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*CSHPM Notes bring scholarly work on the history and philosophy of mathematics to the broader mathematics community. Authors are members of the Canadian Society for History and Philosophy of Mathematics (CSHPM). Comments and suggestions are welcome; they may be directed to either of the column's co-editors:*

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2021 has offered Canadians the opportunity to celebrate several centennials. For instance, insulin was discovered in the summer of 1921 at the University of Toronto by Frederick Banting and Charles Best. Births that year included game show host Monty Hall and singer and actress Deanna Durbin. On May 28–29, the Communist Party of Canada was founded in Guelph, Ontario. Mackenzie King became prime minister on December 29 after the December 6 election awarded his Liberals 116 seats and the agrarian Progressive Party 65 seats.

For mathematicians, though, December 1921 may be more notable for the “National” Meeting of the American Association for the Advancement of Science (AAAS) held at the University of Toronto from the 27th to the 31st. Canadians already had ample precedent for hosting international scientific congresses, including meetings of the:

- AAAS in Montreal in 1857 and 1882, followed by its first Toronto meeting in 1889;
- British Association for the Advancement of Science (BAAS) in Montreal (1884), Toronto (1897), and Winnipeg (1909);
- British Medical Association (BMA) in Montreal (1897) and Toronto (1906);
- International Congress of Americanists in Quebec City (1906);
- American Astronomical Society (AAS) in Ottawa (1911);
- International Geological Congress in Toronto (1913).



Figure 1. John Charles Fields before 1912. [Wikimedia Commons](#).

Also in 1913, University of Toronto (U of T) Mathematics Professor “John Charles Fields [1863–1932] was asked by U of T President Robert Falconer [1867–1943] to extend an invitation to the American Association for the Advancement of Science to hold its 1915 meeting in Toronto” [11, p. 77]. World War I interrupted the planning, but after the war the AAAS was invited once more. Its leadership accepted for the 1921 Winter Meeting. The University and the Royal Canadian Institute, of which Fields was President, were designated the official co-hosts. Even the general public anticipated the event, as the day before the meeting began (Monday, December 26, 1921), the front page of Toronto’s *The Globe* trumpeted: “EMINENT MEN TO VISIT CITY” for a “FOUR-DAY CONVENTION,” a “Great Gathering in Toronto of Scientists of This Continent,” noting that the previous “Toronto Meeting took place the summer before the King’s College fire in 1890” [1].

Fields served as chair of the Local Arrangements Committee, while another leading mathematician, Eliakim Hastings Moore (1862–1932) of the University of Chicago, then the AAAS President, chaired all the plenary sessions. His duties thus included the address of the retiring President, Leland Ossian Howard (1857–1950), which was delivered in the University’s Convocation Hall on the evening of Tuesday, December 27, in two parts: “On Some Presidential Addresses” and “The War Against Insects” [5, p. 36].

While the overall framework and some of the program highlights were provided by the Association’s Washington, DC, headquarters and Fields and the Toronto organising committee, the bulk of the scientific programming had to come from the Sections themselves, their local representatives, and their related societies. These sections ran from Section A Mathematics, through Sections B Physics and D Astronomy, to finally N Medical Sciences and Q Education.

THE SECOND TORONTO MEETING	
BEING THE	
SEVENTY-FOURTH MEETING OF THE ASSOCIATION	
AND	
THE ANNUAL MEETING FOR THE FISCAL YEAR	
1921-1922	
Toronto, December 27 to 31, 1921	
LOCAL COMMITTEE FOR THE SECOND TORONTO MEETING	
J. C. FIELDS, <i>Chairman</i>	
F. A. MOURÉ, <i>Hon. Treasurer</i>	
H. L. SEYMOUR, <i>Secretary</i>	
HIS HONOUR HENRY COCKSHUTT, <i>Lieutenant-Governor of Ontario</i>	
J. W. BAIN	A. G. HUNTSMAN
E. W. BANTING	H. V. F. JONES
S. G. BENNETT	A. D. LePAN
E. A. BOTT	J. J. MacKENZIE
G. S. BRETT	J. C. McLENNAN
E. F. BURTON	J. P. McMURRICH
J. R. COCKBURN	W. L. MILLER
HON. MANNING DOHERTY	C. H. MITCHELL
D. A. DUNLAP	J. M. D. OLMSTEAD
SIR ROBERT FALCONER	SIR EDMUND OSLER
LADY FALCONER	I. R. POUNDER
SIR JOSEPH FLAVELLE	SIR CLIFFORD SIPTON
A. E. GOODERHAM	SIR EDMUND WALKER
HON. R. H. GRANT	C. H. C. WRIGHT
A. HUNTER	
CHAIRMEN OF SUBCOMMITTEES OF THE LOCAL COMMITTEE	
<i>Hospitality, SIR ROBERT FALCONER.</i>	
<i>Entertainment and Dinners, I. R. POUNDER.</i>	
<i>Ladies, LADY FALCONER.</i>	
<i>The Hart House Conversazione, S. G. BENNETT.</i>	
<i>Dormitories, J. M. D. OLMSTEAD.</i>	
<i>Hotels, G. S. BRETT.</i>	
<i>Transportation and Reception, C. H. C. WRIGHT.</i>	
<i>Meeting Places, E. A. BOTT.</i>	
<i>Exhibits, E. F. BURTON.</i>	
<i>Signs and Messenger Service, E. W. BANTING.</i>	
<i>General Program and Other Printing, J. P. McMURRICH.</i>	
<i>Publicity, A. G. HUNTSMAN.</i>	
<i>Membership, H. V. F. JONES.</i>	
<i>Registration Room, J. R. COCKBURN.</i>	
96	

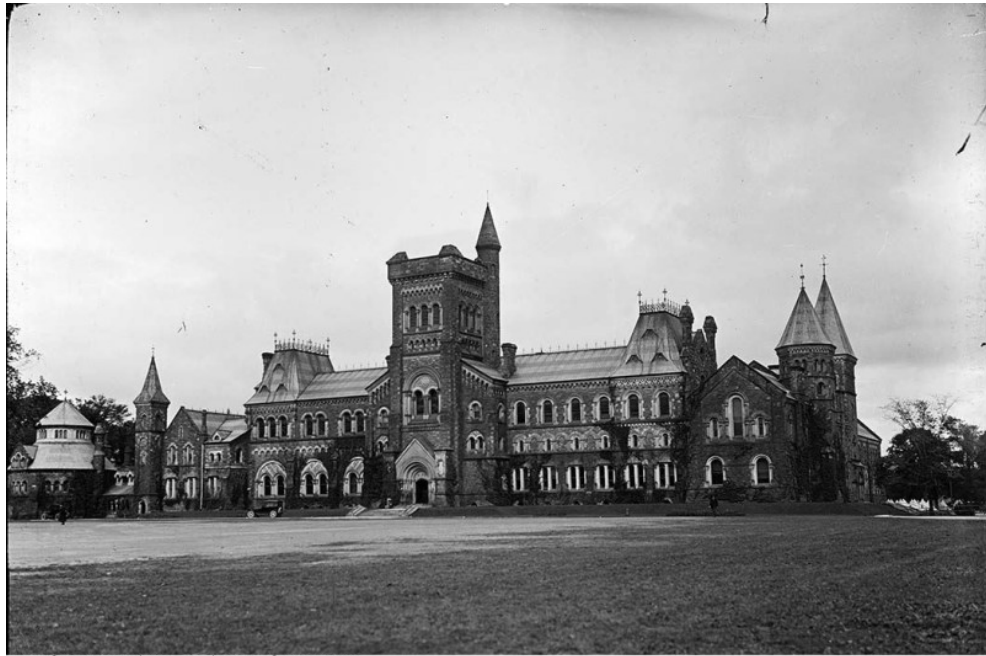
Figure 2. The local organising committee. *Summarized Proceedings of the American Association for the Advancement of Science* (Washington, DC, 1925).

The strength of Canadian participation varied from Section to Section. For example, presentations in Section A Mathematics, which met in Toronto jointly with the American Mathematical Society (AMS) and the Mathematical Association of America (MAA), were largely by Americans. Attendance at Section D Astronomy, since AAS did not come to Toronto but rather met instead at Strathmore College in Pennsylvania, was predominantly Canadian. The Royal Astronomical Society of Canada (RASC) took up most of the slack and provided ample reporting in the *Journal of the RASC*.

The Astronomy section held four sessions. The first, on Wednesday morning, December 28, was officially a Section D-RASC joint session, chaired by the Vice-President for Section D, Samuel Alfred Mitchell (1874–1960), Director of the University of Virginia's Leander McCormick Observatory. The retiring Vice-President of Section D, Joel Stebbins (1878–1966) of the University of Illinois, spoke on "Observation versus Experimentation," and Clarence Augustus Chant (1865–1956), U of T's Professor of Astronomy, gave an address titled "Popularizing Astronomy" [7, p. 37]. Otto Klotz, then of Preston, Ontario, was elected as Stebbins's successor [6, p. 68].

The remaining sessions, held Wednesday afternoon and all day on Thursday, featured 23 papers; these were exclusively by RASC speakers. Six of the talks were by U.S.-based astronomers, including Mitchell's "Comparison of trigonometric and spectroscopic parallaxes" and "The present status of meteor observations," by another Leander McCormick astronomer, Charles Pollard Olivier (1878–1975), now best known as the founder of the American Meteor Society. We note that although he was employed by Johns Hopkins University in Baltimore, Mitchell was a Canadian by birth (Kingston, Ontario) and education (Queens University, MA 1894 and honorary LLD 1924).

Eleven of the presentations were provided by Ottawa's Dominion Observatory, although three of these were delivered by one man, Ralph Emerson DeLury (1878–1956), the brother of U of T Chair of Mathematics Alfred Tennyson DeLury (1864–1951): "Systematic errors in micrometer measurements," "Second note on Cepheid variation," and "Measurements of the distance of the sun deduced from its spectrum." The last was co-authored with John L. O'Connor. Only three and a half years after the May 6, 1918, first light of the 72-inch reflecting telescope at Victoria's Dominion Astrophysical Observatory (DAO), Harry H. Plaskett (1893–1980), son of DAO director John Stanley Plaskett (1865–1941), and future director William Edmund Harper (1878–1940) travelled to deliver "The Pickering series in O-type stars" and "Three spectroscopic orbits [of binary stars], each based on component spectra," respectively. Also from Western Canada was the University of Alberta's John Willliam Campbell (1889–1955), who spoke on "Orbit of the spectroscopic binary H.R. 5942," using 20 plates from the DAO [7, pp. 37–38]. Although he did not present any papers in Section A Mathematics, Campbell—who had studied at Queen's University before earning a PhD on the three-body problem at the University of Chicago in 1915 [3, pp. 119, 137]—was a member of both the AMS and the MAA.



City of Toronto Archives, Fonds 1231, f1231\_t0306

Figure 3. University College in 1917. [City of Toronto Archives](#).

The Mathematics section, which was obviously especially dear to Fields, held a joint session with the AMS and MAA on the afternoon of Thursday, December 29, in Room 8 of University College. Oswald Veblen (1880–1960) of Princeton, the Section A Vice-President, presided, while retiring Vice-President R. D. Curtiss (Northwestern University) gave the lecture, “A Mechanical Analogy in the Theory of Equations.” Next, R. M. Yerkes of the U.S. National Research Council discussed the agency’s “research information service,” and H.E. Slaughter (University of Chicago) explained a program for “subsidy funds for mathematical projects.” Arnold Dresden (University of Wisconsin) read the abstract for R. D. Carmichael’s (University of Illinois) “Algebraic guides to transcendental problems.” The sectional committee nominated George Abram Miller (1863–1951), also from the University of Illinois, to be the Vice-President for Section A Mathematics at the December 1922 AAAS Meeting in Boston.

**THE ISODYADIC QUINTIC.**  
BY J. C. GLASHAN.

*Composition.*—If the roots of the quintic

$$x^5 + 10cx^3 + 10dx^2 + 5ex + f = 0 \quad (1)$$

are expressible by radicals they will be of the form

$$\omega^n y_1 + \omega^{2n} y_2 + \omega^{3n} y_3 + \omega^{4n} y_4, \quad (2)$$

in which

$$(\omega^5 - 1)/(\omega - 1) = 0, \quad n = 1, 2, 3, 4, 5.$$

Also  $(y_1 y_4 - y_2 y_3)^2$  must be rational and satisfy the relation

$$\{3125(y_1 y_4 - y_2 y_3)^6 - 2500A(y_1 y_4 - y_2 y_3)^4 + 400B(y_1 y_4 - y_2 y_3)^2 - 64C\}^2 - 1024(J^2 - 128K)(y_1 y_4 - y_2 y_3)^2 = 0, \quad (3)$$

in which

$$\begin{aligned} A &= 3c^2 + e, \\ B &= 15c^4 - 2c^2 e + 8cd^2 - 2df + 3e^3, \\ C &= (5c^3 - 3ce + 4d^2)(5c^3 - 4ce + 4d^2) + (c^2 + e)(2df - c^2) - ef^2, \\ J &= \text{the invariant of the fourth degree in the coefficients,} \\ \text{and } K &= \text{the invariant of the eighth degree.} \end{aligned}$$

(See *Am. J. of M.*, Vol. XXIII, pp. 49 and 56.)  
The quintic is isodyadic if

$$y_1 y_4 = y_2 y_3 \neq 0, \quad (4)$$

and  $\therefore$  if

$$e \neq 0 \quad \text{and} \quad C = 0. \quad (5)$$

$cC = 0$  may be arranged in the form

$$\{ef - d(c^2 + e)\}^2 - (c^3 - ce + d^2)\{5e^2 - e\}^2 + 16cd^2\} = 0. \quad (6)$$

Substituting  $-p$  for  $c$ ,  $-pa$  for  $2d$ ,  $-p\beta$  for  $e$  and  $-p\gamma$  for  $f$ , this becomes

$$\{2\gamma - \alpha(\beta - p)\}^2 - \{\alpha^2 - 4(\beta + p)\}\{(\beta + 5p)^2 - 4p\alpha^2\} = 0. \quad (7)$$

Let, now,

$$(\beta + 5p)^2 - 4p\alpha^2 = \mu^2\{\alpha^2 - 4(\beta + p)\}; \quad (8)$$

then will

$$2\gamma - \alpha(\beta - p) = \mu\{4(\beta + p) - \alpha^2\} \quad (9)$$

Figure 4. The first page of J.S.C. Glashan's 1923 *AJM* paper.

On the preceding day, AMS had held its own regular sessions, which served as the 28th AMS annual meeting. Eighty-four members heard 32 papers from 30 contributors. For instance, Miller delivered two talks on group theory: “Substitutions which are commutative with every substitution of an intransitive group” and “Solving contradic-

for instance, Miller delivered two talks on group theory: “Substitutions which are commutative with every substitution of an intransitive group” and “Seeming contradictions in the theory of groups.” Canadian presenters included Ottawa’s J.S.C. Glashan (1844–1932), who prepared twinned papers on isodyadic equations, and the U of T’s Samuel Beatty (1881–1970), who had been Fields’s sole PhD student and spoke on one of Fields’s favorite subjects: “The algebraic theory of algebraic functions” [9, pp. 600–601]. At 77 years of age, Glashan was a senior member of the discipline. He had retired from the School Inspectorate in 1910, and Glashan Intermediate School (established in 1888), in the downtown Glebe neighbourhood of Ottawa, was renamed for him in 1905. He was a charter subscriber to the *American Journal of Mathematics* (AJM) in 1878 and published a paper on Taylor Series in the first volume. Klotz was the only other Canadian charter subscriber [4, p. i]. Both of Glashan’s 1921 papers would be published in AJM: “The Isodyadic Quintic” in 1923 and “On the Isodyadic Septimic Equations” in 1924.



**Figure 5.** Louise D. Cummings. “Canadian Women in the Public Eye,” *Saturday Night* (August 24, 1924).

Only two women contributed to the mathematics sessions: Olive Clio Hazlett (1890–1974) of Mount Holyoke College, who spoke on “A symbolic theory of expansions in orthogonal functions,” and Louise Duffield Cummings (1870–1947) of Vassar College, whose talk was entitled “Hesse’s associated points and the Weddel surface” [9, pp. 600–601].

Hazlett grew up in Boston and received her bachelor’s degree from Radcliffe College in 1912. At the University of Chicago, she earned a master’s degree in 1913 and a PhD in 1915. Her thesis director was Leonard E. Dickson (1874–1954). Her dissertation, “On the Classification and Invariantive Characterization of Nilpotent Algebras,” was published in AJM in 1916. She accepted a position as assistant professor at Mount Holyoke in 1918 and was promoted to associate professor in 1924. In 1925, she moved, as an assistant professor with a salary of \$3,000, to the University of Illinois, where she remained for the rest of her professional career [10].

Originally a Canadian, Cummings came from Hamilton to U of T, receiving her BA in mathematics in 1895, followed by graduate studies there and at the University of Pennsylvania, the University of Chicago, and Bryn Mawr College. She taught at Toronto’s St. Margaret’s College in Toronto while completing an MA at U of T under DeLury. She joined the Vassar mathematics faculty in 1902. Her 1914 Bryn Mawr PhD thesis, “On a Method of Comparison for Triple-Systems,” appeared in the AMS *Transactions*. Cummings remained at Vassar until her retirement in 1936 as a full professor [2].

Cummings and Hazlett were two of the eleven women present among the 110 members in attendance for the MAA sessions. Eight others had also traveled from the United States: Clara L. Bacon and Florence P. Lewis, Goucher College; Sister Mariola Dobbin, St. Clara College; Mrs. F.W. Owens—there with her husband F.W. Owens, both of Cornell University; Mrs. Anna J. Pell, Bryn Mawr College; Mary E. Sinclair, Wellesley College; and Jessica M. Young, Washington

University [12, pp. 97–98].

The only woman currently living in Canada was Jennie A. Kinnear (ca 1890–1965) from Port Colborne, Ontario. She was likely in Toronto on her Christmas/New Year’s break from teaching mathematics at Port Colborne Collegiate Institute. She had graduated from Queen’s University in 1913, where “the allurements of Queen’s were too great for Jennie. Ignoring Toronto, she came straight from Port Colborne to take a Mathematical Specialist course here. Her mathematical tendencies haven’t spoiled her genial nature, as is shown by her election to the Presidency of the Residence in her final year. The future before her looks bright. ‘A picture of health and hospitality’” [8, p. 51]. In 1939 the *Queen’s Review* noted she had retired from the teaching profession to become the financial comptroller in her sister’s law office. The 1965 *Review* noted her passing that April 11 at Port Colborne.

On Friday evening, December 30, the mathematicians joined the physicists for a celebratory dinner at Victoria College’s gothic Burwash Hall, on the east side of campus, although Kinnear and others may have instead attended the Women’s Dinner, held in the Great Hall of Hart House. At Burwash Hall there likely was informal discussion about whether the exclusion of mathematicians from Germany (and from the other Central Powers) made Leonard E. Dickson’s offer to host the 1924 International Congress of Mathematicians in the United States a big mistake. And Fields overheard the casual suggestion that the Congress be moved to Toronto [11, p. 81].

Precisely a year later, on December 26, 1922, at a meeting of the Council of the AMS, he—confident from the overwhelming success of the 1921 AAAS Meeting—outlined a plan for an international mathematical congress in Toronto for 1924, in conjunction with a meeting of the BAAS that was already under preparation [11, pp. 134–135].

But that’s another story.

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