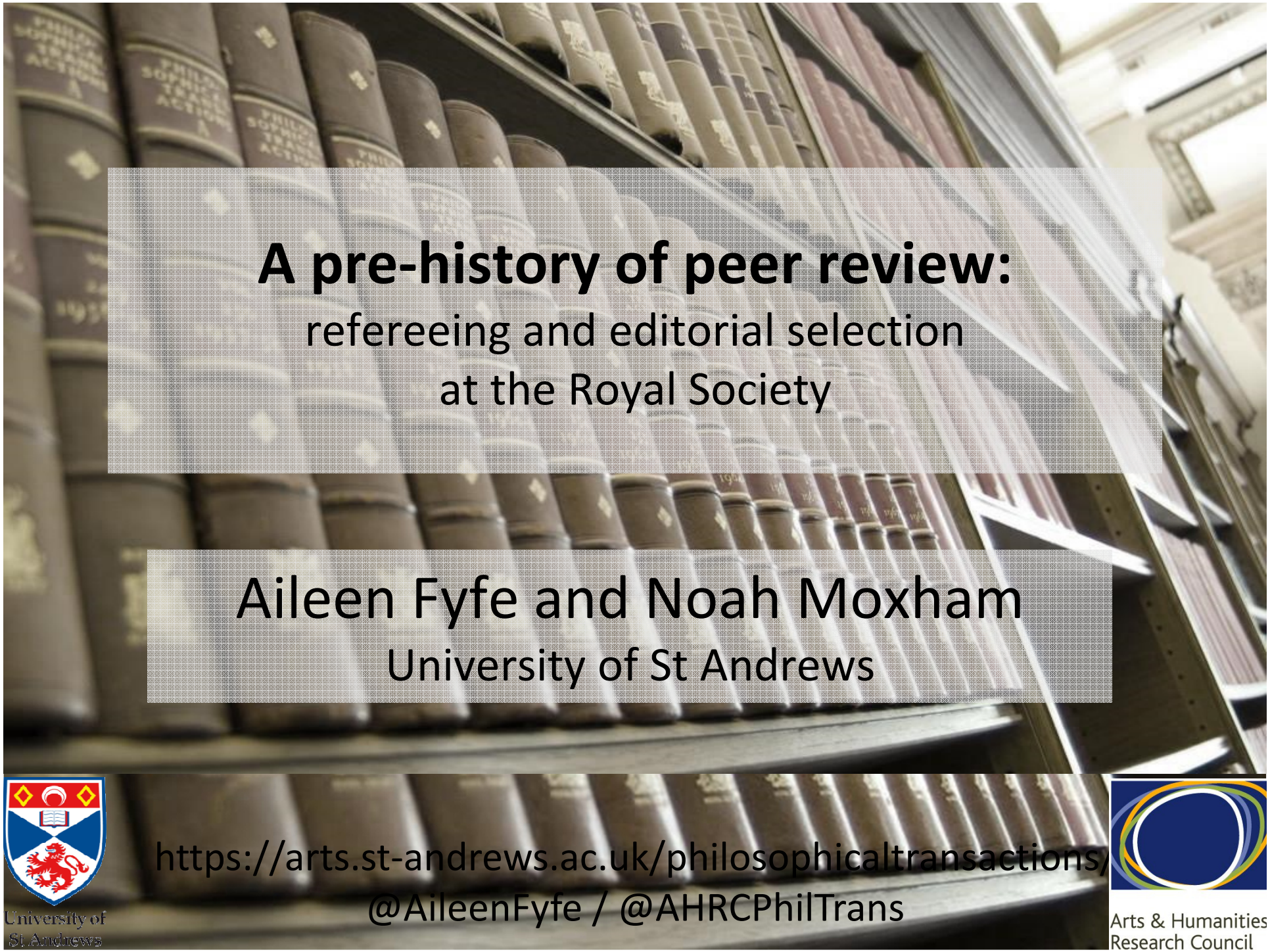


A pre-history of peer review:

refereeing and editorial selection at the Royal Society

Aileen Fyfe and Noah Moxham

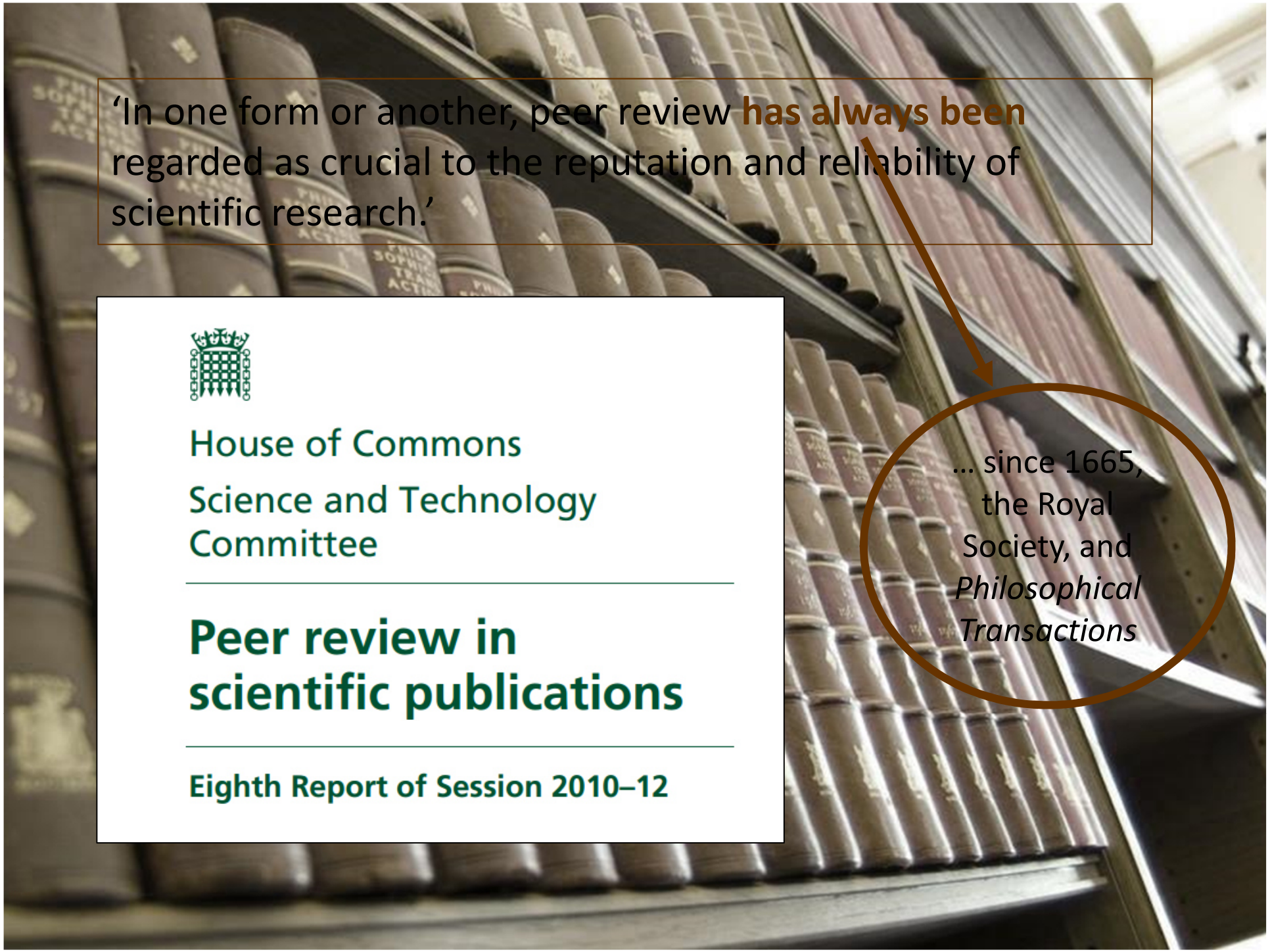
University of St Andrews

https://arts.st-andrews.ac.uk/philosophicaltransactions/

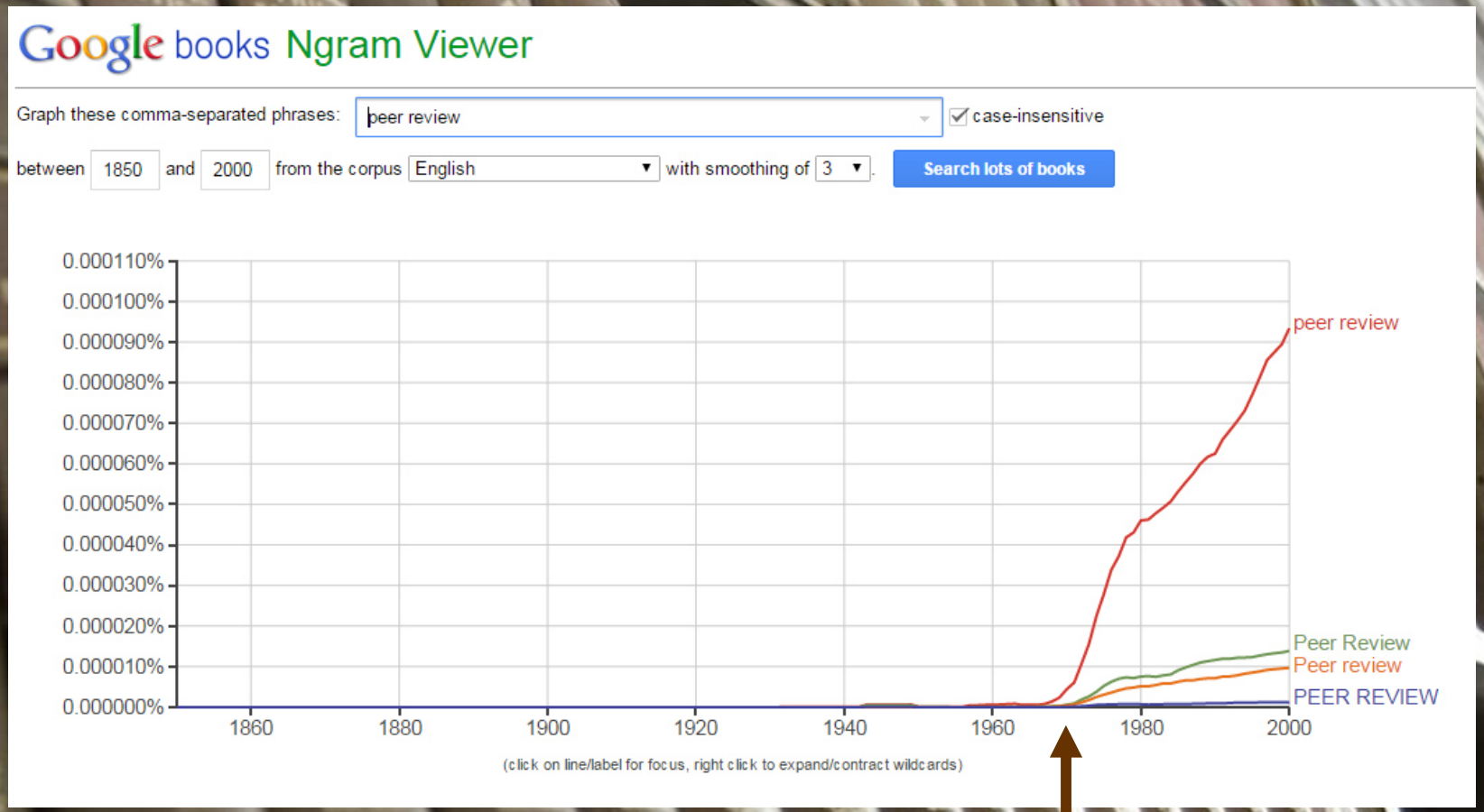
@AileenFyfe / @AHRCPhilTrans

University of St Andrews

Arts & Humanities Research Council


‘In one form or another, peer review has always been regarded as crucial to the reputation and reliability of scientific research.’
House of Commons
Science and Technology Committee
Peer review in scientific publications
Eighth Report of Session 2010–12
… since 1665, the Royal Society, and *Philosophical Transactions*

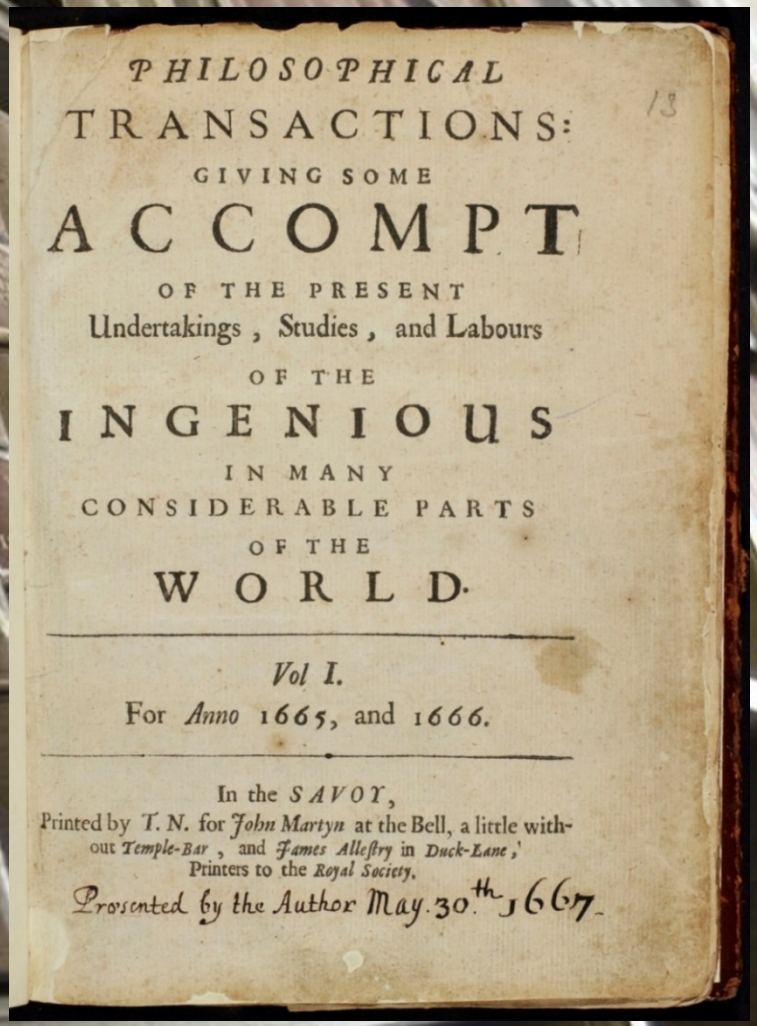
But ‘peer review’ is really recent…



1970

The 'Publishing the *Philosophical Transactions*, 1665-2015' project

The longest-running scientific journal in the world: *Philosophical Transactions*, founded 1665, and published by the Royal Society of London since 1752



PHILOSOPHICAL
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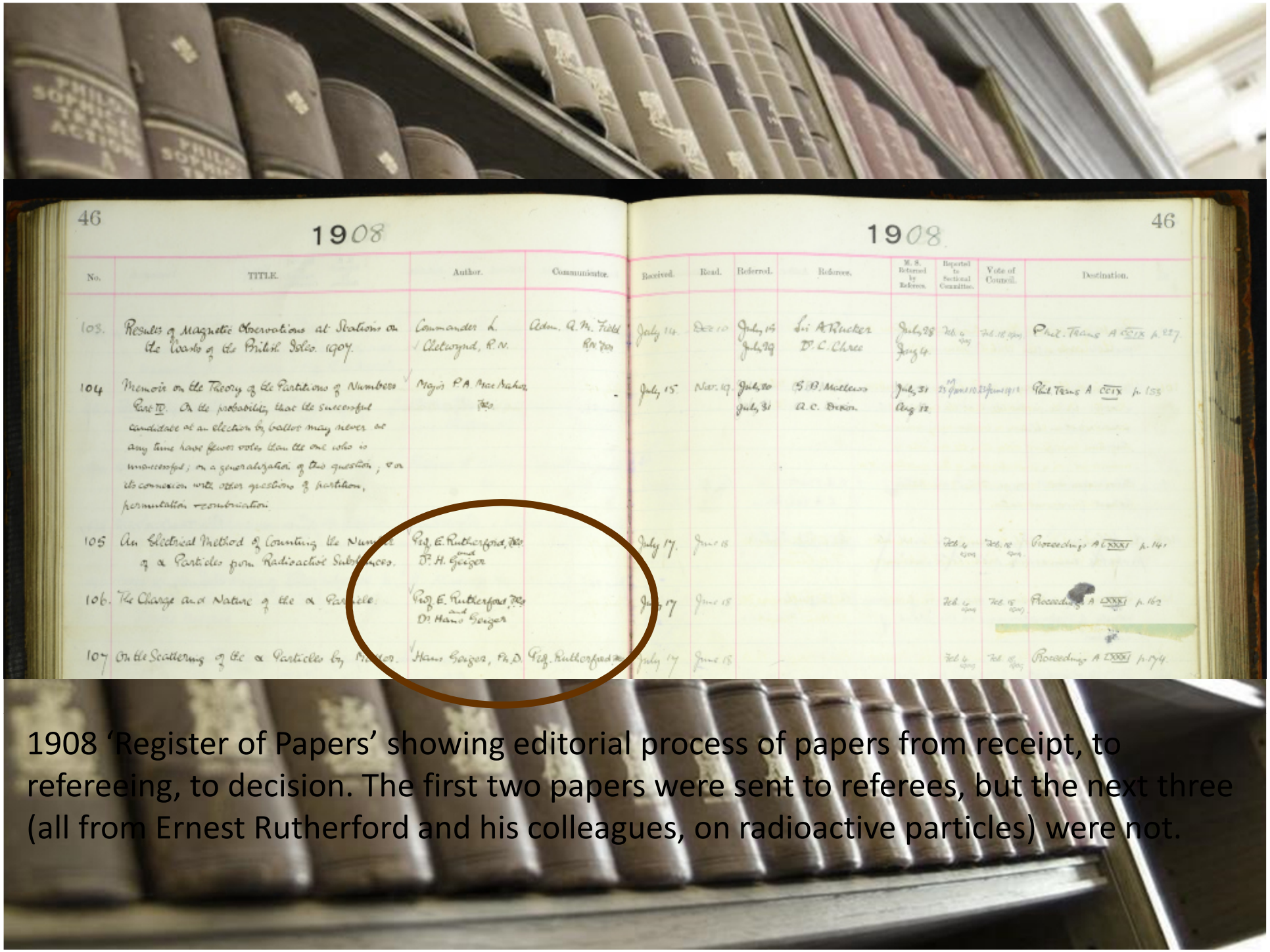
Presented by the Author May. 30th 1667.

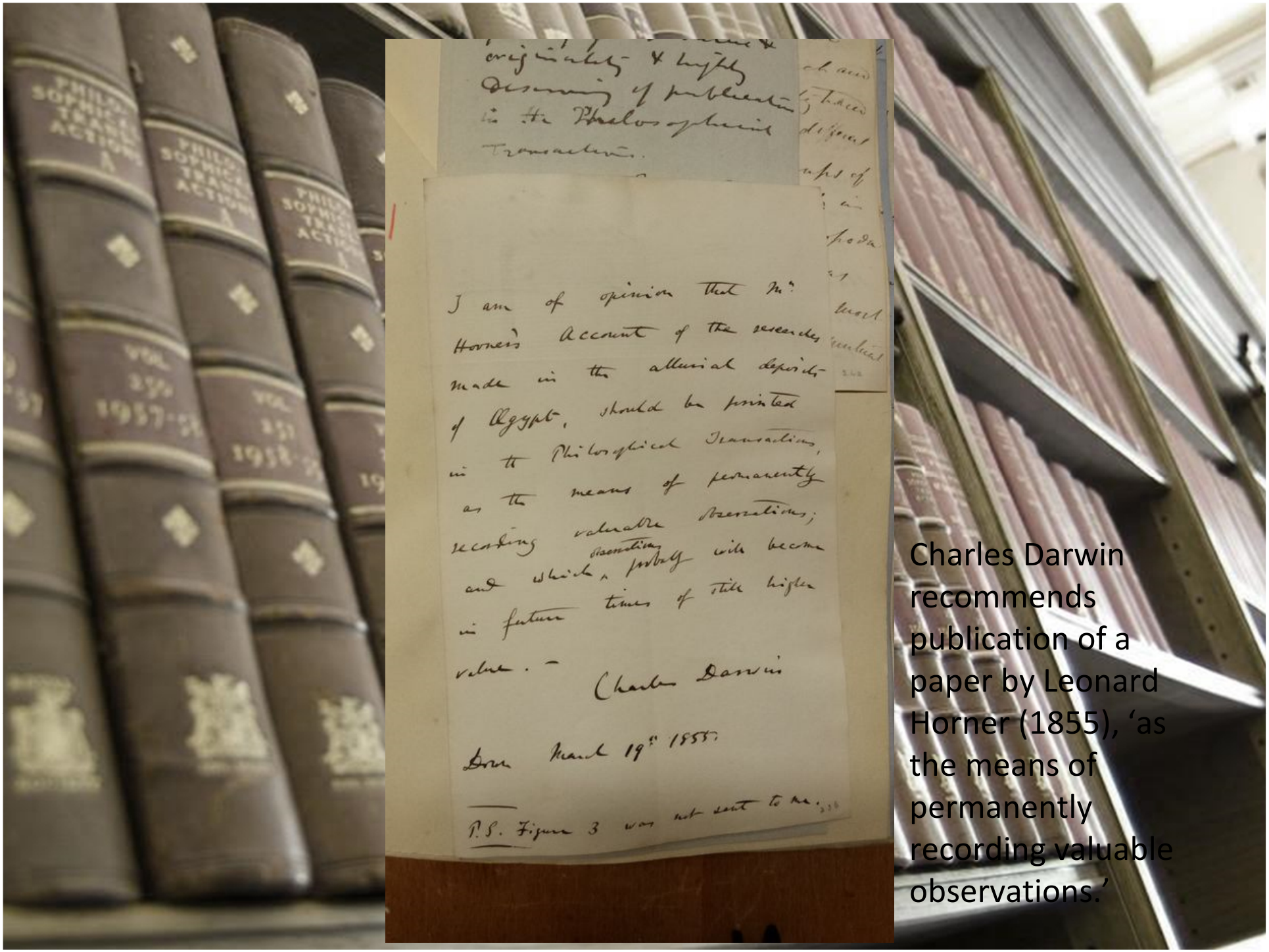


46

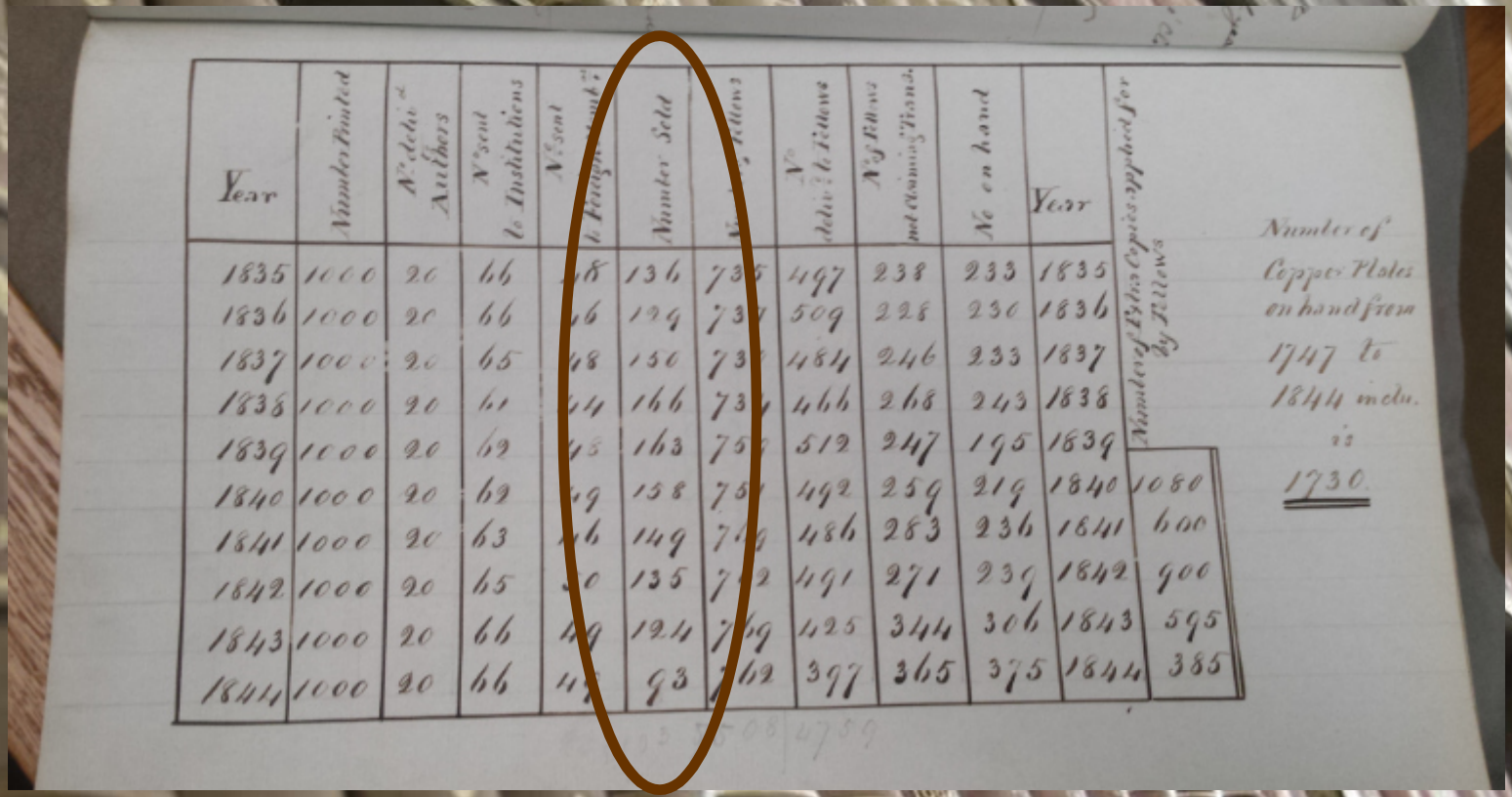
1908

No.	TITLE.	Author.	Communicator.	Received.	Read.	Referred.	Referees.	M. S. Returned by Referee.	Reported to Sectional Committee.	Vote of Council.	Destination.
103.	Results of Magnetic Observations at Stations on the Coasts of the British Isles. 1904.	Commander L. Cheltenham, R.N.	Adm. A. M. Field R.N. F.R.S.	July 14.	Dec 10	July 16 July 29	Sir A. Rücker D. C. Chree	July 28 Aug 4.	Feb 4 1909	Feb 18 1909	Phil. Trans A 208 p. 227
104	Memoir on the Theory of the Partitions of Numbers Part IV. On the probability that the successful candidate at an election by ballot may never at any time have fewer votes than the one who is unsuccessful; or a generalization of this question; & on its connexion with other questions of partition, permutation & combination.	Major P. A. MacMahon F.R.S.		July 15	Nov. 19	July 30 July 31	G. B. Matthews A. C. Dixon	July 31 Aug 12	25 June 1908 23 June 1910		Phil Trans A 209 p. 153
105	An Electrical Method of Counting the Number of α Particles from Radioactive Substances.	Prof. E. Rutherford F.R.S. and Dr. H. Geiger		July 17.	June 18				Feb 4 1909	Feb 18 1909	Proceedings A [illegible] p. 141
106.	The Charge and Nature of the α Particle.	Prof. E. Rutherford F.R.S. and Dr. Hans Geiger		July 17	June 18				Feb 4 1909	Feb 18 1909	Proceedings A [illegible] p. 162
107	On the Scattering of the α Particles by Matter.	Hans Geiger, Ph.D.	Prof. Rutherford F.R.S.	July 17	June 18				Feb 4 1909	Feb 18 1909	Proceedings A [illegible] p. 174

1908 'Register of Papers' showing editorial process of papers from receipt, to refereeing, to decision. The first two papers were sent to referees, but the next three (all from Ernest Rutherford and his colleagues, on radioactive particles) were not.



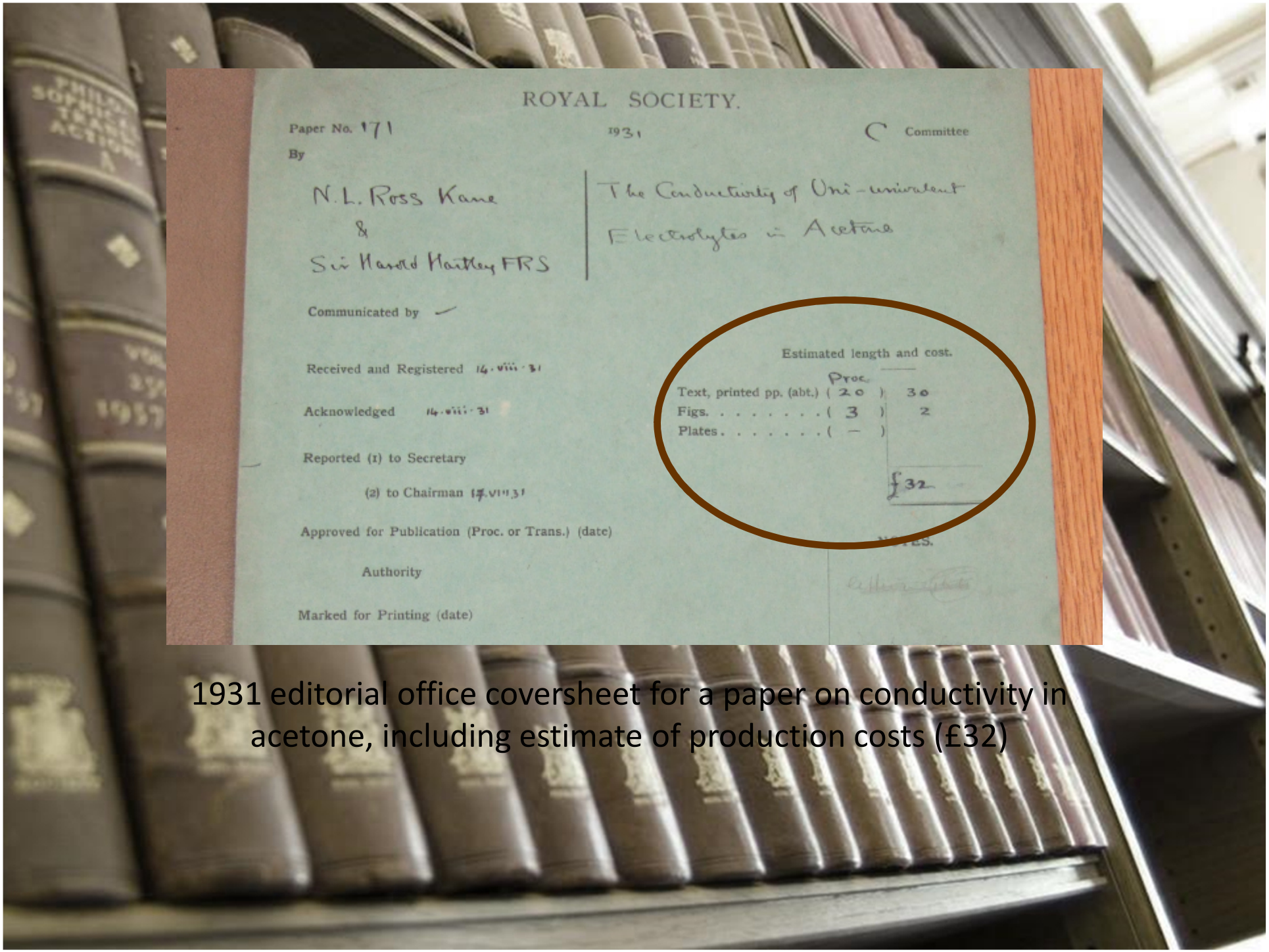
Charles Darwin recommends publication of a paper by Leonard Horner (1855), ‘as the means of permanently recording valuable observations.’



Year	Number Printed	No. delivered to Authors	No. sent to Institutions	No. sent to Foreign Societies	Number Sold	No. delivered to Fellows	No. Fellows not claiming Plates	No. on hand	Year	Number of the Copies applied for by Fellows
1835	1000	20	66	48	136	735	497	238	233	1835	
1836	1000	20	66	46	144	734	509	228	230	1836	
1837	1000	20	65	48	150	734	484	246	233	1837	
1838	1000	20	61	44	166	734	466	268	243	1838	
1839	1000	20	69	45	163	754	519	247	195	1839	
1840	1000	20	69	49	158	754	492	259	219	1840	1080
1841	1000	20	63	46	149	749	486	283	236	1841	600
1842	1000	20	65	50	135	749	491	271	239	1842	900
1843	1000	20	66	49	124	749	425	344	306	1843	595
1844	1000	20	66	49	93	749	397	365	375	1844	385

Number of Copper Plates on hand from 1747 to 1844 inclu. is 1730.

1847 report on print run, **sales** and other distribution of the *Transactions*, 1835-1844

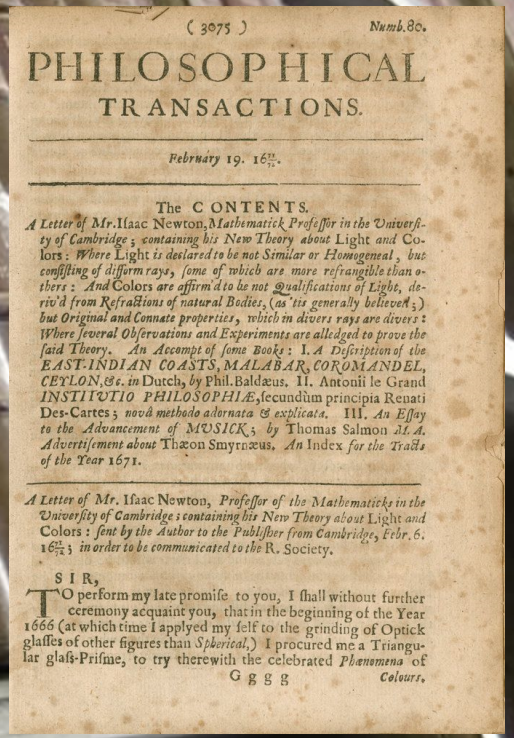


1931 editorial office coversheet for a paper on conductivity in acetone, including estimate of production costs (£32)

1665: Oldenburg's *Philosophical Transactions*

1665 1752 1832 1890s 1990

Henry Oldenburg founded the *Philosophical Transactions,* a monthly news-sheet reporting natural philosophical news from all over Europe, to his English readers



(3075) Numb. 80.

PHILOSOPHICAL TRANSACTIONS.

February 19. 16$\frac{72}{73}$.

The CONTENTS.

A Letter of Mr. Isaac Newton, *Mathematick Professor in the University of Cambridge; containing his New Theory about* Light *and* Colors: *Where* Light *is declared to be not Similar or Homogeneal, but consisting of difform rays, some of which are more refrangible than others: And* Colors *are affirm'd to be not Qualifications of Light, deriv'd from Refractions of natural Bodies, (as 'tis generally believed;) but Original and Connate properties, which in divers rays are divers: Where several Observations and Experiments are alledged to prove the said Theory. An Accompt of some Books:* I. *A Description of the* EAST-INDIAN COASTS, MALABAR, COROMANDEL, CEYLON, *&c. in* Dutch, *by* Phil. Baldæus. II. Antonii le Grand *INSTITUTIO PHILOSOPHIÆ, secundùm principia* Renati Des-Cartes; *novâ methodo adornata & explicata.* III. *An Essay to the Advancement of* MUSICK; *by* Thomas Salmon *M. A. Advertisement about* Thæon Smyrnæus. *An* Index *for the Tracts of the Year* 1671.

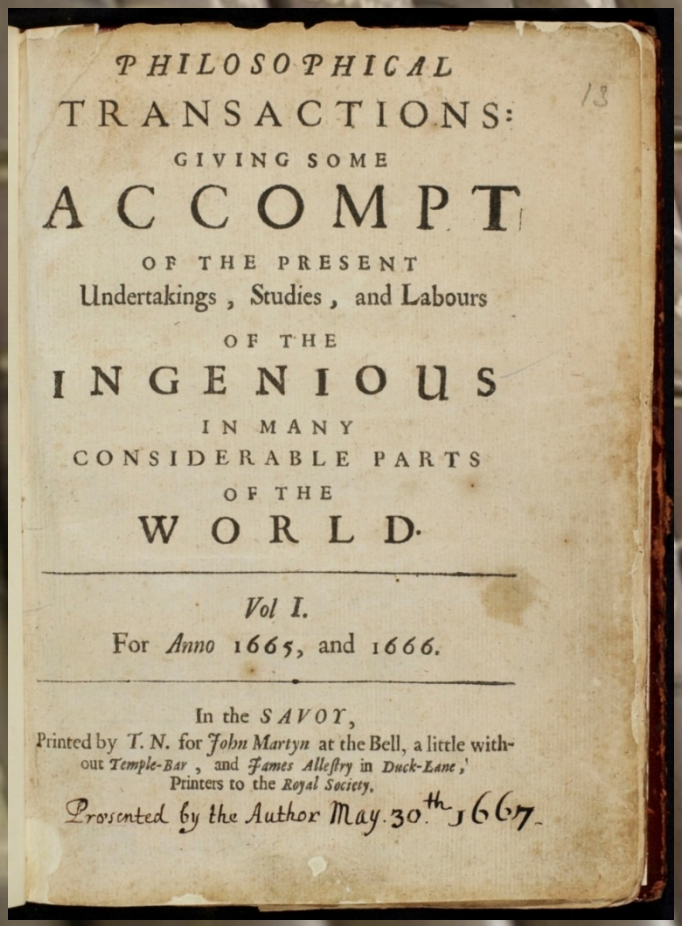
A Letter of Mr. Isaac Newton, *Professor of the Mathematicks in the University of Cambridge; containing his New Theory about* Light *and* Colors: *sent by the Author to the Publisher from Cambridge, Febr.* 6. 16$\frac{72}{73}$; *in order to be communicated to the* R. Society.

SIR,

TO perform my late promise to you, I shall without further ceremony acquaint you, that in the beginning of the Year 1666 (at which time I applyed my self to the grinding of Optick glasses of other figures than *Spherical,*) I procured me a Triangular glass-Prisme, to try therewith the celebrated *Phænomena* of

Gggg *Colours.*

Oldenburg: a strong, independent, editor



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‘Strong editors’: a successful model

THE

PHILOSOPHICAL MAGAZINE.

COMPREHENDING

THE VARIOUS BRANCHES OF SCIENCE,

THE LIBERAL AND FINE ARTS,

AGRICULTURE, MANUFACTURES,

AND

COMMERCE.

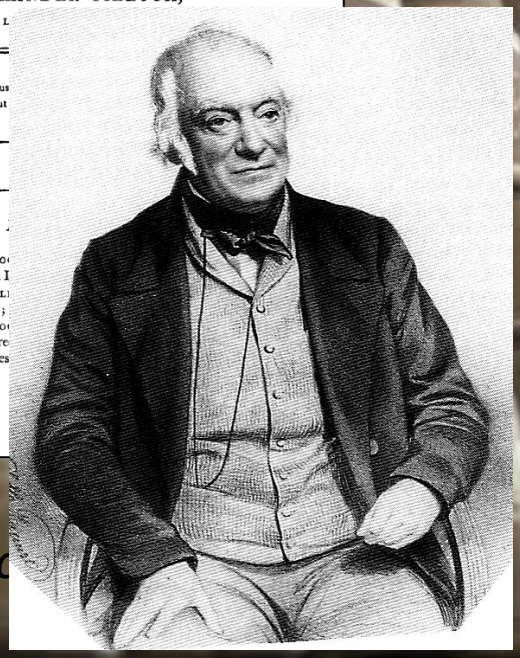
BY ALEXANDER TILLOCH,

MEMBER OF THE L

“ Nec aranearum fane textus
vilior quia ex alienis libamus ut

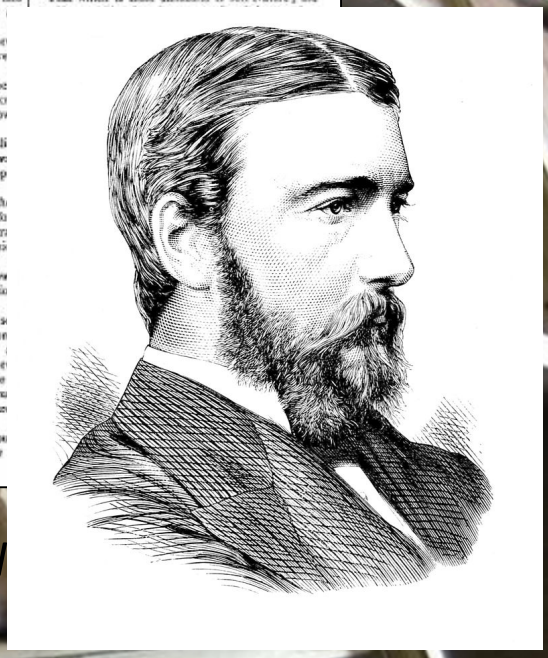
Printed for ALEX. TILLO
Cornhill; CADELL and I
MURRAY and HIGHL
Paternoster Row;
VERNOR and Ho
St. James's-stre
St. Giles

Philosophic
(f.1798)



Richard Taylor (1781-1858)

N

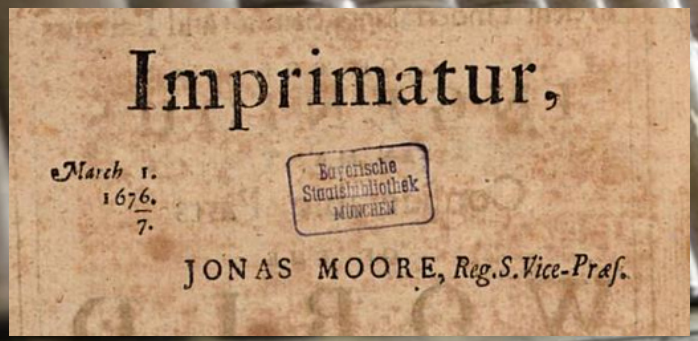


Norman Lockyer (1836-1920)

The 'imprimatur' 1665-1695

Printed with Licence, For *John Martin*, and *James Allistry*,
Printers to the *Royal Society*.

- *Philosophical Transactions* was printed using Royal Society's licensing privilege (thus, no need for additional state censorship)
- RS President was vouching for suitability of publication
- No treason, blasphemy etc!

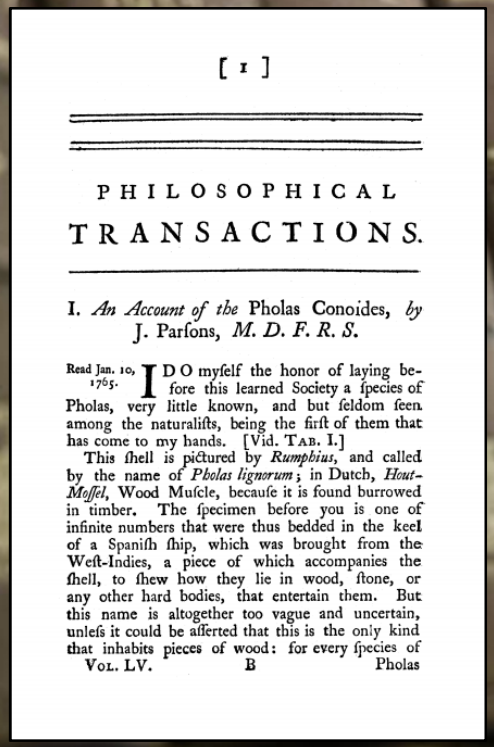

Imprimatur,

March 1. 1676/7.

JONAS MOORE, *Reg.S.Vice-Præs.*

1752: Editing by Committee

1665 → 1752 → 1832 → 1890s → 1990



[1]

PHILOSOPHICAL
TRANSACTIONS.

I. *An Account of the* Pholas Conoides, *by* J. Parſons, *M. D. F. R. S.*

Read Jan. 10, 1765. I DO myſelf the honor of laying before this learned Society a ſpecies of Pholas, very little known, and but ſeldom ſeen among the naturaliſts, being the firſt of them that has come to my hands. [Vid. TAB. I.]

This ſhell is pictured by *Rumphius*, and called by the name of *Pholas lignorum*; in Dutch, *Hout-Moſſel*, Wood Muſcle, becauſe it is found burrowed in timber. The ſpecimen before you is one of infinite numbers that were thus bedded in the keel of a Spaniſh ſhip, which was brought from the Weſt-Indies, a piece of which accompanies the ſhell, to ſhew how they lie in wood, ſtone, or any other hard bodies, that entertain them. But this name is altogether too vague and uncertain, unleſs it could be aſſerted that this is the only kind that inhabits pieces of wood: for every ſpecies of

VOL. LV. B Pholas

The Royal Society took over the *Transactions;* linked publication to meetings; and set up committee structures for collective editorial responsibility.

Why take on the *Transactions*?

For ‘the **Honour and Credit** of the Society’…

Because of ‘the high Degree, in which the **Reputation** of the Society was concerned, in respect of the papers printed and published in the Transactions’…

And the apparent need ‘of Obviating any future Inconveniences from **the want of a due Attention** to the proper choice of such publications’

23 January 1751/2

George Parker, Earl of Macclesfield,
Council member, soon-to-be-President

Gate-Keeping and Decision-Making

‘The Members of the Council for the time being, shall constitute and be a standing Committee, to whom the consideration of the Publication of such Papers as shall have been read, or communicated to the Society at their weekly Meetings…’

Royal Society statutes, 1752

1752: denial of responsibility for ‘certainty of facts’

[iii]

ADVERTISEMENT.

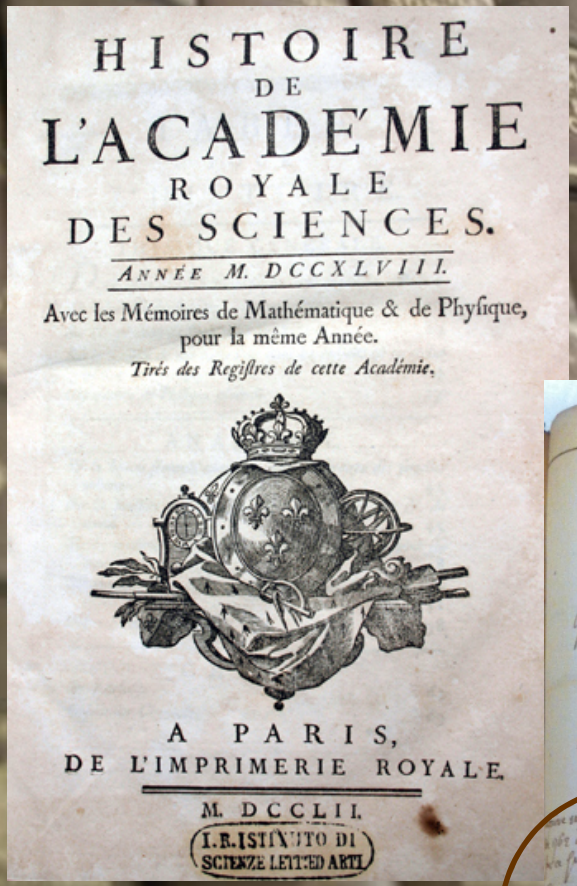
THE Committee appointed by the *Royal Society* to direct the publication of the *Philosophical Transactions*, take this opportunity to acquaint the Public, that it fully appears, as well from the council-books and journals of the Society, as from repeated declarations, which have been made in several former *Transactions*, that the printing of them was always, from time to time, the single act of the respective Secretaries, till the Forty-seventh Volume: the Society, as a body, never interesting themselves any further in their publication, than by occasionally recommending the revival of them to some of their Secretaries, when, from the particular circumstances of their affairs, the *Transactions* had happened for any length of time to be intermitted. And this seems principally to have been done with a view to satisfy the Public, were then continued for the improvement of k mankind, the great ends of their first institutio and which they have ever since steadily pursue

But the Society being of late years greatly munications more numerous, it was thought adv of their members should be appointed to recon fore them, and select out of them such, as they per for publication in the future *Transactions* ; done upon the 26th of March 1752. And the are, and will continue to be, the importance an jects, or the advantageous manner of treating th to answer for the certainty of the facts, or pr contained in the several papers so published, wh credit or judgment of their respective authors.

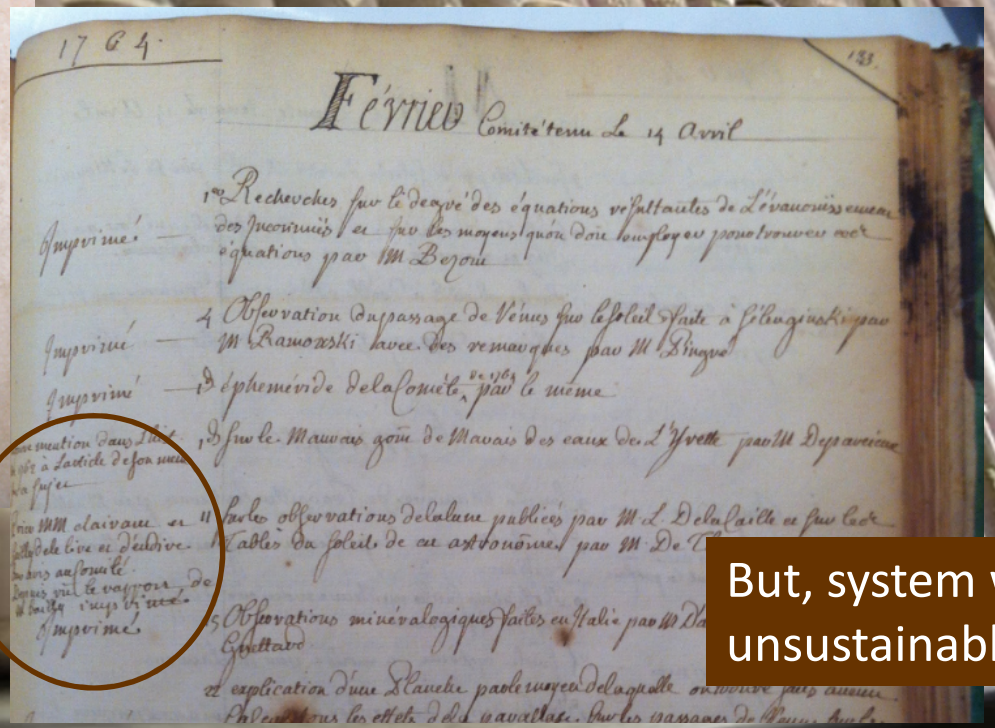
A 2 It.

done upon the 26th of March 1752. And the grounds of their choice are, and will continue to be, the importance and singularity of the subjects, or the advantageous manner of treating them; without pretending to answer for the certainty of the facts, or propriety of the reasonings, contained in the several papers so published, which must still rest on the credit or judgment of their respective authors.

Contrast with: *Académie royale des sciences*

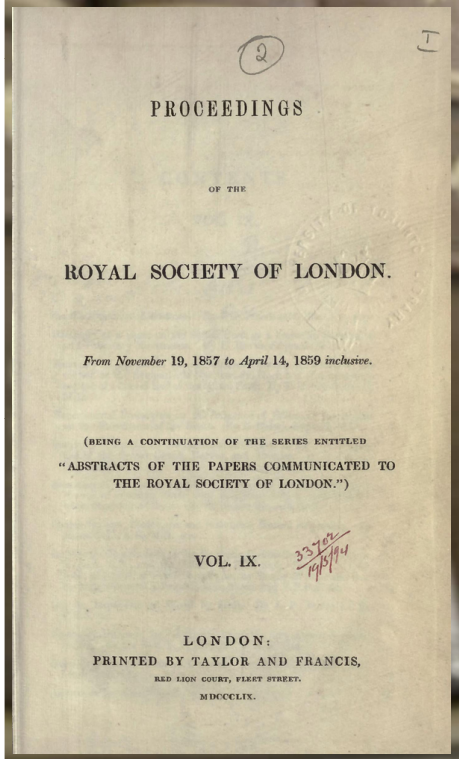

HISTOIRE
DE
L'ACADE'MIE
ROYALE
DES SCIENCES.
ANNÉE M. DCCXLVIII.
Avec les Mémoires de Mathématique & de Physique, pour la même Année.
Tirés des Regiſtres de cette Académie.
A PARIS,
DE L'IMPRIMERIE ROYALE.
M. DCCLII.

- Set up small committees to examine work by outsiders
- Tested/replicated the results
- Reported (jointly) in writing


1764.
Février Comité tenu le 14 Avril
But, system was unsustainable by 1830s

1832: Written Refereeing

1665 1752 1832 1890s 1990



PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON.

From November 19, 1857 *to April* 14, 1859 *inclusive.*

(BEING A CONTINUATION OF THE SERIES ENTITLED
"ABSTRACTS OF THE PAPERS COMMUNICATED TO
THE ROYAL SOCIETY OF LONDON.")

VOL. IX.

LONDON:
PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.
MDCCCLIX.

Started issuing *Proceedings* as well; it carried abstracts, and came out approximately monthly. The *Transactions* carried long papers, and came out every six months.
The Society faced calls for reforms, e.g. from Charles Babbage.
Written refereeing was adopted for *Transactions*.

Charles Babbage, author of *Decline of Science in England* (1830)

Written Refereeing

Papers for publication in the *Transactions* are now only being approved if 'a **written report of its fitness** shall have been previously made by one or more members of the Council, to whom it shall have been especially **referred for examination**'

November 1832

Frederick Augustus, the Duke of Sussex,
President of the Royal Society

The ‘referring’ of papers before 1832

1752 statutes: the Committee of Papers may summon any other fellow, who was ‘knowing and well-skilled in the particular branch of Science’, to deliver an opinion of a paper on whose merits the Committee felt itself unqualified to decide.

Rarely used…

Occasionally, in **1780s/90**s, a paper was ‘referred’ to a member of the Committee

Not additional expertise, but closer scrutiny?

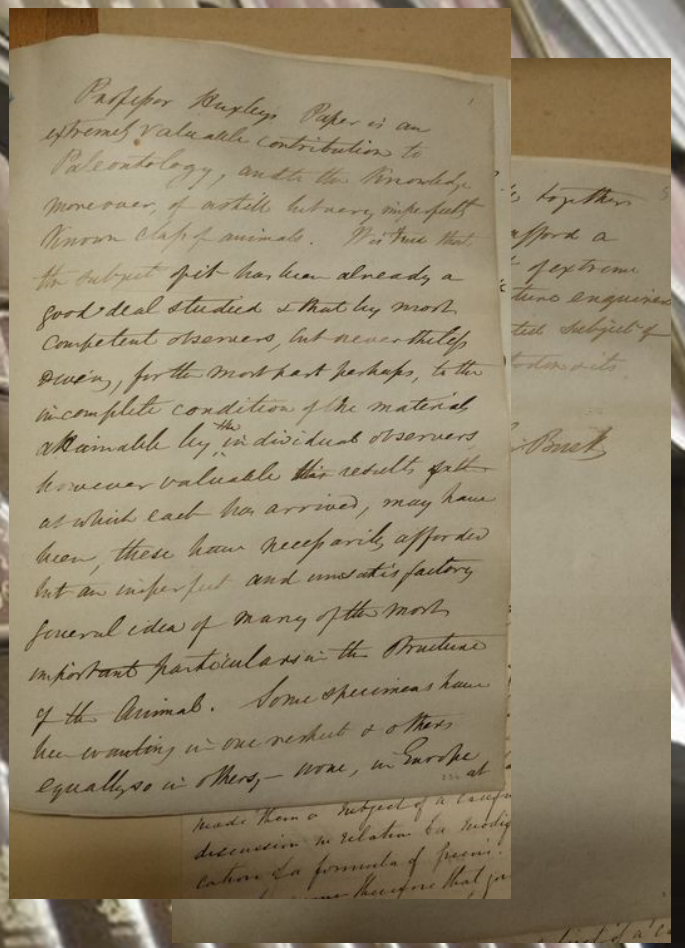
These referees reported orally

1820s assumption among fellows: that ‘every communication is supposed to have been previously […] referred to the judgment of some competent member who reports his opinion’

Refereeing happened more often than is formally recorded?

Variety of Practice 1832—c.1850s

- Written or oral?
- How many referees?
- Who can act as referee?
- Joint reports, or independent?
- Public reports, or confidential?
- How long should a report be?
- Publication recommendation, and/or suggestions to author?

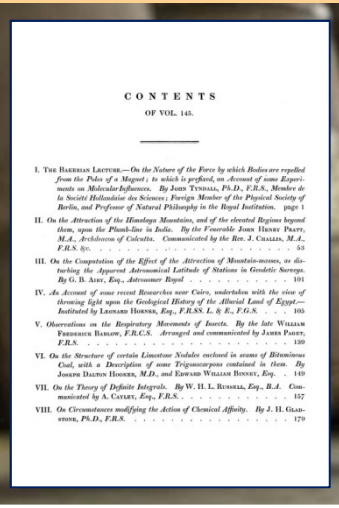


George Busk took five pages to recommend publication of TH Huxley's 1861 paper on Glyptodon

1890s: the meaning of refereeing?

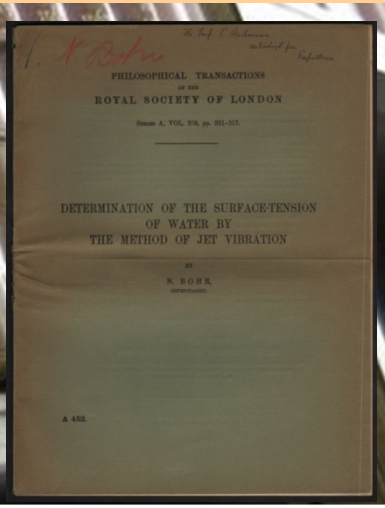
1665 1752 1832 1890s 1990

Serious financial problems re publications…
Reforms to meeting and publications: too many submissions to fit into weekly Society meetings; link between meetings and *Transactions* dropped.
Changes to gate-keeping and pre-refereeing scrutiny.



CONTENTS

OF VOL. 145.



PHILOSOPHICAL TRANSACTIONS
OF THE
ROYAL SOCIETY OF LONDON

Series A, VOL. 209, pp. 281-317.

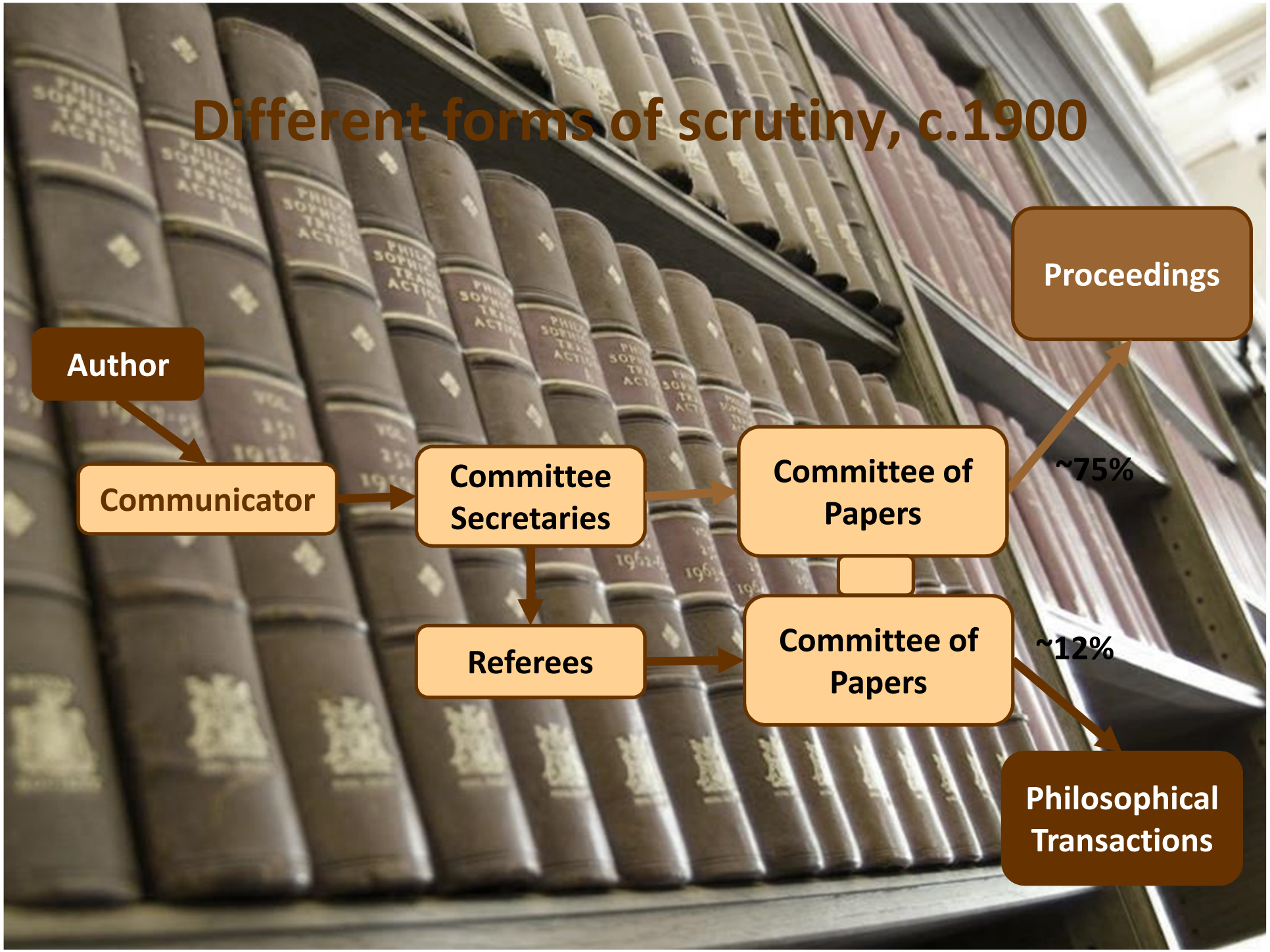
DETERMINATION OF THE SURFACE-TENSION OF WATER BY THE METHOD OF JET VIBRATION

BY

N. BOHR,

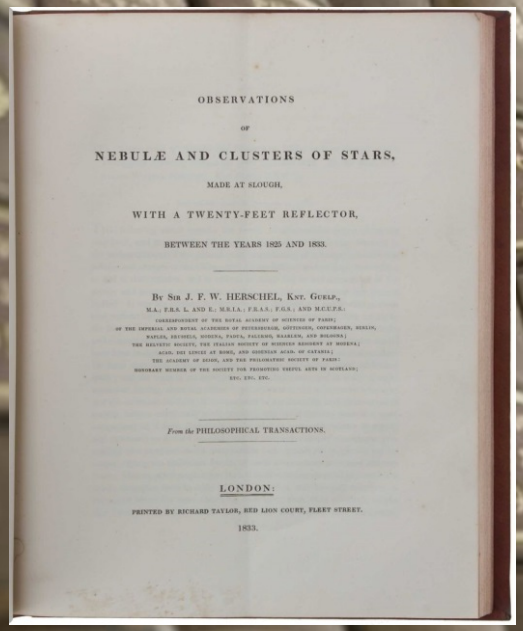
COPENHAGEN.

A 462.


Different forms of scrutiny, c.1900
Author
Communicator
Committee Secretaries
Referees
Committee of Papers
Committee of Papers
~75%
~12%
Proceedings
Philosophical Transactions

Why did *Transactions* need referees…

… if *Proceedings* did not?



OBSERVATIONS

OF

NEBULÆ AND CLUSTERS OF STARS,

MADE AT SLOUGH,

WITH A TWENTY-FEET REFLECTOR,

BETWEEN THE YEARS 1825 AND 1833.

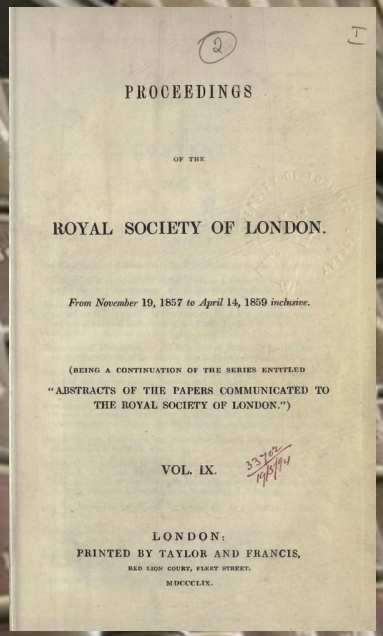
By Sir J. F. W. HERSCHEL, Knt. Guelp,

From the PHILOSOPHICAL TRANSACTIONS.

LONDON:

PRINTED BY RICHARD TAYLOR, RED LION COURT, FLEET STREET.

1833.



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MDCCCLIX.

Transactions	Proceedings
Papers with scope, originality and significance	Results which can be adequately reported in brief
More prestigious for author	
40+ pages	< 12 pages
Can be highly illustrated	Few illustrations

Awarding Prestige

Protecting Finances

Gentlemanly refereeing post-1945

1665 1752 1832 1890s 1990

Growth – in numbers, and in internationalism – of scientific research
Post-1945 rise of commercial journals

1969: Appointment of Associate Editors; expansion of the pool of referees

1990: Appointment of Editors for each journal; dissolution of the Committee of Papers

Should all referees be Fellows of the Society?

- Fairness (gender, seniority, geography)?
- Workload
  - Limited pool of Fellows
  - Growth of international science…

Complaints from Fellows, 1950

For mercy's sake, **don't send me any more papers to referee for a long time**! During the last five very busy weeks I have had five papers, not one of which was fit for publication in a first-class scientific journal

… And all… have been sent up from… experienced… Fellows, who could, if they would only take the trouble, exercise their undoubted critical powers and have the papers put into proper shape, on in some cases stopped, before sending them in.

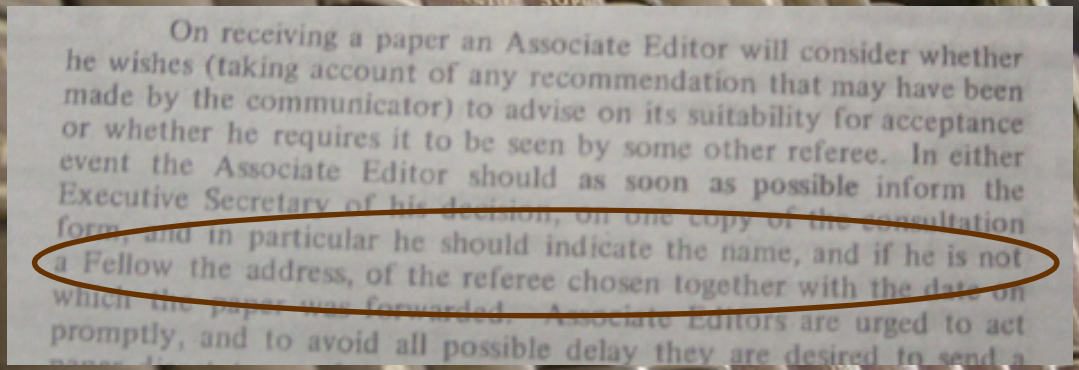
If I get much more heavy refereeing like this, **it is goodbye to any chance of doing real scientific work myself**… If I could only get some uninterrupted time, I could do real work of ten times the value of **the sort of rubbish I have been required to report on** lately….

NPG x163407

Neil Kensington Adam FRS (1891-1973)

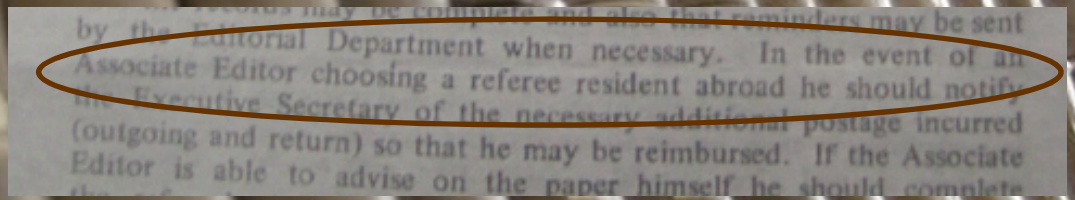
Expanding the pool of referees, 1969

After 1969 reforms, referees did not need to be necessarily Fellows, and not necessarily UK-resident



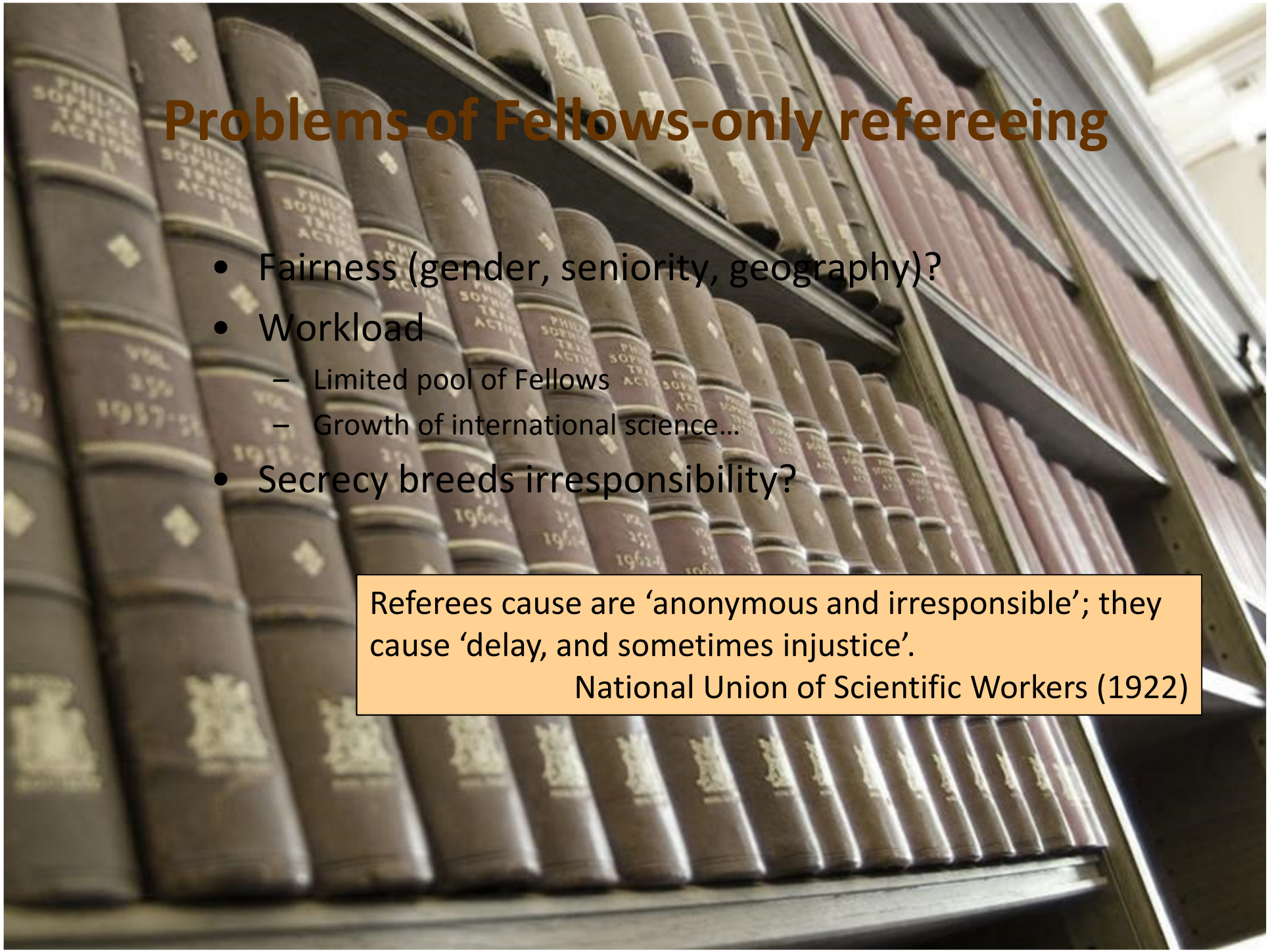
On receiving a paper an Associate Editor will consider whether he wishes (taking account of any recommendation that may have been made by the communicator) to advise on its suitability for acceptance or whether he requires it to be seen by some other referee. In either event the Associate Editor should as soon as possible inform the Executive Secretary of his decision, on one copy of the consultation form, and in particular he should indicate the name, and if he is not a Fellow the address, of the referee chosen together with the date on which the paper was forwarded. Associate Editors are urged to act promptly, and to avoid all possible delay they are desired to send a

'… and if he is not a Fellow…'



by the Editorial Department when necessary. In the event of an Associate Editor choosing a referee resident abroad he should notify the Executive Secretary of the necessary additional postage incurred (outgoing and return) so that he may be reimbursed. If the Associate Editor is able to advise on the paper himself he should complete

'…in the event of… choosing a referee resident abroad…'

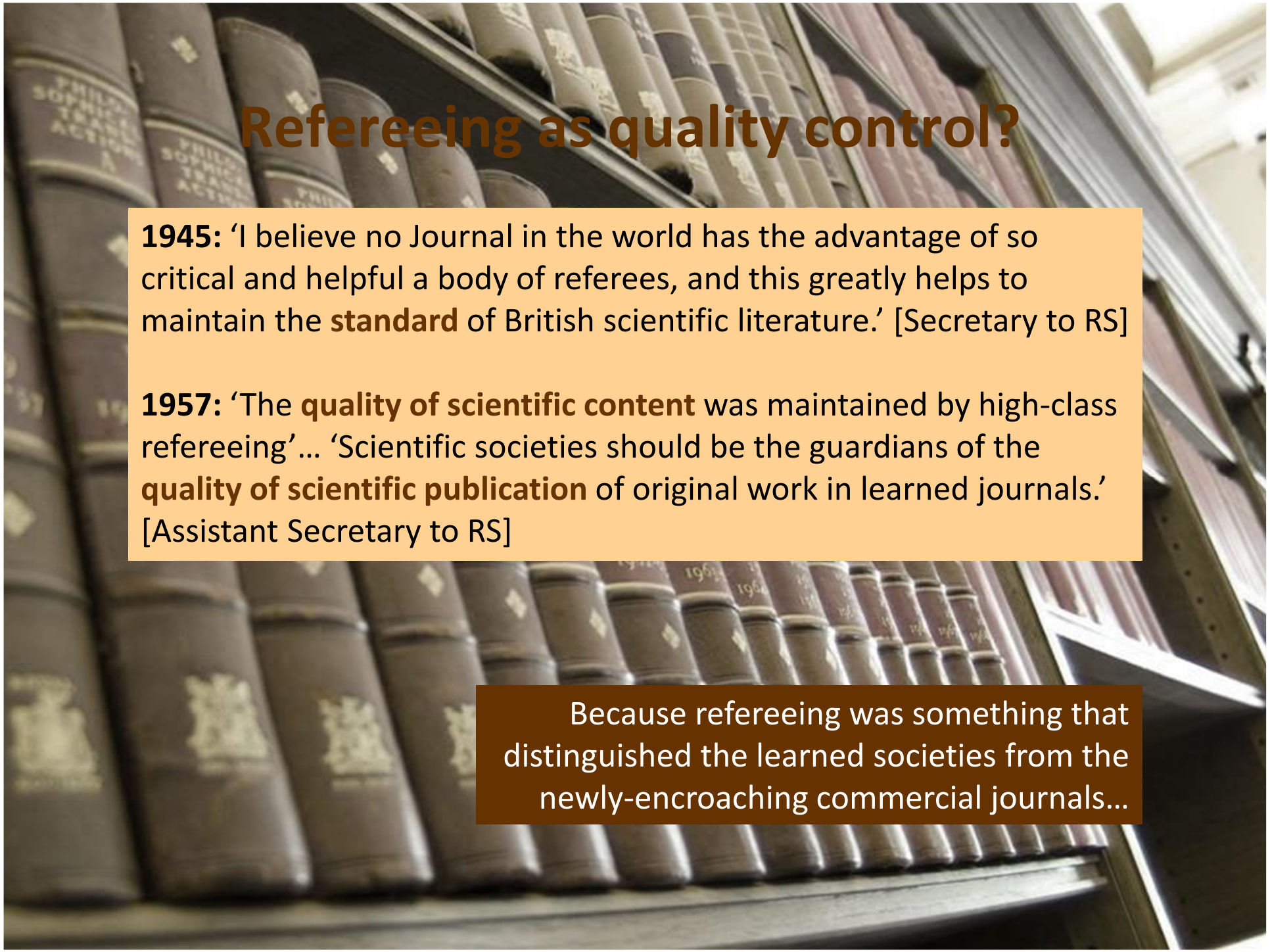


Problems of Fellows-only refereeing

- Fairness (gender, seniority, geography)?
- Workload
  - Limited pool of Fellows
  - Growth of international science…
- Secrecy breeds irresponsibility?

Referees cause are ‘anonymous and irresponsible’; they cause ‘delay, and sometimes injustice’.

National Union of Scientific Workers (1922)



Refereeing as quality control?

1945: 'I believe no Journal in the world has the advantage of so critical and helpful a body of referees, and this greatly helps to maintain the **standard** of British scientific literature.' [Secretary to RS]

1957: 'The **quality of scientific content** was maintained by high-class refereeing'… 'Scientific societies should be the guardians of the **quality of scientific publication** of original work in learned journals.' [Assistant Secretary to RS]

Because refereeing was something that distinguished the learned societies from the newly-encroaching commercial journals…

1970s-1990s

HARRIET ZUCKERMAN AND
ROBERT K. MERTON

Patterns of Evaluation in Science: Institutionalisation, Structure and Functions of the Referee System

THE referee system in science involves the systematic use of judges to assess the acceptability of manuscripts submitted for publication. The referee is thus an example of status-judges who are charged with evaluating the quality of role-performance in a social system. They are found in every institutional sphere. Other kinds of status-judges include teachers assessing the quality of work by students (and, as a recent institutional change, students officially assessing the quality of performance by teachers), critics in the arts, supervisors in industry and coaches and managers in sports. Status-judges are integral to any system of social control through their evaluation of role-performance and their allocation of rewards for that performance. They influence the motivation to maintain or to raise standards of performance.

In the case of scientific and scholarly journals, the significant status-judges are the editors and referees. Like the official readers of manuscripts of books submitted to publishers, or the presumed experts who appraise proposals for research grants, the referees ordinarily make their judgements confidentially, these being available only to the editor and usually to the author. Other judges in science and learning make their judgements public, as in the case of published book reviews and the often important review articles which assess the "credibility" of recent work in a special field of knowledge.

Although the referee system has its inefficiencies, practising scientists see it even in its current form as crucial for the effective development of science. Professor J. M. Ziman puts the case emphatically:

The fact is that the publication of scientific papers is by no means unconstrained. An article in a reputable journal does not merely represent the opinions of its author; it bears the *imprimatur* of scientific authenticity, as given to it by the editor and the referees he may have consulted. The referee is the lynchpin about which the whole business of Science is pivoted.[1]

The chemist, Professor Leonard K. Nash, describes the "editors and referees of scientific journals" as "the main defenders of scientific 'good

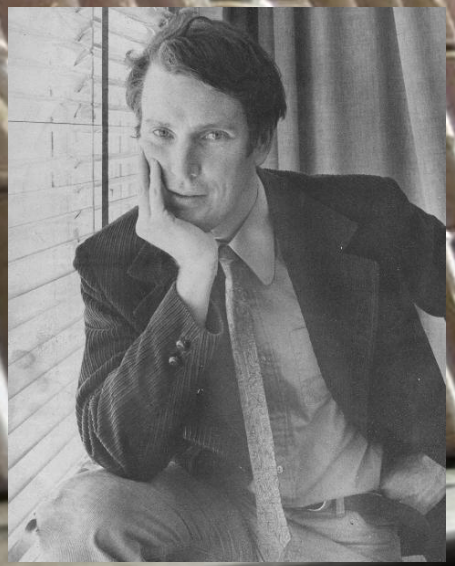
[1] Ziman, J. M., *Public Knowledge: The Social Dimension of Science* (Cambridge University Press, 1966), p. 148.

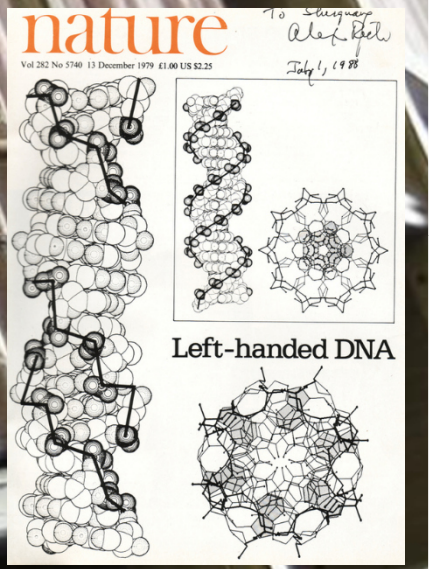
1971: Zuckerman and Merton's analysis of refereeing

1973: David Davies made refereeing standard practice at *Nature*

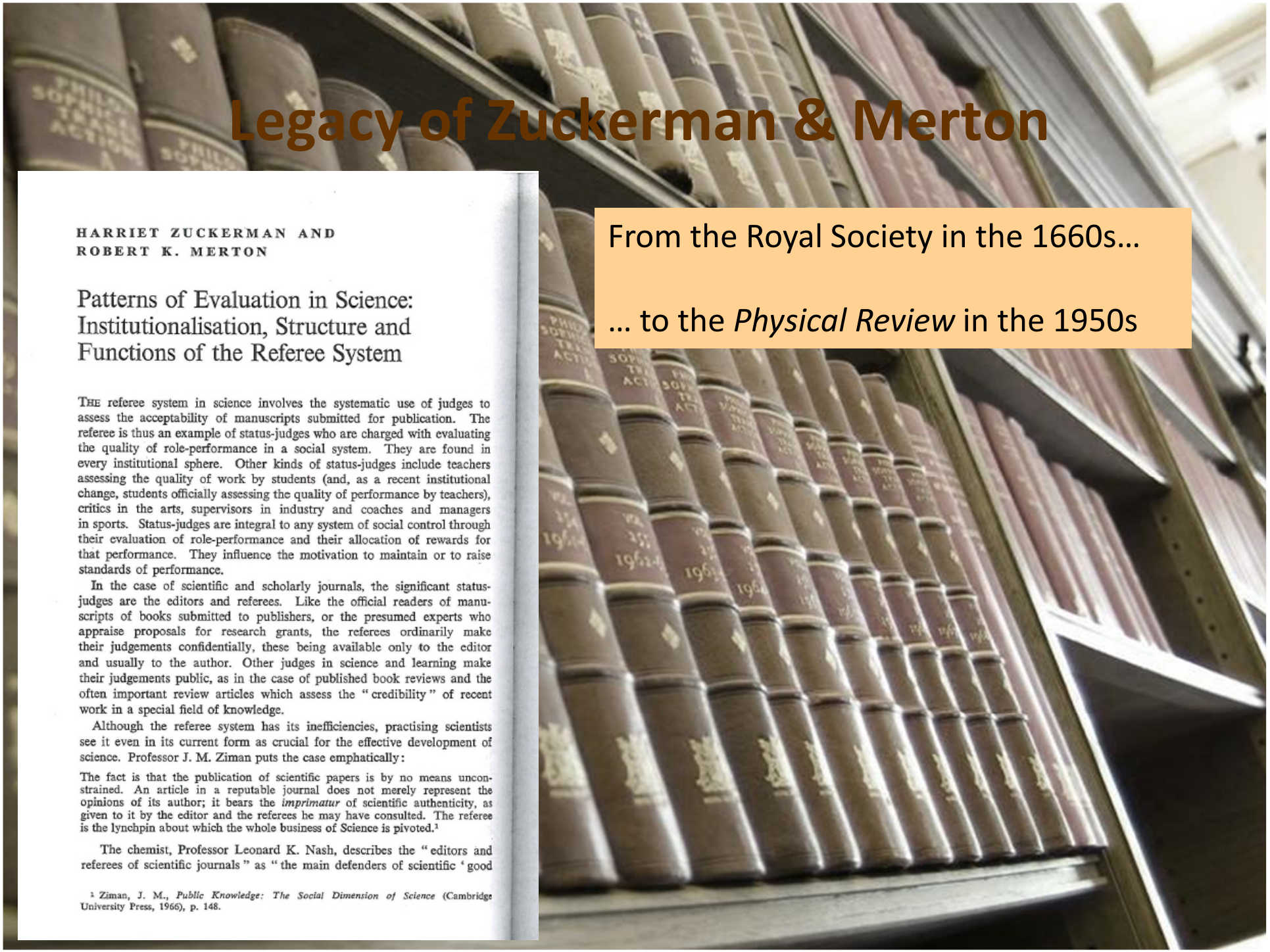
1975: first recorded use of 'peer review' in the context of academic journals (OED)

1989: Cold fusion affair; both *Nature* and the Royal Society argue for the important role of peer review





Legacy of Zuckerman & Merton



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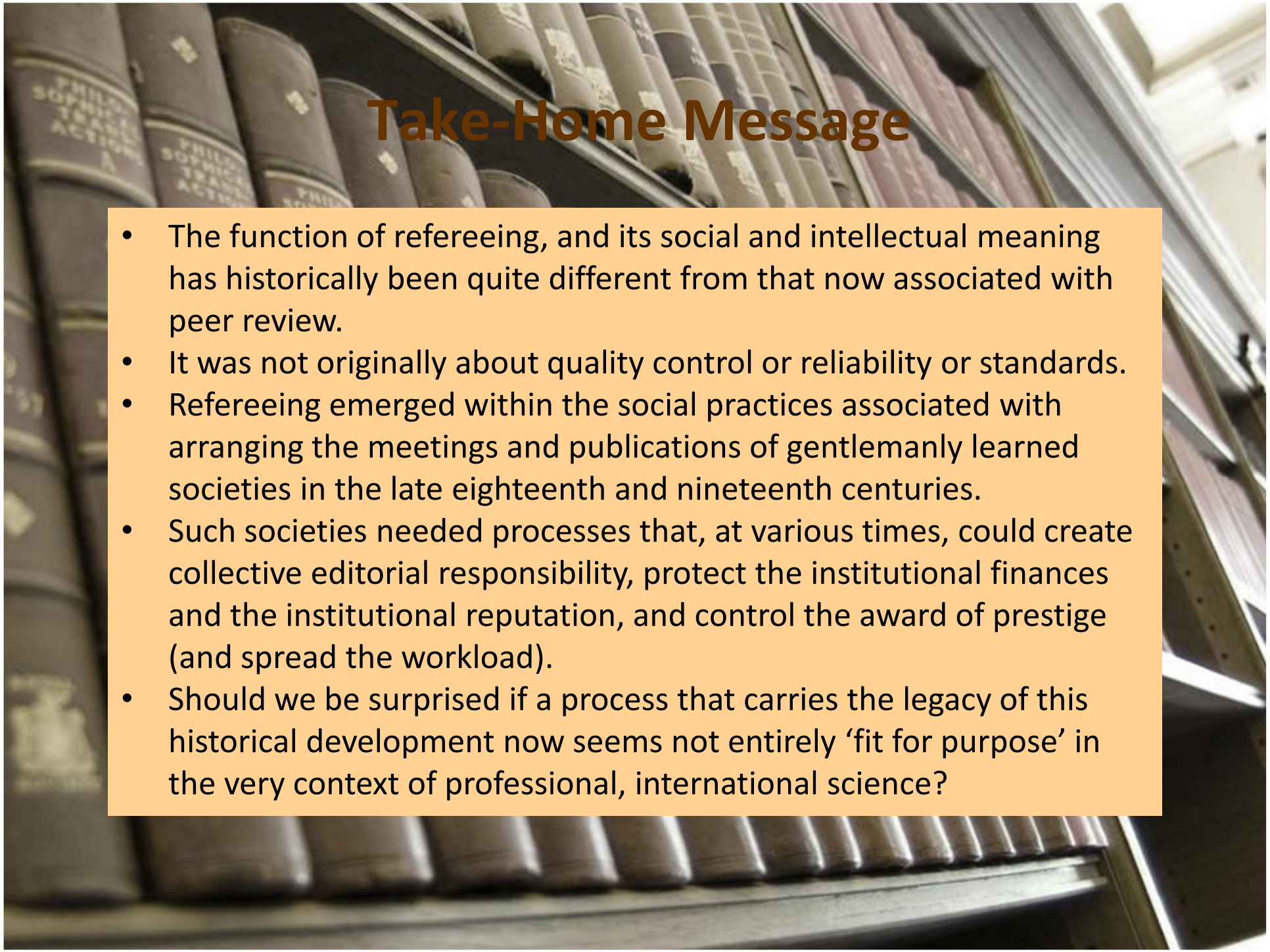
From the Royal Society in the 1660s…

… to the *Physical Review* in the 1950s

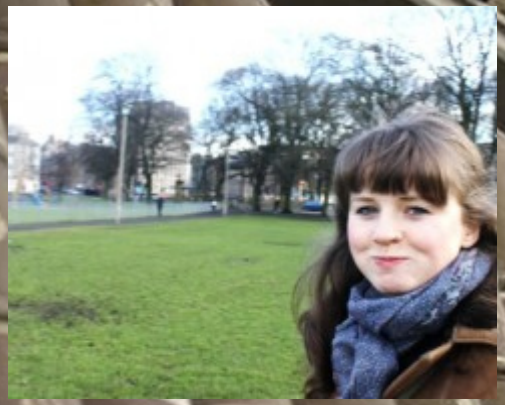


Take-Home Message

- The function of refereeing, and its social and intellectual meaning has historically been quite different from that now associated with peer review.
- It was not originally about quality control or reliability or standards.
- Refereeing emerged within the social practices associated with arranging the meetings and publications of gentlemanly learned societies in the late eighteenth and nineteenth centuries.
- Such societies needed processes that, at various times, could create collective editorial responsibility, protect the institutional finances and the institutional reputation, and control the award of prestige (and spread the workload).
- Should we be surprised if a process that carries the legacy of this historical development now seems not entirely ‘fit for purpose’ in the very context of professional, international science?

The Project Team

Noah Moxham
17th-18th C



Julie McDougall-Waters
19th and early 20th C

Camilla Mørk Røstvik
Later 20th and 21st C

University of St Andrews

Arts & Humanities Research Council