SOCIETE CANADIENNE D'HISTOIRE ET PHILOSOPHIE DES MATHEMATIQUES

CANADIAN SOCIETY FOR HISTORY AND PHILOSOPHY OF MATHEMATICS

THIRTEENTH ANNUAL MEETING - TREIZIEME CONGRES ANNUEL

McMASTER UNIVERSITY, HAMILTON, ONTARIO

May 25 - 27, 1987 / le 25 - 27 mai 1987

PROGRAMME

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All sessions will be held in Burke Science Hall, B. 115.

Monday, May 25 - Morning

Special Session on Bertrand Russell

9:30   I. H. Anellis (Philosophia Mathematica): *Mathematical Hegelianism? Russell and Engels on philosophy of mathematics.*

10:00   N. Griffen (McMaster): *Russell at Cambridge 1890-93 : Russell's mathematical education.*

10:30   A. Garciadiego (Universidad Nacional de Mexico): *Russell's precise language.*

11:00   J. Loase (Westchester College, SUNY): *Pure thought in its relationship to the development of the digital computer - a salute to Russell.*

Lundi le 25 mai - après-midi

2:00   F. Abeles (Kean College of NJ): *An early database: C.L. Dodgson's letter register.*

2:45   R.H. Eddy (Memorial): *An application of Desargues' two - triangle theorem from the late 19th century.*

3:30   M. Clutton-Brock (Manitoba): *Probability distributions which express ignorance.*

4:15 → Executive Council.

Tuesday, May 26 - Morning

9:30   M. Folkerts (U. of Munich): ~~German-language~~ *Vernacular* *mathematical texts of the late middle ages.*

10:30   R. Herz-Fischler (Carleton): *Dürer's Paradox,* or *Why an ellipse is not egg-shaped.*

~~11:15 U. D'Ambrosio (Campinas): Alpoym and Colonial mathematics in Brazil~~

12:00-1:30   Assemblée Genérale / Annual Business Meeting

mardi le 26 - après-midi

2:00   J. Dawson (Penn. State U.): *Prelude to recursion theory: the Gödel-Herbrand correspondence.*

2:45   I. Anellis: *J. van Heijenoort as a logician.*

3:30   A. Garciadiego: *Cantor and the paradoxes of set theory.*

Wednesday, May 27 - Morning

9:30   J. Loase: *The problematic irrationals.*

10:15   L. Beaulieu (Montreal): *Bourbaki 1935-1950: a sketch.*

11:00   A. Antolin (Toronto): *Philosophy and Mathematics in the 18th century.*

mercredi le 27 mai - après-midi

2:00   A. Shenitzer (York): *Remarks on discontinuous groups of motions and their geometries.*

3:00   A. Ray (Fundamental Research Institute): *A perception of a mathematician's world.*

1. **F. Abeles** - *An Early Database: C. L. Dodgson's Letter Register*

In 1890, Charles L. Dodgson published an essay, "Eight or nine wise words about letter writing". In it is a section on creating a record of letters received and sent. His need for such a register is evident: in the last thirty-seven years of his life, he was either the originator or recipient of more than 100,000 letters. What is remarkable about his record-keeping device is that in his instructions for creating it, he employed all the fundamental ideas of a modern database.

2. **I.H. Anellis** - *Jean van Heijenoort as a logician - in memory of Jean van Heijenoort, 1912-1986*

Jean van Heijenoort is best known as an historian of logic and as the editor of From Frege to Gödel: A Source Book in Mathematical Logic, 1879-1931, and of Jacques Herbrand, Ecrits Logiques. Van Heijenoort's primary interest was the history of the development of quantification theory, in particular with the historical development and theoretical relations between proof-theoretic methods of first-order functional calculus.

Van Heijenoort's historical work was buttressed by original contributions which he made to general logic and the development of proof theory. This work is not so well-known; much of it remains unpublished, and circulated privately in manuscript photocopies among his students and colleagues.

3. **I.H. Anellis** - *Mathematical Hegelianism? Russell and Engels on philosophy of mathematics*

If one makes a comparative study of the pronouncements in philosophy of mathematics of Engels and the early Russell on such issues as the nature of the infinite, the intellectual integrity of infinitesimal analysis, and the questions of what shall count as a number properly so-called, one is struck at once by strong similarities.

We are led to ask whether the similarity of views on mathematics expressed by Russell and Engels was a matter of simple coincidence and perhaps more apparent than real, was the result of the general intellectual climate in the second half of the nineteenth century, or was due to an underlying unified Hegelian philosophy of mathematics.

4. **A. Antolin** - *Philosophy and Mathematics in the Eighteenth Century*

Euler has often been portrayed as either naive or indifferent toward the foundations of analysis. He was not; only his efforts must be understood in the light of a different tradition. That this is the case is brought out by comparing some of his arguments to what his contemporaries had to say about the foundations of knowledge in general - the question of the foundation of mathematics began to be treated as an autonomous problem at a later date.

I choose for comparison two of the arguments Euler put forward in the course of his debate with Jean d'Alembert and Daniel Bernoulli on the vibrations of a string, and passages from Leibniz, Berkeley and Condillac. The similarity of these philosophers' views on the matter at hand is all the more striking in the light of their disagreement on most other matters.

5. **L. Beaulieu** - *Bourbaki 1935-1950: A Sketch*

Between 1935 and 1950, Bourbaki published 11 booklets of the *Elements de Mathematique*. However, the group's initial plan was to write a *cours d'analyse*, in the hope that it may replace the currently used treatises, such as Goursat's, and thus rejuvenate the teaching of *calculus* in France. Their discussions quickly strayed from curriculum concerns to focus on current mathematical literature. I will first examine how this change in objectives occured. Next, I will discuss the processes through which some of the choices were made for Bourbaki's first publications in Set Theory, Algebra and Topology. I will also make some remarks on how this collective work was carried through, at different points in time.

6. **Martin Clutton-Brock** - *Probability distributions which express ignorance*

Statisticians often argue heatedly over which theory of inference is "correct". But the rival theories are different because they are trying to answer different questions, and each theory is therefore correct within its own frame of reference. Seen in this light, Jeffrey's theory of rational Bayesian inference is important because it tries to answer the question which scientists most naturally ask. It is, however, unpopular because it requires us to use prior probability distributions which express ignorance. These distributions are improper and often give rise to apparently unacceptable paradoxes. I shall review some of these paradoxes and show that they arise from the fact that a state of complete ignorance is itself paradoxical.

7. **U. D'Ambrosio** - *Alpoym and colonial mathematics in Brazil*

An analysis of the mathematical work of José Fernandez Pinto Alpoym through his books on artillery, and his action as an urbanist and politician, as indicators of mathematical activity in Brazil during the colonial period.

8. **John W. Dawson** - *Prelude to recursion theory: the Gödel-Herbrand corresponence*

As is well-known, the notion of general recursive function was first introduced by Kurt Gödel in his 1934 lectures at the Institute for Advanced Study. Gödel's definition was a modification of one suggested to him by Jacques Herbrand in a letter of April 7, 1931, to which Gödel replied July 25, two days before Herbrand's death in a mountain climbing accident. Long thought to have been lost, these two letters recently came to light during my cataloguing of Gödel's *Nachlass*. I will exhibit the text of the two letters and comment on their historical and mathematical significance.

9. **R. H. Eddy** - *An application of the Desargues' two-triangle theorem from the late nineteenth century.*

The Desargues' two-triangle theorem in the plane states that if two triangles are perspective from a point P they are perspective from a line ℓ and vice versa. In this talk, we discuss a particular family of such triangles, called Kiepert triangles circa 1884, and derive the corresponding loci of P and ℓ.

10. **M. Folkerts** - *German-language mathematical texts of the late middle ages.*

This talk will present information on mathematical treatises in the vernacular languages from the 13th to the 15th century, first summarizing general developments in non-German texts, then discussing in detail texts in the German language.

11. **A. Garciadiego** - *An alternative historical reconstruction of Cantor's discovery and understanding of the set theoretic paradoxes.*

The goal of this talk is to present an alternative, yet plausible, new historical reconstruction of how and why Georg Cantor (1845-1918) discovered the now famous set theoretic paradoxes, in particular those now known as Cantor's and Burali-Forti's paradox. Most important, we will attempt to explain Cantor's own reaction and understanding of such happening for the development of the foundations of mathematics.

12. **A. Garciadiego** - *Russell's precise language*

Some historians of mathematics treat the terms 'antinomy', 'paradox' and 'contradiction' as synonyms, overlooking the grammatical and philosophical differences behind their usage. The close analysis of how Russell employed these terms, between 1898 and 1903 when he wrote The Principles of Mathematics, will clarify their dissimilarities and, most important, the various philosophical influences that Russell experienced while writing this book.

13. **N. Griffin** - *Russell at Cambridge 1890 - 1893*

The paper pulls together what little is known or can be inferred about Russell's mathematical education at Cambridge in the 1890's. It provides some explanation, therefore, of Russell's later criticism of his mathematical education in his autobiographical writings, and of his early misadventures in the philosophy of mathematics.

14. **R. Herz-Fischler** - *Durer's Paradox* or *Why an ellipse is not egg-shaped*

In his Treatise on Mensuration with the Compass and Ruler in Lines, Planes, and Whole bodies, published in 1525, the German Painter and Mathematician Albrecht Dürer showed how to graphically obtain the ellipse as a section of a cone. From the drawing and Dürer's remarks it is clear that he believed that the ellipse is egg-shaped and not symmetric. In my talk I will describe Dürer's method and explain why the use of the method might indeed lead one to believe that the ellipse is egg-shaped. I will then show how the analytic form of Dürer's method can be used to derive the Cartesian form of the ellipse.

15. **J. F. Loase** - *Pure thought in its relationship to the development of the digital computer - a salute to Russell.*

This lecture will discuss developments in mathematical logic and automata theory from Russell to Turing from the perspectives of several academic disciplines, which include the mathematical, linguistic, and psychological.

16. **J. F. Loase** - *The problematic irrationals - a logistic, intuitionistic, formalistic, and constructivist perspective.*

This lecture will scrutinize the development of the irrational numbers through three schools of modern mathematics which include logicism, intuitionism, and formalism. Just as these three mathematical philosophical schools failed to develop a firm foundation for modern mathematics, the above schools appear also to have a fallen short of developing the irrationals without recourse to problematic axioms, implicit assumptions, or obfuscatory argument. This researcher will expand upon the foregoing and will outline his recently completed proof that the irrationals cannot be "constructed" by finite methods - namely by a mapping from the natural numbers via a polynomical function with rational coefficients (or a composite-function of polynomical functions) to the digits of any irrational, modulo K.

17. **A. Ray** - *A perception of a Mathematician's world.*

The present exposition is some sort of characterization of a Mathematician's world. History tells that a mathematician may emerge from any profession (e.g. : Theology, Law Medicine and others) or no profession, with human qualities, with/without eccentricity, keenly interested in many things outside mathematics and if not gifted, be driven by irresistible impulse to do mathematics. Politics and religion are no exceptions to a Mathematician's profound utterances or understanding; and in that concern, the author intends to enumerate case studies from history of mathematics that could likely retain some composure and smugness but not entercounter wilderness in terms of oriental perceptions as mathematical mind in operation.

18. A. Shenitzer - *Remarks on discontinuous groups of motions and their geometries*

Uniformly discontinuous groups of motions of R^2 and R^3 yield <u>all</u> geometries that are locally isometric to R^2 and R^3 respectively. The larger class of groups is that of discontinuous groups of motions. The discontinuous groups of motions of R^2 are the finite groups of motions of R^2, the freize groups and the wall paper groups (= the plane crystallographic groups). These groups induce geometries that are locally isometric to R^2 but include singularities of definite types.

There is a natural connection between some of these issues and the issue of geometries that are locally isometric to H^2 (= the hyperbolic plane) rather than to R^2 (the question of geometries that are locally isometric to H^2 was first investigated by Poincaré).