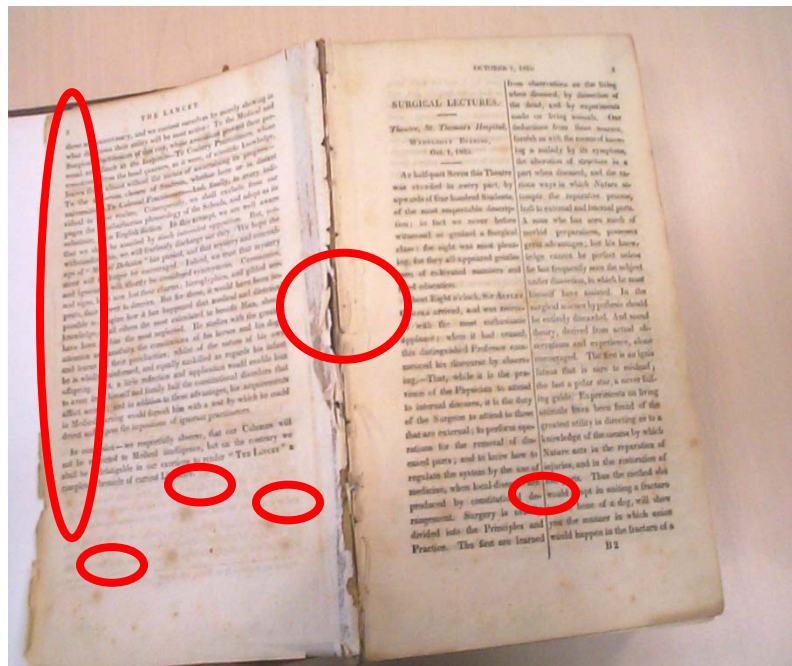
1. Introduction

Occurrence of host-controlled modification with a bacteriophage strain carrying its genetic information on a single-stranded DNA molecule was recently observed by Hoffmann-Berling (personal communication), who found that his phage fd (Hoffmann-Berling, Marvin & Dürwald, 1963) is restricted in male strains of *Escherichia coli* B, in which the rare plaque formers undergo host-controlled modification. This means that fd.B, grown on B, is no longer restricted on B. In this respect, fd behaves like phage λ (Arber & Dussoix, 1962). However, fd.B does not encounter any restriction in *E. coli* K12, whereas λ .B is restricted in the host K12.

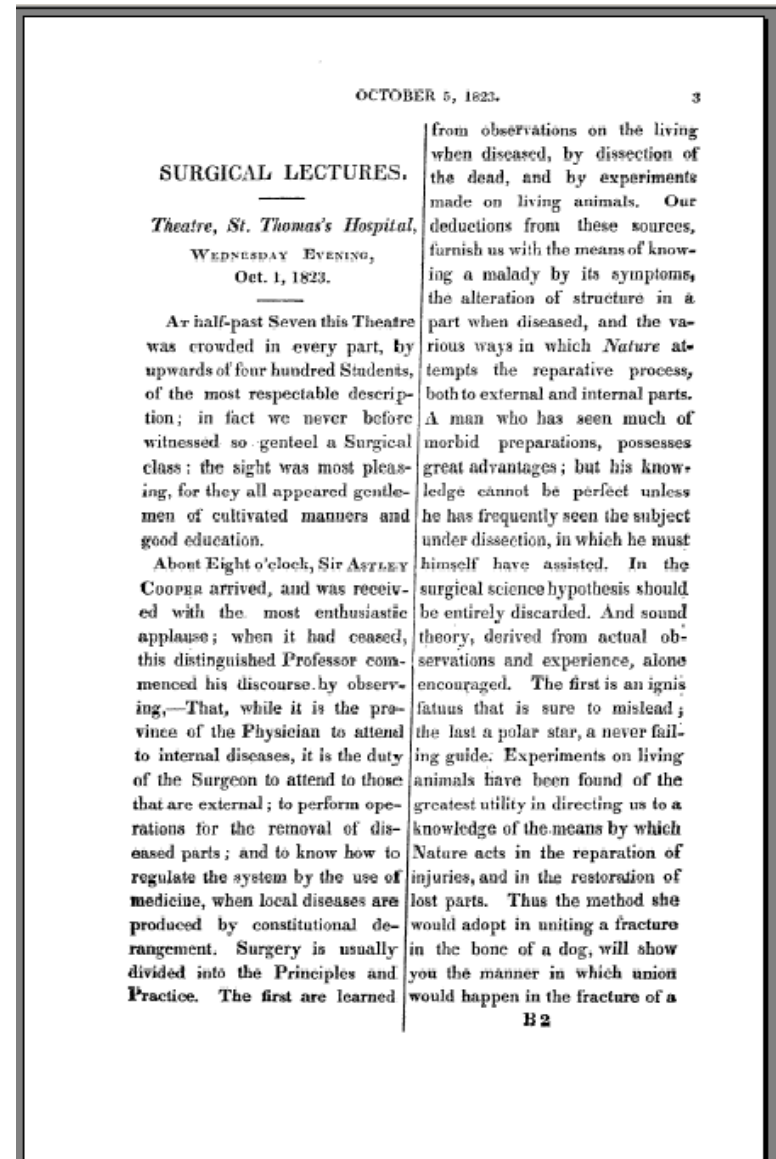
A number of independent isolates of male-specific bacteriophages has been shown to be very closely related to phage fd (Zinder, Valentine, Roger & Stoekenius, 1963; Hofschneider, 1963; Salivar, Trageloff & Pratt, 1964). In particular, they all have the form of a flexible rod of some 8000 Å length and 50 Å diameter (Marvin & Hoffmann-Berling, 1963; Hofschneider, 1963; Zinder *et al.*, 1963). They contain a single-stranded DNA molecule of some 5000 nucleotides only (Hoffmann-Berling, Marvin & Dürwald, 1963; Salivar *et al.*, 1964), the molecular weight of which, namely about 1.6×10^6 ,

Hypothesis 1: Technology has reinvigorated history

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Volume 1, Number 1, 1823

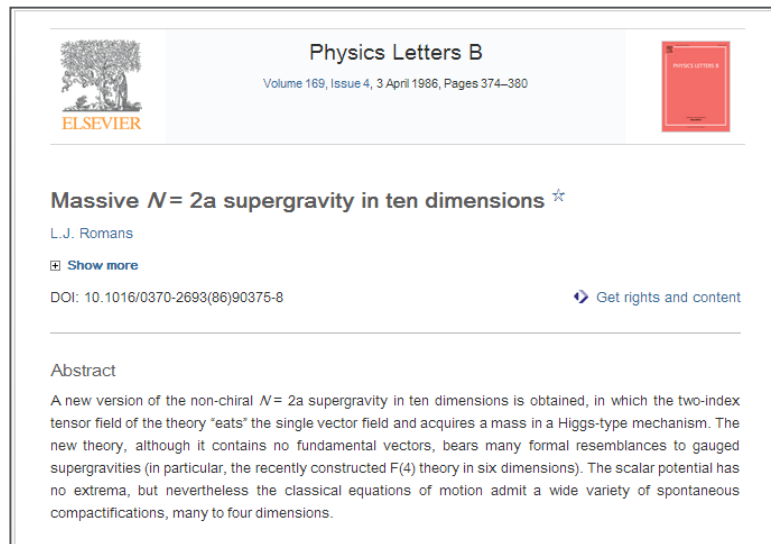


Hypothesis 2a: Some ideas are ahead of their time ‘aka Sleeping beauties’

The Sleeping Beauty

L.J. Romans, Physics Letters B

- Published in 1986
- Article only cited 10 years after publication
- Then cited intensively more than 60 times

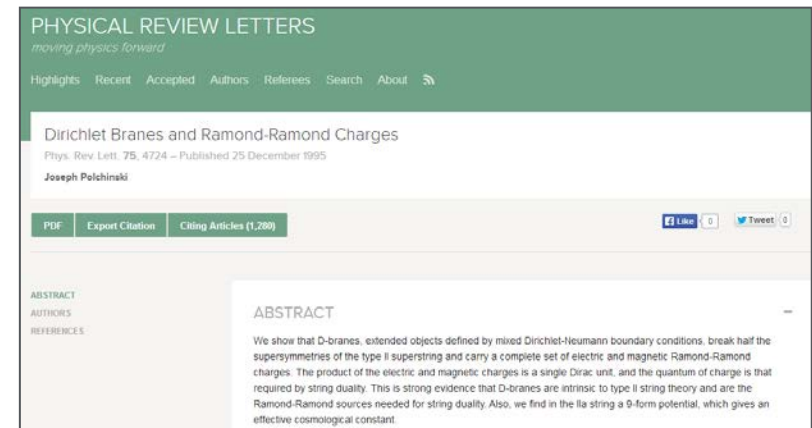


The Prince

J. Polchinski, Physics Review Letters 75

Published in 1995

Picked up Romans' articles



Hypothesis 2b: Technology is not always ready for science

ScienceDirect

Broken symmetries, massless particles and gauge fields

P.W. Higgs

Tait Institute of Mathematical Physics, University of Edinburgh, Scotland

Received 27 July 1964

Recently a number of people have discussed the Goldstone theorem (1, 2), that any solution of a Lorentz-invariant theory which violates an internal symmetry operation of that theory must contain a massless scalar particle. (This and Law (3) show that the theorem does not necessarily apply to non-relativistic theories and implied that their considerations would apply equally well to Lorentz-invariant field theories. Gilbert (4), however, gave a proof that the failure of the Goldstone theorem in the nonrelativistic case is of a type which cannot exist when Lorentz invariance is imposed in a theory. The purpose of this note is to show that Gilbert's argument fails for an important class of field theories, but that in supercurrent currents are coupled to gauge fields. Following the procedure used by Gilbert (4), let us consider a theory of two hermitian scalar fields

Volume 12, number 2

PHYSICS LETTERS

12 September 1964

$\phi_1(x), \phi_2(x)$ which is invariant under the phase transformation

$$\phi_1 \rightarrow \phi_1 \cos \alpha + \phi_2 \sin \alpha,$$

$$\phi_2 \rightarrow -\phi_1 \sin \alpha + \phi_2 \cos \alpha.$$

Then there is a conserved current j_μ such that

$$\int_V d^3x j_0(x), \quad \phi_1(0) = \phi_2(0).$$

We assume that the Lagrangian is such that symmetry is broken by the nonvanishing of the vacuum expectation value of ϕ_2 . Goldstone's theorem is proved by showing that the Fourier transform of $\langle j_\mu(x) \phi_1(0) \rangle$ contains a term

$$2\pi \delta(p^2) \delta(p_0) \delta(p_1) \delta(p_2),$$

where p_μ is the momentum, as a consequence of Lorentz-invariance, the conservation law and eq. (2).

Now and Law (3) avoided this result in the non-relativistic case by showing that the most general form of the Fourier transform is now, in Gilbert's notation,

$$F.T. \rightarrow \delta(p^2) \delta(p_0) \delta(p_1) \delta(p_2) + C(p) \delta(p_0) \delta(p_1) \delta(p_2),$$

where $C(p)$ which may be taken as (1, 0, 0, 0), (3) gives out a special Lorentz frame. The conservation law then reduces eq. (3) to the less general form

$$F.T. \rightarrow \delta(p^2) \delta(p_0) \delta(p_1) \delta(p_2) + C(p) \delta(p_0) \delta(p_1) \delta(p_2),$$

It turns out, on applying eq. (3), that all three terms in eq. (4) can contribute to $\langle j_\mu \phi_1 \rangle$. Thus the Goldstone theorem fails if $\langle j_\mu \phi_1 \rangle \neq 0$, which is possible only if the other terms exist. Gilbert's remark that no special timelike vector n_μ is available in a Lorentz-invariant theory appears to rule out this possibility in such a theory.

There is however a class of relativistic field theories in which a vector n_μ does indeed play a part. This is the class of gauge theories, where an arbitrary unit timelike vector n_μ must be introduced in order to define a radiation gauge in which the vector gauge fields are well defined operators. Such theories are nevertheless Lorentz-covariant, as has been shown by Schwinger (5). (This has, of course, long been known of the simplest such theory, quantum electrodynamics. There seems to be no reason why the vector n_μ should not appear in the Feynman transform under consideration.)

It is characteristic of gauge theories that the conservation law holds in the strong sense, as a consequence of field equations of the form

$$\partial_\mu \phi = g_\mu \phi^\dagger \phi,$$

$$F_{\mu\nu} = g_\mu A_\nu - g_\nu A_\mu.$$

Except in the case of abelian gauge theories, the fields $A_\mu, F_{\mu\nu}$ are not simply the gauge field variables $A_\mu, F_{\mu\nu}$, but contain additional terms with coefficients of the structure constants of the group as coefficients. The structure of the Fourier transform of $\langle j_\mu \phi_1 \rangle$ must be given by eq. (3). Applying eq. (3) to this commutator gives us the Fourier transform of $\langle j_\mu \phi_1 \rangle$, $\phi_1(0)$ the single term $[A_\mu(x) \phi_1(0)] \delta(p^2) \delta(p_0) \delta(p_1) \delta(p_2)$. We have thus recovered both Goldstone's zero-mass boson and the "spurious" state of $A_\mu = 0$ proposed by Khan and Lee.

In a subsequent note it will be shown, by considering more classical field theories which display broken symmetries, that the introduction of gauge fields may be expected to produce qualitative changes in the nature of the particles described by such theories after quantization.

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2. *Nuovo Cimento* **10** (1964) p. 154
3. S. Weinberg
4. *Phys. Rev. Lett.* **13** (1964) p. 527
5. J. Schwinger

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Higgs boson scientists share physics Nobel prize

Peter Higgs went on holiday without a phone to avoid media storm surrounding Tuesday's physics Nobel announcement

Ian Sample, science correspondent
theguardian.com, Tuesday 8 October 2013 14.55 BST



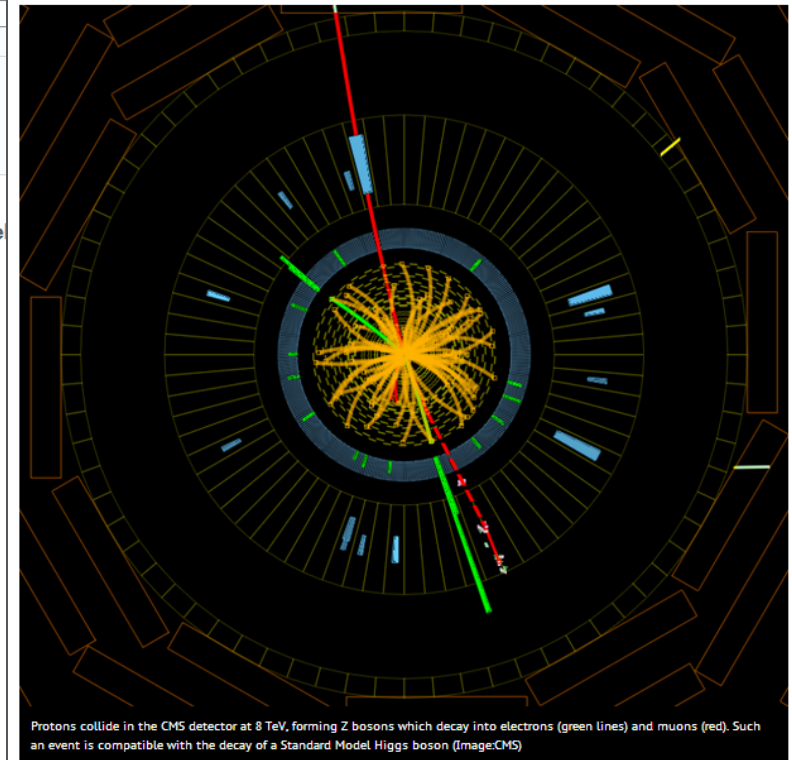
Peter Higgs (left) and François Englert won the Nobel Prize in Physics 50 years after theorising the field that gives fundamental particles their mass. Photograph: Getty

And so the wait is over. Half a century after he wrote down a theory that would change the world, Peter Higgs, the Edinburgh-based researcher, has won the Nobel Prize in Physics.

Higgs, 84, shares the 8m Swedish kronor (£775,000) prize – and no shortage of kudos – with François Englert at the Free University of Brussels for showing how fundamental particles get their masses. Before the theory, the answer to this basic question was unknown.

The Royal Swedish Academy awarded the prize for "the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed

ATLAS and CMS submit Higgs-search papers



The ATLAS and CMS collaborations today submitted papers to the journal *Physics Letters B* outlining the latest on their searches for the Higgs boson. The teams report even stronger evidence for the presence of a new Higgs-like particle than announced on 4 July.

On 4 July the experiments reported indications for the presence of a new particle, which could be the Higgs boson, in the mass region around 126 gigaelectronvolts (GeV). Both ATLAS and CMS gave the level of significance of the result as 5 sigma. On the scale that particle physicists use to describe the certainty of a discovery, one sigma means the results could be random fluctuations in the data, 3 sigma counts as an observation and a 5-sigma result is a discovery.

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Hypothesis 3: It's an issue of funding

“a growing cited half-life might also reflect major structural shifts in the way science is funded and the way scientists are rewarded. A gradual move to **fund incremental and applied research** may result in fewer fundamental and theoretical studies being published. Giving credit to these founders may require authors cite an increasingly aging literature.” Phil Davies



Basic Research Often Mocked, Targeted for Budget Cuts Due to Lack Of Public Understanding

To protect funding for basic research, the foundation for all science applications, scientists need to do a better job explaining the value of their work, panelists said at the AAAS Forum on S&T Policy.

15 May 2015 Kathleen O'Neil

“The great beyond: will the UK science budget be cut by 40%?”

Jenny Rohn

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The role of the librarian 4 mins

Questions 10 mins

Part 1

Part 2

Thank you!

**For queries about E-PIC, speak to me afterward,
or e-mail me at r.rogan@elsevier.com**