

## MATHEMATICAL PUBLICATION ON THE WEB

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CECM

Centre for Experimental &  
Constructive Mathematics

*One Reference:* Scholarly Publishing: the  
Electronic Frontier, MIT Press, 1996

&

*One Conference:* Scholarly Communication  
in the Next Millennium, March 5-8, 1997  
SFU

**URL:** <http://www.sfu.ca/~dkirby/index.html>

**URL:** <http://www.cecm.sfu.ca/~jborwein/>

\*A lightly annotated version of oral presentation

1

## CHANGING TIMES

"The world will change. It will probably change for the better. It won't seem better to me."

- J. B. Priestley

"Caution, skepticism, scorn, distrust and entitlement seem to be intrinsic to many of us because of our training as scientists... . These qualities hinder your job search and career change."

- former astrophysicist Stephen Rosen, now director, Scientific Career Transitions Program, New York City, giving job-hunting advice in an on-line career counseling session.

- quoted in Science, 4 August 1995, page 637

3

## THE WEBSTER DEFINITION\*

- pub-lish \ 'peb-lish\ vb  
[ME publishen, modif. of MF publier, fr. L publicare, fr. publicus public]  
vt (14c)  
1a: to make generally known  
1b: to make public announcement of  
2a: to place before the public: DISSEMINATE  
2b: to produce or release for publication;  
specif: PRINT  
2c: to issue the work of (an author)  
vi  
1: to put out an edition  
2: to have one's work accepted for publication  
<a publishing scholar> syn see DECLARE

\*Publishing and printing are not synonymous; the web fits right in.

2

## FOR AN ANCIENT SUBJECT ...

" 'the proof is left as an exercise' occurred in *De Triangulis Omnimodis* by Regiomontanus, written 1464 and published 1533.

He is quoted as saying

'This is seen to be the converse of the preceding. Moreover, it has a straightforward proof, as did the preceding. Whereupon I leave it to you for homework.' "

- quoted in Science, 1994.

4

### ... THE INTERNET IS A MIXED BLESSING

"As the fading light of a dying day filtered through the window blinds, Roger stood over his victim with a smoking .45, surprised at the serenity that filled him after pumping six slugs into the bloodless tyrant that had mocked him day after day, and then he shuffled out of the office with one last look back at the shattered computer terminal lying there like a silicon armadillo left to rot on the information highway."

- Winning entry in 1994 *Bulwer-Lytton Fiction contest for lousy literature*.

- ◊ Author of 'It was a dark and stormy night.' (in 'Paul Clifford' (1830)).\*

\*This was obscure information in 1994. The '95 and '96 winners are on the CNN website. 'Bulwer-Lytton' yielded 300 hits on Alta-Vista.

5

### PREDICTION ISN'T NEW

"I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks."

- Thomas Alva Edison\*, 1922

\*Nor is such accuracy uncommon: Consider:  
*I have traveled the length and breadth of this country and talked with the best people, and I can assure you that data processing is a fad that won't last out the year.*

(The CEO of Prentice Hall, 1957) and  
*I think there is a world market for about five computers.*

(Thomas Watson, CEO IBM, 1947), and Edison again:  
*Fooling around with alternating current is just a waste of time. Nobody will use it, ever.*

7

"I imagine most of that stuff on the information highway is roadkill anyway."

- John Updike\*, 1994.

" 'I don't really start', he said, 'until I get my proofs back from the printer. Then I can begin serious writing.' "†

- from *Keynes the Man* written on the 50th Anniversary of Keynes' death.

- ◊ Sir Alec Cairncross, in the *Economist*, April 20, 1996.

\*Who then admitted he had not looked to see!

†Not even Keynes could hope for this indulgence today.

6

### MICROSOFT IS

"I know, it's hard to believe that Microsoft would release a product before it was ready, but there you have it. A Seattle cyberwag says,

*At Microsoft, quality is job 1.1.*

We had him killed."

- in *Welcome to Stale* – a terrific take-off of Microsoft's high-cost "webzine" *Slate*\* (<http://www.stale.com/>) August 1996.

\*An unhappy anagram for STEAL, LEAST, STALE.

8

## WHAT CECM DOES\*

- **Tele-Learning** (Network of Centres of Excellence)
  - ◊ The first large scale Canadian network in the social sciences
  - 1. Interactive books (*Organic Math Proceedings*)
  - 2. Web interfaces for computing (*Inverse Symbolic Calculator*) and for internet supplements to textbooks
  - 3. Shared computational and authoring environments (*Polynet*)
  - 4. Need to serve commercial software (*Matlab, Maple, SPlus*)

\*Our server now gets about 5 million 'hits' a year – whatever that counts!

9

- **Pacific Institute** for the Mathematical Sciences:

1. Running a regular tele-colloquium\*
2. Administration on the internet
3. Building a virtual network (CU-CMe) using Polynet
4. Aiming at distributed high-ish performance computing
5. Hoping for a *National Network for Collaboration in the Mathematical Sciences*

\*BC and Alberta Universities participate. Talk originates at one site and everyone can ask questions. The technology is pretty good for 'talking heads' but is not yet really adequate for mathematics.

11

- **Camel** (CMS Electronic Services)
  1. Full gamut of services (75,000 hits/month)
  2. Electronic journals (*CRUX Mathematicorum with Mayhem + Maple*)\*
  3. Preprint server (a write-off!)†
  4. Need to 'recover' costs
  5. Runs largely on profit from print journals‡
  6. Need to serve a wide spectrum of clients

\*The four CMS Publications will be fully on-line by the end of 1997.

†As the AMS has also discovered, research communities which are ready for such tools (e.g., Category Theory, Banach Spaces, Los Alamos (<http://xxx.lanl.gov:80/>)) would rather use their own – others don't yet want them.

‡Parallel paper and electronic versions that preserve a 'revenue-stream' are prerequisite for all Society or University Press Journals for the foreseeable future.

10

## SOME ISSUES ARE COMMON TO ALL

- Organizing (too-much) information for diverse users
- Polished look or timely/easy updates
- Cost of preparing information
  - every user is an expert
  - every client looks different
  - *access to free information* or *free access to information*
  - "I'm putting my course on line"

12

**WHILE SOME ISSUES ARE SPECIFIC  
TO MATHEMATICS\***

- Technical demands of our notation (*OCR*)
- Reliance on “old” sources
- The unusual reliability of our literature
- Too small to interest Microsoft
- We are the least laboratory-bound science
- We are the most distributed science

\**Two Views from the Electronic Trenches* by JMB and Richard Smith, Canad. J. Communications <http://edie.cprost.sfu.ca/~scom/index.html> tackles these issues in detail.

13

**AND TEND TO FORGET THE  
MACRO-ISSUES and THE CONCERNS  
OF THE OTHERS**

- Marketing & Distribution
- Advertizing
- Archiving
- Accreditation and validation
- Ease of access/collaboration
- Intellectual property issues (*inter-leukin*)
- Copyright & plagiarism

15

**STAKEHOLDERS HAVE DIFFERENT  
NEEDS ...**

- Commercial Publishers
- University Presses (17% titles, 2% dollars)
- Large Academic Societies (*AMS, SIAM*)
- Small Academic Societies (*CMS, SIAM*)
- Research Libraries
- Commercial Software-houses
- Individual Researchers
- Individual Teachers/Students

14

**SOME MODEST PREDICTIONS\***

- Hardcopy proceedings will disappear soon
- Books will not
- Site license models for charging for journals (nothing else works)
- Expectations will always outpace performance

\*Copyright and IP issues are pervasive and threaten to throttle science. A company still-borne a decade ago is suing the maker of inter-leukin for many millions claiming the idea was stolen from a research grant by a reviewer. Differences in national copyright laws and predatory behaviour by companies like *Elsevier* make many electronic publishing initiatives impracticable.

16

## SOME LESS MODEST PREDICTIONS

- On-line data bases will drive out obscure or contrarian material (ease versus scholarship; value versus profit)
- Elites will re-form (*Internet2, HPC-subnets, Ivy-League*)
- Information now flows to people rather than the converse  
⇒ the McGraw-Hill University?\*
- You can't go home again

\*I seriously wonder how many students would rather see a real professor in person, warts and all, as opposed to a digitally enhanced version of Richard Feynman lecturing on 21st century physics for an internet delivered Harvard-McGraw-Hill degree. Preserving a recognizable university in this milieu is a grand challenge for all of us.

17

## STILL WHAT GOES AROUND, COMES AROUND

"I see some parallels between the shifts of fashion in mathematics and in music. In music, the popular new styles of jazz and rock became fashionable a little earlier than the new mathematical styles of chaos and complexity theory. Jazz and rock were long despised by classical musicians, but have emerged as art-forms more accessible than classical musicians to a wide section of the public. Jazz and rock are no longer to be despised as passing fads. Neither are chaos and complexity theory. But still, classical music and classical mathematics are not dead. Mozart lives, and so does Euler. When the wheel of fashion turns once more, quantum mechanics and hard analysis will once again be in style."

18

- Freeman Dyson\* on *Nature's Numbers* by Ian Stewart (Basic Books, 1995)

"It's generally the way with progress that it looks much greater than it really is." (Ludwig Wittgenstein)†

## AND WE'VE A REPUTATION TO CHANGE

"a certain impression I had of mathematicians was ... that they spent immoderate amounts of time declaring each other's work trivial."

- Richard Preston, *The Mountains of Pi*, New Yorker, 1992

\**MAA Monthly*, Aug-Sept 1996, p. 612.

†Quoted in *The Wittgenstein Controversy*, by Evelyn Toynton, *Atlantic Monthly*, June 1997, pp. 28-41.

19

## ADDITIONAL URLS:\*

- **Extended interactive version** of this talk:  
[www.cecm.sfu.ca/~jborwein/97math\\_on\\_web.html](http://www.cecm.sfu.ca/~jborwein/97math_on_web.html).
- **Electronic Publishing** practicalities:  
[edie.cprost.sfu.ca/,/scom/index.html](http://edie.cprost.sfu.ca/,/scom/index.html)
- **Organic Mathematics**, a *live* book:  
[www.cecm.sfu.ca/organics/map/](http://www.cecm.sfu.ca/organics/map/)
- **CECM PolyNet & Inverse Symbolic Calculator**  
[polymath.cecm.sfu.ca/](http://polymath.cecm.sfu.ca/) [www.cecm.sfu.ca/projects/ISC/](http://www.cecm.sfu.ca/projects/ISC/)
- **Camel**, Canadian Math Society web services:  
[www.camel.math.ca/Camel/](http://www.camel.math.ca/Camel/)
- **CMS Journals** online at:  
[www.camel.math.ca/CMS/Publications/](http://www.camel.math.ca/CMS/Publications/)
- The **Pacific Institute** for the mathematical sciences:  
[www.pims.math.ca/](http://www.pims.math.ca/)
- **Tele-Learning Network** of Centres of Excellence:  
[www.telelearn.ca/telelearn/](http://www.telelearn.ca/telelearn/)

\*All begin <http://>

20