



The global voice of scholarly publishing

Henry Oldenburg & the Invention of Journal Publishing

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Oldenburg and the Invention of Journal Publishing

CONTEXT

Copernicus (1473–1543)

NICOLAI COPERNICITORINENSIS DE REVOLUTIONIBUS ORBIUM COELESTIUM,

Libri VI.

IN QUIBUS STELLARVM ET FIXARVM ET ERRATICARVM MOTVS, EX VETERIBUS atq; recentibus observationibus, restituit hic autor. Præterea tabulas expeditas luculentasq; addidit, ex quibus eisdem motus ad quoduis tempus Mathematicum studiosus facillime calculare poterit.

ITEM, DE LIBRIS REVOLUTIONVM NICOLAI COPERNICI Narratio prima, per M. Georgium Ioachim Rheticum ad D. Ioan. Schonerum scripta.

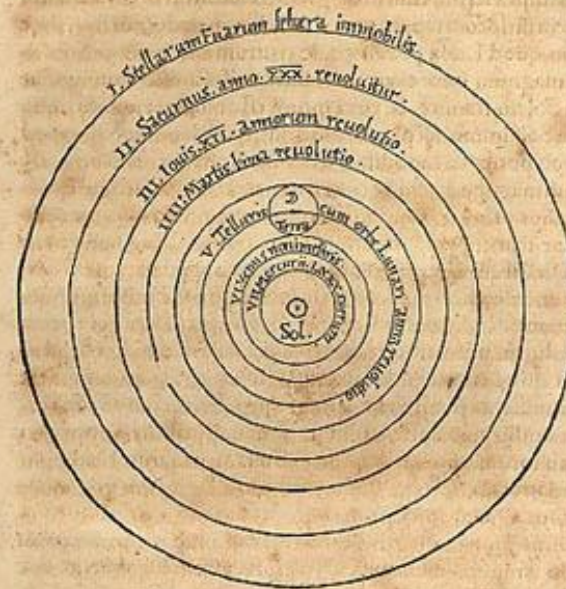


Cum Gratia & Privilegio Caes. Maieſt.

BASILEAE, EX OFFICINA HENRICI PETRINI.

NICOLAI COPERNICI

net, in quo terram cum orbem lunari tanquam epicyclo contineri diximus. Quinto loco Venus nono mense reducitur. Sextum deniq; locum Mercurius tenet, octuaginta dierum spacio circū currens. In medio utro omnium residet Sol. Quis enim in hoc



pulcherrimo templo lampadem hanc in alio vel meliori loco poneret, quam unde totum simul possit illuminare? Siquidem non inepte quidam lucernam mundi, alij mentem, alij rectiorem vocant. Trimegistus uisibilem Deum, Sophocles Electra intuentē omnia. Ita profecto tanquam in solio regali Sol residens circum agentem gubernat Astrorum familiam. Tellus quoque minime fraudatur lunari ministerio, sed ut Aristoteles de animalibus ait, maximam Luna cum terra cognationē habet. Cōcipit interea à Sole terra, & impregnatur anno partu. Inuenimus igitur sub hac

Andreas Vesalius (1514-64)

ANDREAE VESALII, DE CORPORIS HUMANI fabrica Liber Secundus,

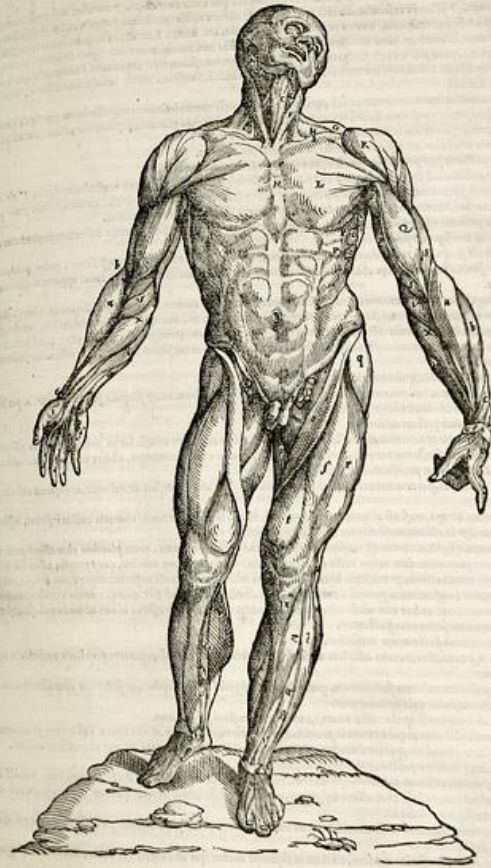
LIGAMENTIS OSSA CARTILAGINESQUE
INVICEM COMMITTENTIBVS, ET
Musculis, uoluntariorum motuum instrumentis, dedicatus:
& figuras ipsi proprias, uti nunc describetur,
proponens.



TABVLAE seriatim modò sequentes, omnibus ferè secundi libri Capitibus
communis erunt. Prima enim quatuordecim, integros exprimit homines: hu-
rumq; ordine prima, anteriorem uiri faciem delineatam continet secunda latera
ostendit: tertia, quarta, quinta, sexta, septima, octaua, anteriorem faciem quoque
proponunt, in hoc illud ue latus, pro musculorum, qui indicantur, natura & situ,
magis repositam. Sex uerò octauam consequentes, posteriorem corporis faciem
referunt, omnes propemodum ita effigiat, ut musculi in præcedere tabula con-
spicui, in sequente resecti, ab infertione pendant. Deinde omnes ta-
bulæ ita inuicem conueniunt, ut uni, quæ anteriorem exprimit faciem, alia face-
dere possit, posteriorem exhibens. Integrum namque erat, tertie subiungi notiam, mox quartam, dein deci-
mam: insuper quintam, illi uerò undecimam: postmodum sextam, ab hac duodecimam: deinceps septimam,
quam sequetur decimatertiam: cui rursus succederet octaua, & hinc decimaquarta. Unde etiam non inop-
portunè feceris, si utraque serie has musculorum tabulas intuearis, atque quid singule potissimum expri-
mant, ex ipsarum earundemq; characterum indicibus obiter requiras, quò promptius à Capitulo contem-
ad eas recurras. Perpaucis enim secundi libri Capitibus peculiare figuræ præponuntur: ipsi uerò numero sum-
mat, quorum musculi communibus figuris scitè omnes exprimi nequaerunt. in quorum numero sunt, oculo-
rum mouentes musculi, laryngis musculi, peni peculiare, & recto intestino & ceruici uel scæ præterea. Dein
primi Capitis frontis tabella adhibebitur, ligamentorum differentijs ostendendis præcipue apta: & secun-
di Capitis initium eas ostendet figuras, quæ musculorum compositioni intelligende sunt idoneæ.

Porro nõ suffecerit, in una tabula musculum aliquem intueri, etiamsi illum characterè insignuimus: sed
ut uideas, ubi nam quisque emineat, alteri ue succumbat, passim tibi uenit inquirendus, & potissimum
spectandus, ubi totus se offert. quod ferè fit, ubi peculiariter uni musculo plures characteres adhibentur,
præcipue quum is extra aliorum ordinè masculo Græcis characterè peculiari notatur. Quòd uerò in in-
tegras tabulas, musculorum effigies ita digesserim, neque singulis Capitibus singuli articuli cum suis me-
mbris appicti sint, ea potissimum occasione factam puta, quòd illi, si priuati articuli pingerentur, à nemine,
nisi Anatomes peritissimo, possent distingui. Nunc autem, quum omnia cohercant, cuius obuium est,
qua scde quisque musculus reperitur: adeò sanè, ut profus fuisset operæ præcium, integras ad hunc modum
tabulas delineari, quantumuis etiam scorsim articuli fuissent expressi. Insuper si singulis Capitibus suos
musculos adhibere, uel aliqua ratione necessarium fore putassem, non hoc ulu studiosi caruissent: quando-
quidem præter sumptum, nullus labor insuper mihi impendendus erat. Ex his namque integris tabulis ne-
cessario sculpsit, particulas singulas articulos ue scorsim transcendendos dare, non maioris mihi esset opo-
ra, quam ex chartis, quibus tabulæ iam impressæ sunt, nunc caput, nunc brachium, nunc crur aut
thoracem utut uisum esset, abscindere, & sculptori offerre. Ad hæc, idem semper li-
bor lectori in uertendis folijs impendisset, quum eadem pagina & mu-
sculorum effigiem, & characterum indicem, ac deinde ma-
sculorum descriptionem historiamq; con-
tinere nequeat.

PRIMA MUSCULORVM TABVLA.



Francis Bacon (1561-1626)

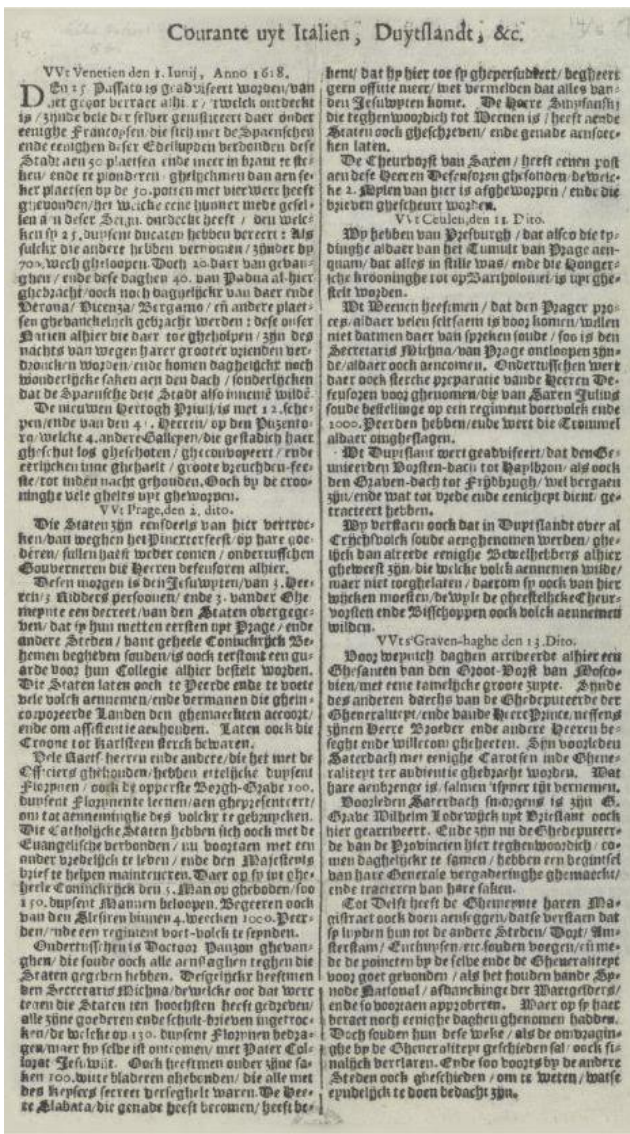


- Publications
 - Essays, 1597-1625
 - The advancement of learning, 1605
 - Novum Organum, 1620
 - New Atlantis, 1627
- God-father of the scientific revolution
 - systematic observation as the route to truth
 - scientific method and the experiment
 - investigation as a state sponsored collective activity
 - inspired the founders of the Royal Society and the first true journal

Intellectual Ferment 1543 -1620

- Individualism: ownership of ideas
 - Consequence of the Renaissance (1400-1600)
- Technology
 - Introduction of printing (1440s)
- Investigating the unknown is allowed
 - Discovery of the New World (1492)
 - Humanism and the refounding of Church thinking based on the newly rediscovered classical texts of the bible
 - Erasmus (c1469-1536)
 - Reformation and new ideas
 - Luther (1485-1546), Vesalius (1514-64) and Copernicus (1473-1543)
- New philosophy
 - Francis Bacon (inductive method and “torturing nature”)
 - Galileo (the experiment “il cimento” - ordeal)

First Newspapers 1620s



- *Courant out of italie, germanie, [etc.]*
- Translation of first Dutch newspaper (opposite)

F Marin Mersenne (1588-1648)

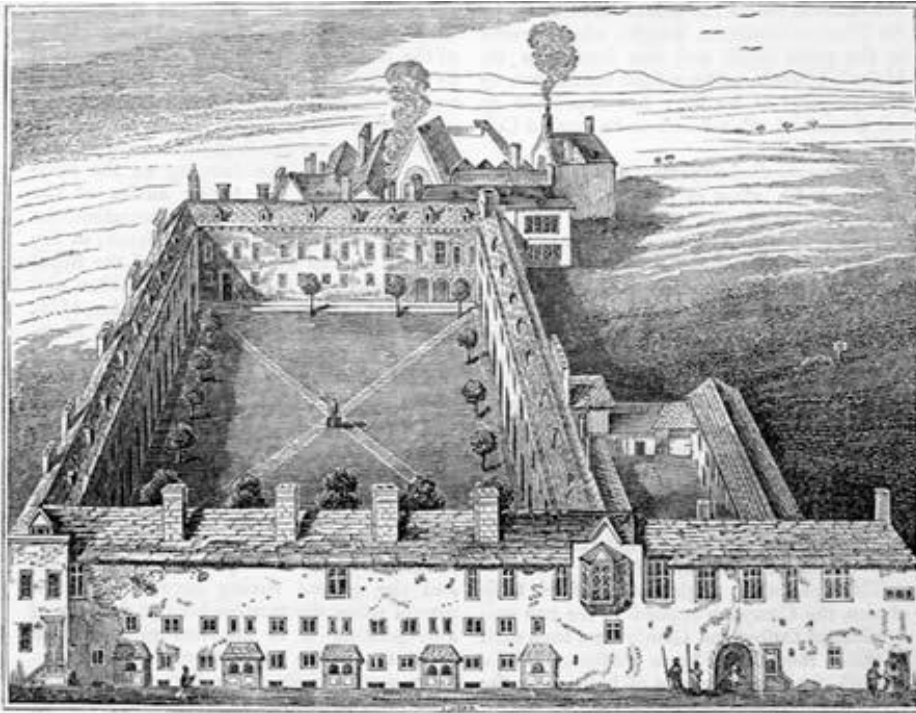


- A Minim Friar at the Place Royale, Paris
- Centre of a letter-writing circle with Fermat, Pascal, Descartes and Galileo
- Admirer of Bacon
- Inspired the founders of the French Academy

Learned Societies

- First scholarly societies
 - Accademia del Lincei, Rome 1603-30
 - Founded by Prince Federico Cesi
 - Galileo demonstrates telescope 1611
 - Galileo's publisher in Rome
 - Accademia del Cimento, Florence 1657-67
 - Founded by the Medici, Grand Duke Ferdinand II and his brother Leopold
 - Dedicated to confirming Galileo's works through the experiments conducted in its laboratories
 - Published its results in *Saggi di naturali esperienze*
 - Royal Society of London, 1660
 - Set up as a Baconian institution for research

Royal Society of London, 28 November 1660



- First established at Gresham College (had been used for meetings of the “Invisible College” since 1645) after a lecture by Christopher Wren who was Professor of Astronomy there
- Founding Fellows 40 in number each paying 1s a week

Too Many... Books

- “One of the diseases of this age is the multiplicity of books; they doth so overcharge the world that it is not able to digest the abundance of idle matter that is every day hatched and brought forth.”

– Barnaby Rich, 1611

Building Blocks in Place

- Problems with books (1610s)
- Development of modern scientific practice (1610-20)
 - “The Scientific Method”: Bacon (“torturing nature”)
 - “The Experiment”: Galileo (*il cimento* “the ordeal”)
- Growth in individual scholars wanting recognition (and safety from intellectual piracy) by their peers
 - First learned societies (1603, 1657, 1660)
- A desire for (scientific) “news”
 - letter writing circles (Marsenne 1588-1600)
 - development of first newspapers (1621)
- Infrastructure: improvements in postal systems

Oldenburg and the Invention of Journal Publishing

INVENTION

Henry Oldenburg (c1618-1677)



- Born in Bremen, Germany
- Resident in London from 1652 as diplomat
- Involved with Robert Boyle as tutor of relative
- Fluent in five languages
- Appointed without any salary (joint) Secretary to the Royal Society in 1663
- In 1664 considered making money through a printed newsletter

Robert Boyle (1627-91)



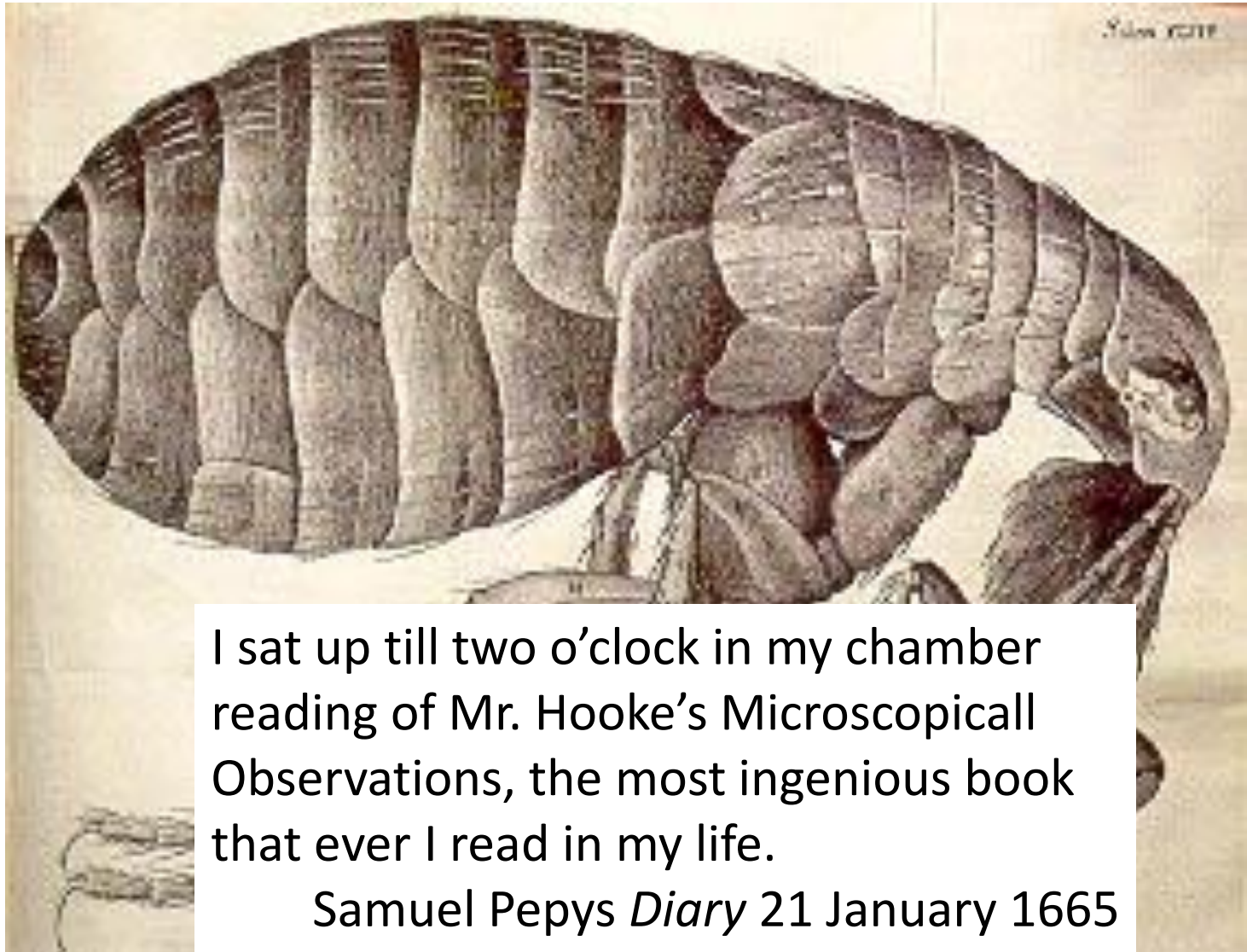
- 7th son of the Earl of Cork, Oldenburg's patron
- Worked and lived in Oxford in 1655-68
- Founding Fellow of the Royal Society
- Boyle's Gas Law
 $\text{pressure} \times \text{volume} = \text{constant}$

Robert Hooke (1635-1703)



- Founder of microscopy and elements of mechanics (Hooke's Law)
- Worked with Boyle in Oxford from 1658
- First Royal Society Curator of Experiments: first salaried scientist in England!
- No known likeness

Hooke's Flea from *Micrographica*, 1665



I sat up till two o'clock in my chamber reading of Mr. Hooke's Microscopical Observations, the most ingenious book that ever I read in my life.

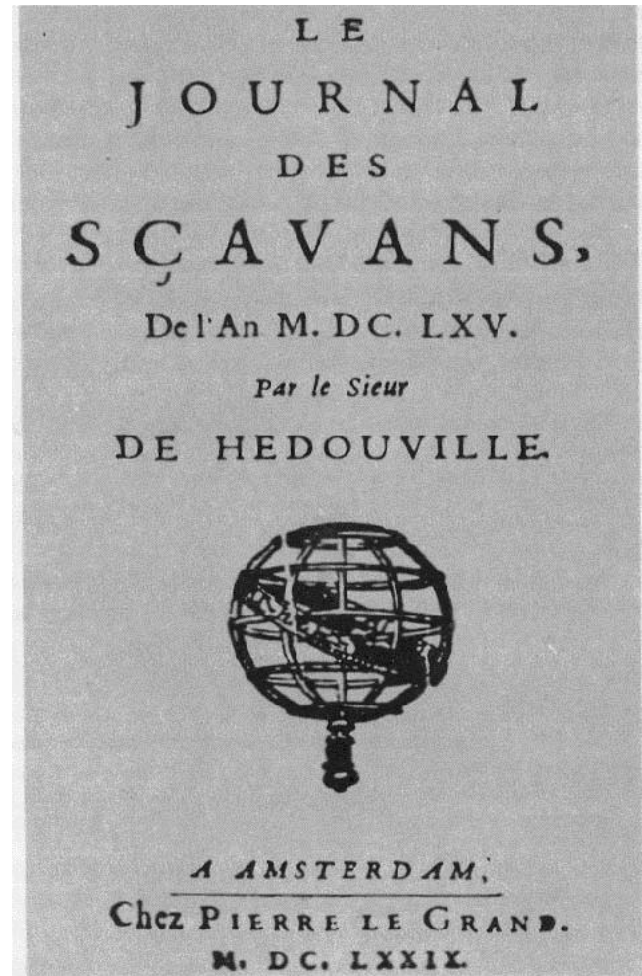
Samuel Pepys *Diary* 21 January 1665

Robert Hooke's Proposal (1663)

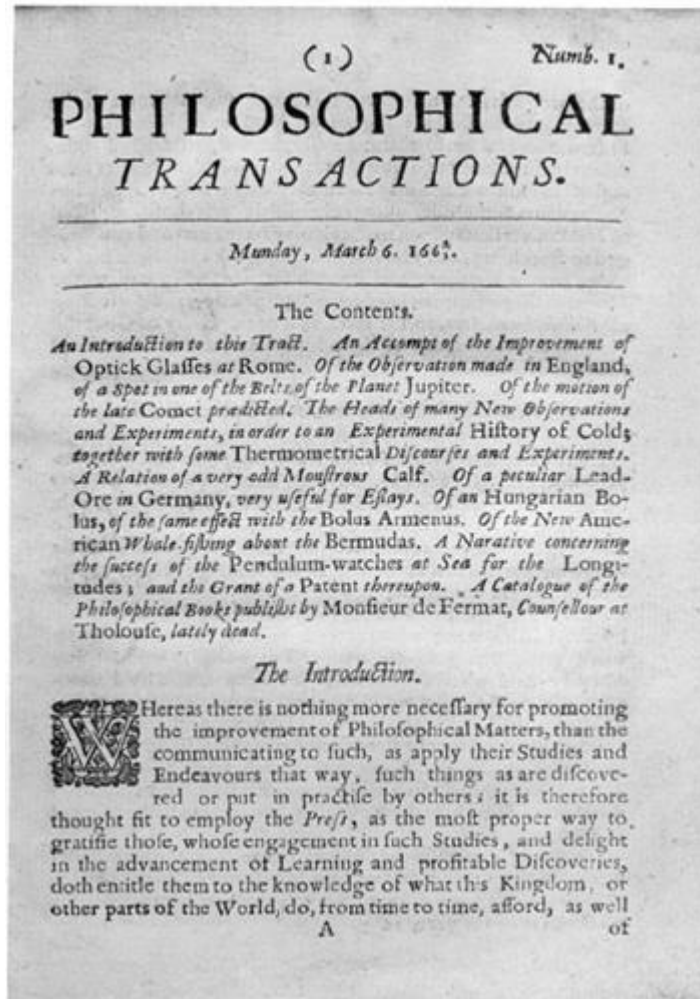
- A weekly printed publication providing:
 - ... a brief discourse of what is new and considerable in their letters from all parts of the world, and what the learned and inquisitive are doing and have done in physick, mathematicks, mechanicks, opticks, astronomy, medicine, chymistry, anatomy, both abroad and at home.

First “Journal”

- 5th January 1665
Le Journal des Sçavans
- Editor Denis de Sallo de la Coudraye
- First published in Paris
- A digest of book reviews, news and scholarly activity written by scribes (journalists)
- Still in existence as *Le Journal des Savants*



First Scientific Journal



- 6th March 1665
Philosophical Transactions
- Editor and publisher, Henry Oldenburg
Secretary of the Royal Society
- First true scholarly journal
- Published for profit at Oldenburg's expense

Countdown to *Philosophical Transactions*

- Oldenburg and Boyle exchange letters on how best to publish results 24 November to 3 December 1664
- November 1664 they find out about *J de Scavans*
- *J de Scavans* is published 5 January 1665
- Oldenburg reads an extract from it at Royal Society meeting on 11 January 1665
- Early February, a specimen of *Phil. Trans.* displayed at a meeting
- Approved by the Council on 1 March 1665
- First issue published, Monday 6 March 1665

Oldenburg to Boyle, 24 November 1664

The Society alwayes intended, and, I think, hath practised hitherto, what you recommend concerning ye

REGISTRATION

[We must be] very careful of registering as well the person and time of any new matter.., as the matter itself; whereby the honor of ^{ye} invention will be inviolably preserved to all posterity.

My New correspondent... hath given me notice.. yt they have a dessein in France to publish from time to time a Journall of all which passeth in Europe in matter of knowledge both Philosophicall and Politicall

Oldenburg to Boyle, 3 December 1664

- [By registering and giving due honour]
I thence persuade myselfe, yt all Ingenious men will be thereby incouraged to impart their knowledge and discoveryes, as farre as they may, not doubting of ye Observance of ye Old Law, of Suum cuique tribuere .

DISSEMINATION

Boyle to Oldenburg, 1665

- [I should not] neglect the opportunity of having some of my Memoirs preserv'd, by being incorporated into a Collection [such as the continuing issues of *Phil. Trans.*], that is like to be as lasting as usefull

ARCHIVE

Royal Society Order in Council, 1 March 1665 – introduction of peer review

Ordered, that the Philosophical Transactions, to
be composed by M^r. Oldenburg, be printed the first Monday
of every month, if he have sufficient matter for it, and
that that Tract be licensed by the Council of the Society,
being first reviewed by some of the Members of the same.

CERTIFICATION

STM

Journal Publication as Author Protection

- **Robert Boyle** to Henry Oldenburg, 27 August 1665
 - **But some here [Oxford] are a little Jealous y^t if our Expts be known elsewhere without being before hand registred by you together wth y^e Time of their having been made or proposd, they may beget such claimes & disputes.**
- **Henry Oldenburg** to Robert Boyle, 29 August 1665
 - **I acknowledge, y^t y^t yealousy, about the first Authors of Experiments, wch you speak off, is not groundlesse. And therefore offer myselfe, to register all those, you or any person shall please to communicate, as now, wth y^t fidelity, wch both of y^e honor of my relation to the R. Society (wch is highly concerned in such Experiments) and my owne inclinations doe strongly oblige me to.**

Oldenburg and the Invention of Journal Publishing

AFTERMATH

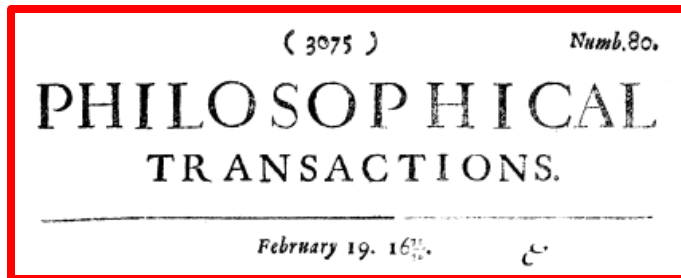
Philosophical Transactions after 1665

- Oldenburg remained editor (and for-profit publisher) until his death in 1677
 - publishing 136 issues at regular intervals (1st Monday of each month) with the exception of the Plague (July-November 1666) and his imprisonment for treason in the Tower (June and August 1667)
- Publication ceased 1678-1682 while Hooke published *Philosophical Collections*, and again from 1688-90
- Publication resumed in 1691 and has remained continuous ever since
- Royal Society assumed full financial responsibility in March 1752 and so it became finally *Philosophical Transactions of the Royal Society*

Functions of the journal à la Oldenburg

- Date stamping or priority via **registration**
- Quality stamping (**certification**) through peer-review
- Recording the final, definitive, authorised versions of papers and **archiving** them
- **Dissemination** to targeted scholarly audience
- *[Added later] For readers, search and **navigation***
 - Achieved via creation and then management of the “journal brand”

Example from 19 February 1672



The CONTENTS.

A Letter of Mr. Isaac Newton, Mathematick Professor in the University of Cambridge; containing his New Theory about Light and Colours: Where Light is declared to be not Similar or Homogeneous, but consisting of diffirent rays, some of which are more refrangible than others: And Colours 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 Account of some Books: I. A Description of the EAST-INDIAN COASTS, MALABAR, COROMANDEL, CEYLON, &c. in Dutch; by Phil. Baldæus. II. Antonii le Grand INSTITVTIO PHILOSOPHIÆ, secundum 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 Traills 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 Colours: sent by the Author to the Publisher from Cambridge, Febr. 6. 1672; in order to be communicated to the R. Society.

S I R,
T O 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 Phenomena of Colours.

A Letter of Mr. Isaac Newton, Professor of the Mathematicks in the University of Cambridge; containing his New Theory about Light and Colours: sent by the Author to the Publisher from Cambridge, Febr. 6. 1672; in order to be communicated to the R. Society.

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Example from 14 November 1985

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LETTERS

NATURE VOL. 318 14 NOVEMBER 1985

C₆₀: Buckminsterfullerene

**H. W. Kroto*, J. R. Heath, S. C. O'Brien, R. F. Curl
& R. E. Smalley**

Rice Quantum Institute and Departments of Chemistry and Electrical Engineering, Rice University, Houston, Texas 77251, USA

During experiments aimed at understanding the mechanisms by which long-chain carbon molecules are formed in interstellar space and circumstellar shells¹, graphite has been vaporized by laser irradiation, producing a remarkably stable cluster consisting of 60 carbon atoms. Concerning the question of what kind of 60

Received 13 September; accepted 18 October 1985.

1. Heath, J. R. *et al. Astrophys. J.* (submitted).
2. Dietz, T. G., Duncan, M. A., Powers, D. E. & Smalley, R. E. *J. chem. Phys.* **74**, 6511-6512 (1981).
3. Powers, D. E. *et al. J. phys. Chem.* **86**, 2556-2560 (1982).
4. Hopkins, J. B., Langridge-Smith, P. R. R., Morse, M. D. & Smalley, R. E. *J. chem. Phys.* **78**, 1627-1637 (1983).
5. O'Brien, S. C. *et al. J. chem. Phys.* (submitted).
6. Rohlfing, E. A., Cox, D. M. & Kaldor, A. *J. chem. Phys.* **81**, 3322-3330 (1984).
7. Marks, R. W. *The Dymaxion World of Buckminster Fuller* (Reinhold, New York, 1960).
8. Heath, J. R. *et al. J. Am. chem. Soc.* (in the press).
9. Herbig, E. *Astrophys. J.* **196**, 129-160 (1975).

Example from 15 March 2012

OPEN ACCESS Freely available online



Cryptic Diversity in Indo-Pacific Coral-Reef Fishes Revealed by DNA-Barcoding Provides New Support to the Centre-of-Overlap Hypothesis

Nicolas Hubert^{1,2*}, Christopher P. Meyer³, Henrich J. Bruggemann¹, Fabien Guérin⁴, Roberto J. L. Komeno⁵, Benoit Espiau², Romain Causee⁶, Jeffrey T. Williams⁷, Serge Planes²

Perpignan Via Domitia, Perpignan, France, ³Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States of America, ⁴UMR PVBMT, Faculté des Sciences et Technologies, Université de La Réunion, Saint-Denis, Réunion, France, ⁵Institut Halieutique et des Sciences Marines, Université de Toliara, Toliara, Madagascar, ⁶Département Milieux et Peuplements Aquatiques, Muséum National d'Histoire Naturelle, Paris, France, ⁷Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States of America

Abstract

Diversity in coral reef fishes is not evenly distributed and tends to accumulate in the Indo-Malay-Philippines Archipelago (IMPA). The comprehension of the mechanisms that initiated this pattern is in its infancy despite its importance for the conservation of coral reefs. Considering the IMPA either as an area of overlap or a cradle of marine biodiversity, the hypotheses proposed to account for this pattern rely on extant knowledge about taxonomy and species range distribution. The recent large-scale use of standard molecular data (DNA barcoding), however, has revealed the importance of taking into account cryptic diversity when assessing tropical biodiversity. We DNA barcoded 2276 specimens belonging to 668 coral reef fish species through a collaborative effort conducted concomitantly in both Indian and Pacific oceans to appraise the importance of cryptic diversity in species with an Indo-Pacific distribution range. Of the 141 species sampled on each side of the IMPA, 62 presented no spatial structure whereas 67 exhibited divergent lineages on each side of the IMPA with K2P distances ranging between 1% and 12%, and 12 presented several lineages with K2P distances ranging between 3% and 22%. Thus, from this initial pool of 141 nominal species with Indo-Pacific distribution, 79 dissolved into 165 biological units among which 162 were found in a single ocean. This result is consistent with the view that the IMPA accumulates diversity as a consequence of its geological history, its location on the junction between the two main tropical oceans and the presence of a land bridge during glacial times in the IMPA that fostered allopatric divergence and secondary contacts between the Indian and Pacific oceans.

Citation: Hubert N, Meyer CP, Bruggemann HJ, Guérin F, Komeno RJL, et al. (2012) Cryptic Diversity in Indo-Pacific Coral-Reef Fishes Revealed by DNA-Barcoding Provides New Support to the Centre-of-Overlap Hypothesis. PLoS ONE 7(3): e28987. doi:10.1371/journal.pone.0028987

Editor: Vincent Laudet, Ecole Normale Supérieure de Lyon, France

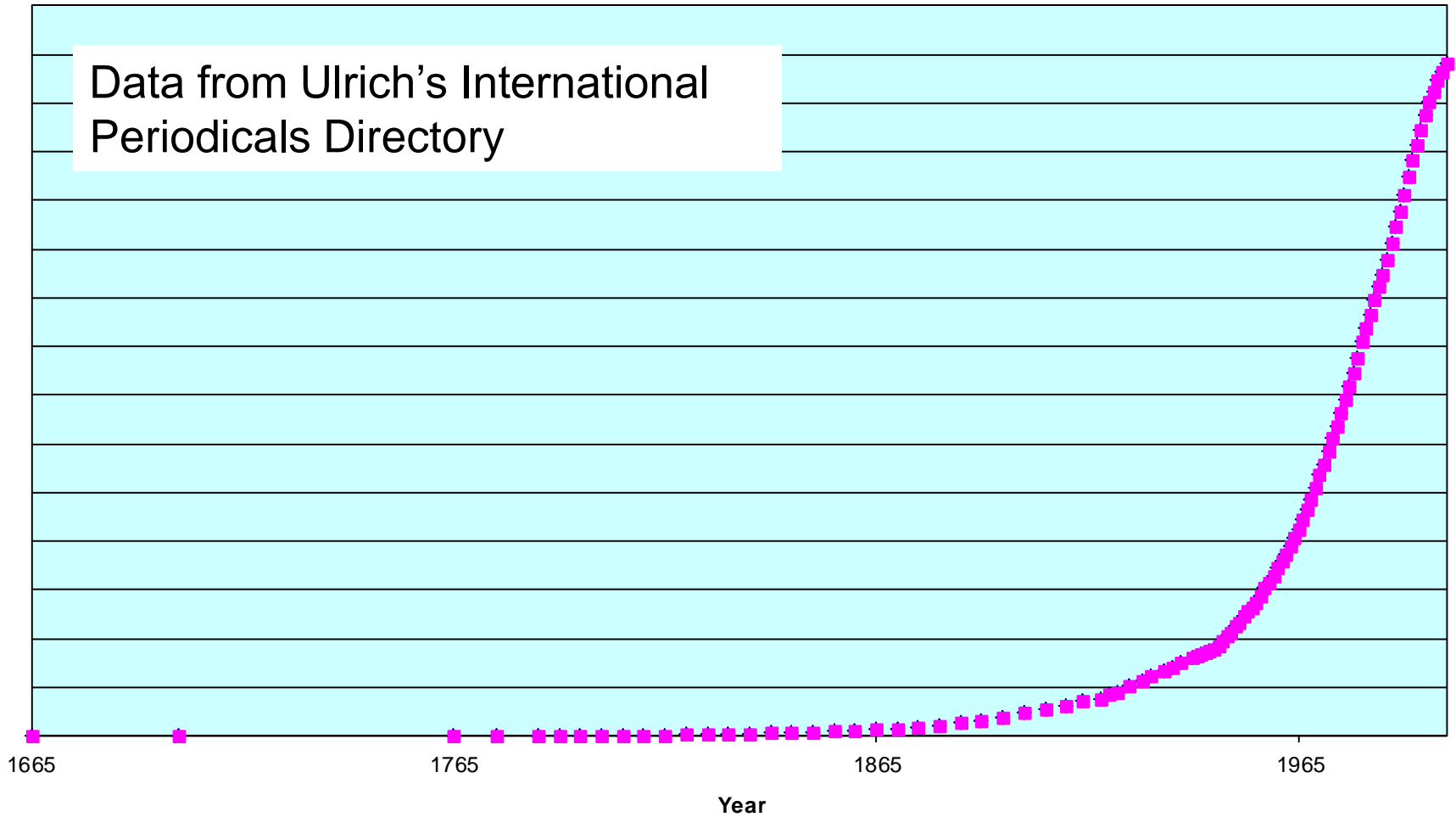
Received: August 10, 2011; **Accepted:** November 17, 2011; **Published:** March 15, 2012

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Journal Growth 1665-2014

Data from Ulrich's International Periodicals Directory

No of titles launched and still extant



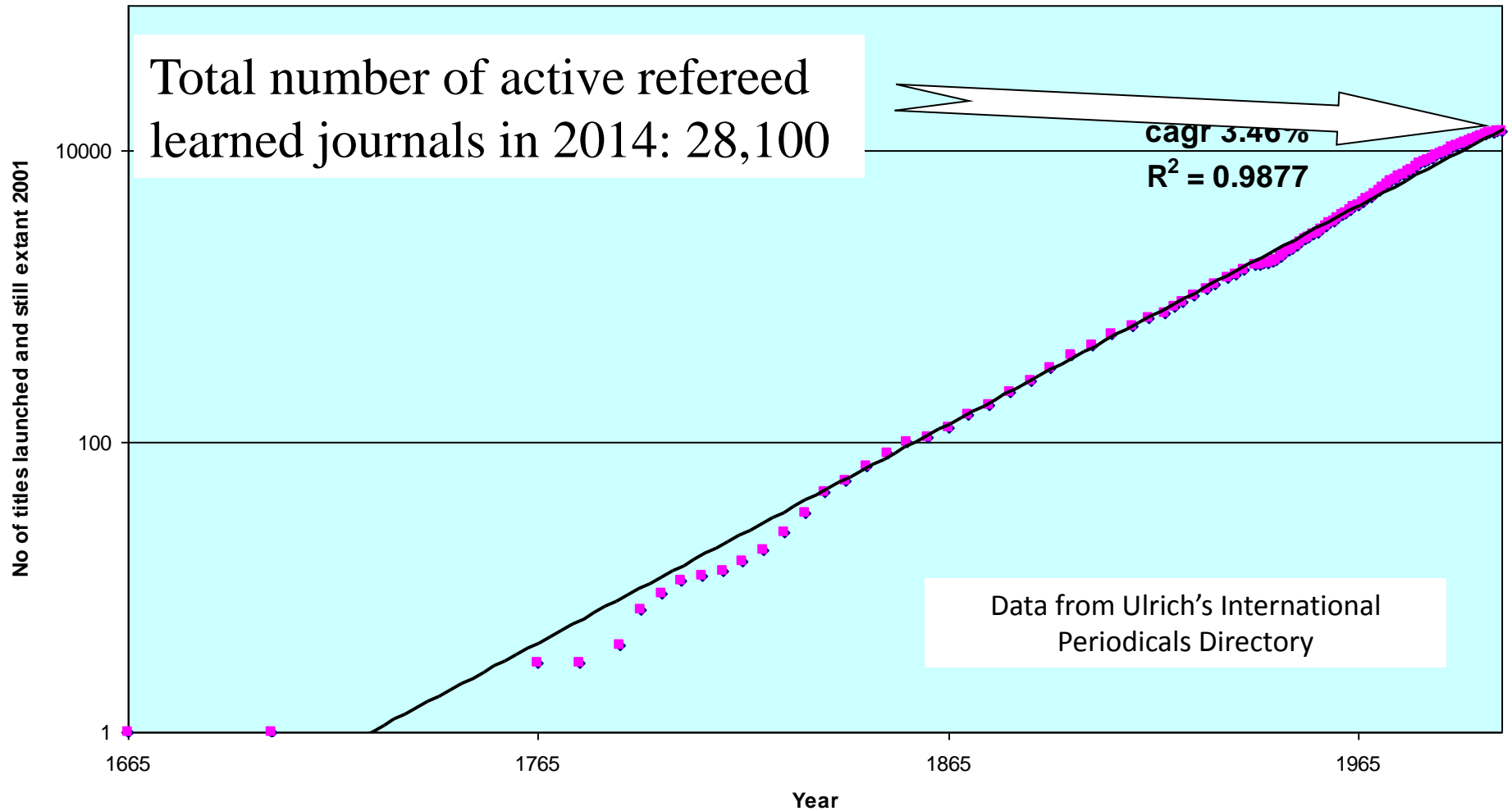
Reactions to Journal Growth

- “This is truly the decade of the journal, and one should seek to limit their number rather than to increase them, since there can also be too many periodicals.”
 - review in *Neues med. Wochb. f. Aertzte*
 - published **1789**
- **It is certainly impossible** for any person who wishes to devote a portion of his time to chemical experiment, **to read all the books and papers that are published..; their number is immense**, and the labour of winnowing out the few [of interest] .. is such, that most persons who try .., pass by what is really good.
 - **Michael Faraday 1826**

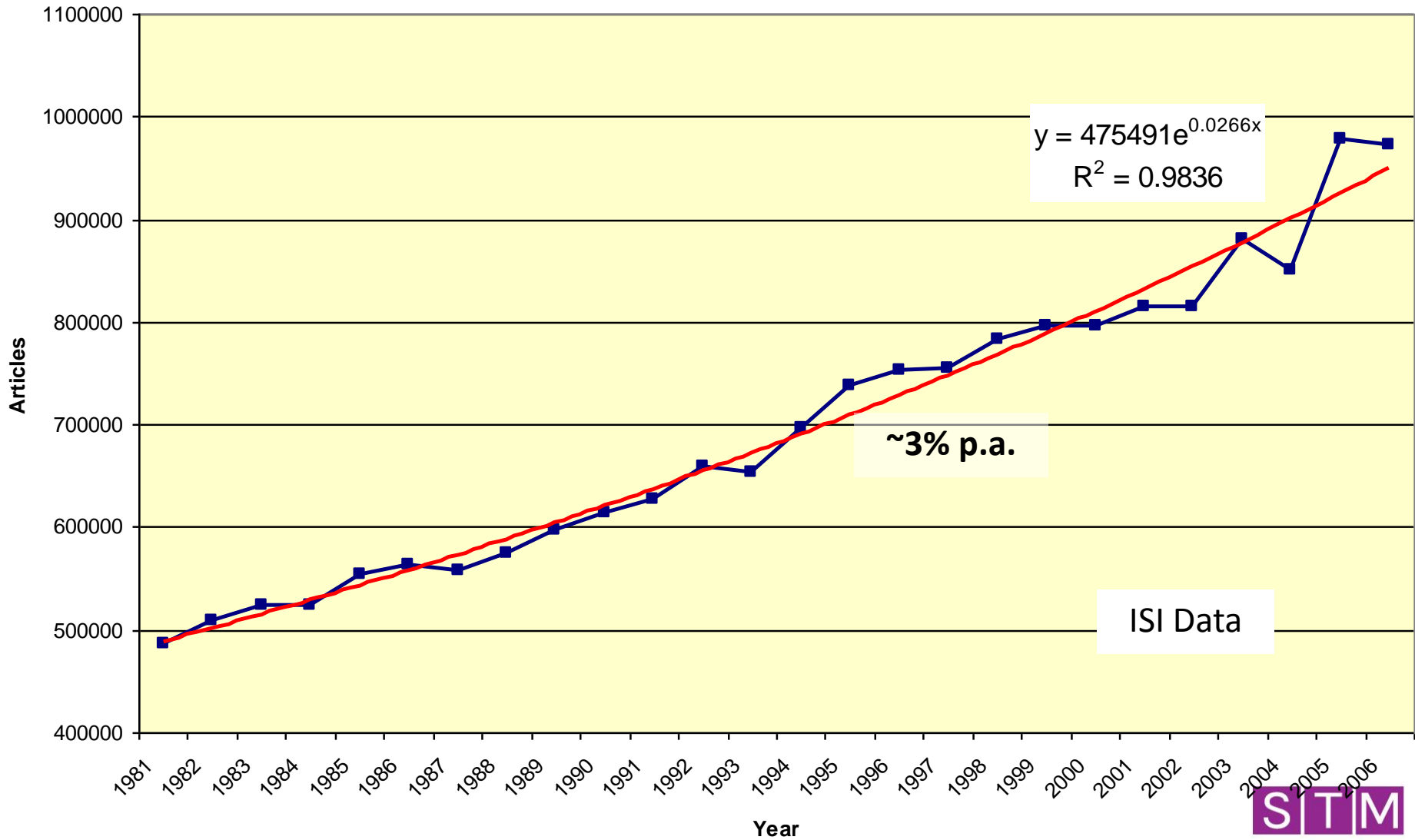


Journal Growth 1665-2014

[Sources: M A Mabe The number and growth of journals *Serials* **16**(2).191-7, 2003; Mabe & Amin Growth Dynamics of Scholarly and Scientific Journals *Scientometrics* **51**(1) 147- 162, 2001]

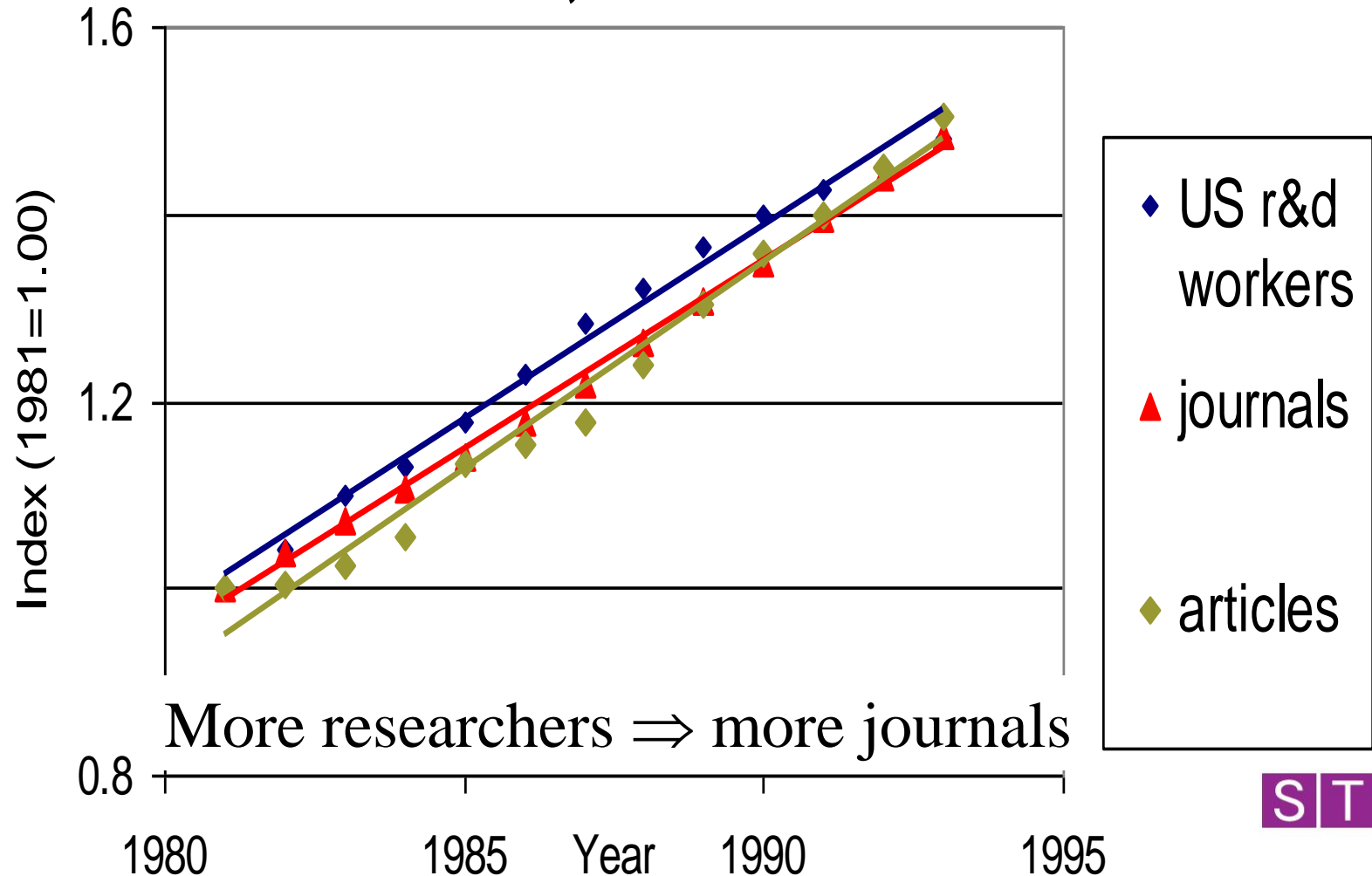


Article Growth 1981-2006



Relationship of Journals & Researchers



R&D Workers, Journals and Articles



Where are we now?

- About 28,100 peer reviewed English language journals
 - Growing by about 3.5% each year
- 2.5 million scholarly articles each year
 - Growing by about 3-4%
- All scientific, technical and medical titles are online, most arts and humanities too
- Multimedia, cross reference linking, 3D structures are the norm

The STM Report, 2015




The global voice of scholarly publishing

The STM Report

An overview of scientific and scholarly journal publishing

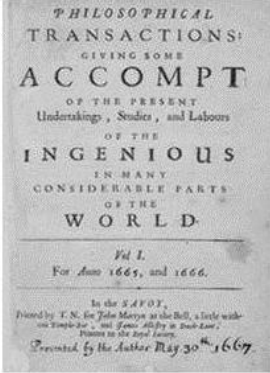
Celebrating the 350th anniversary of journal publishing



Mark Ware
(Mark Ware Consulting & Outsell, Inc.)

Michael Mabe
(International Association of Scientific, Technical and Medical Publishers)

Fourth Edition
March 2015



PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.
Vol. I.
For Anno 1665, and 1666.
By the SAVOY,
Printed by T. N. for John Moxon at the Bull, a little within
St. Dunstons, and Isaac Alfrey in South Lane,
Printers to the Royal Society.
Printed by the Author May 30th 1667.