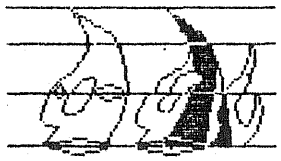

Canadian Society for History
and Philosophy of Mathematics

Société canadienne d'histoire et
de philosophie des mathématiques

ANNUAL MEETING
CONGRES ANNUEL

Université de Montréal, Montréal
Pavillion Jean-Brillant, 3200 rue Jean-Brillant.
Room / local JB 3310
June 2-3-4 juin
1985

PROGRAMME

Sunday June 2 juin dimanche:

10:00		Cancelled - Annulé
11:00	Erwin KREYSZIG	On the History of Functional Analysis
12:00		☐☐ LUNCH - REPAS ☐☐
13:30	Craig FRASER	J.L. Lagrange and the Equations of the Calculus of Variations
14:00	Wiliam ASPRAY, Invited speaker	Princeton Oral History Project
15:00	Roger COOKE	Joseph Perott, Sonya Kovalevskaya, and Clark University
16:00	Frederick V. RICKEY	W.E. Story of Hopkins and Clark

Monday June 3 juin lundi:

9:30	Len BERGGREN	Ancient Optics in Light of a New Arabic Manuscript
10:30	Israel KLEINER	Evolution of the Function Concept
11:30	Marshall WALKER	History of the CSHPM/SCHPM

12:00		●●● Lunch - Business Meeting ●●● ●●● Repas - Assemblée générale ●●●
14:00	Albert LEWIS, Invited speaker	Bertrand Russell as a Mathematician
15:00	David WHEELER	Aspects of the Relations Between Philosophy and Pedagogy of Mathematics
16:00	Giovanna CIFOLETTI	Kepler's Philosophy of Mathematics: "De Quantatibus"
19:00	Louis CHARBONNEAU	Workshop: Pictural Material in the Classroom

Tuesday June 4 juin mardi

9:30	Francine VINETTE	In a Search of Mesoamerican Geometry
10:30	Victor KATZ	Precalculus and Calculus: A Historical Approach to Teaching
11:30	Liliane BEAULIEU	Bourbaki and Bourbakis in Twenty Years of AMS Publications (1935-1954). A Citations Analysis.
12:30		□□ Lunch - Repas □□

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ABSTRACTS - RESUMES

1- On the History of Functional Analysis
Erwin KREYSZIG, Carleton University

This talk is based on joint work with Garrett Birkhoff (Harvard U.). Beginning with a short survey of some influential factors from the prehistory, we shall concentrate on the evolution of functional analysis from its rather heterogeneous beginnings around 1887 (Volterra's notes on functionals) to its establishment as a unified field of its own around 1932, the year of the appearance of the three classical books by Banach, von Neumann, and M. H. Stone. We shall characterize the early impacts from classical analysis (particularly from the calculus of variations and integral equations) and describe the accomplishments of the main contributors (Volterra, Fréchet, Hilbert and his school, F. Riesz, Hahn, Banach and von Neumann). The emphasis will be on the development of general ideas, including their motivations by classical and quantum physics.

2- J.L. Lagrange and the Equations of the Calculus of Variations
Craig FRASER, University of Toronto.

J.L. Lagrange provided several different derivations fo the fundamental relations of the calculus of variations. These derivations illustrate late 18th century notions of mathematical rigor and help us to understand the formal basis of Lagrange's analysis. Works to be disscussed include Lagrange's 1760 memoir on the calculus of variations and his 1797 treatise on the theory of functions.

3- Joseph Perott, Sonya Kovalevskaya, and Clark University
Roger Cooke, University of Vermont

In the transfer of European mathematics westward across the Atlantic during the last half of the nineteenth century, a small but signifiant role was played by a few Europeans who had studied with the great masters in Paris and Berlin and then, usually for personal rather than professional reasons, chose to emigrate. While these people were not the best of the European

mathemaitcians some of them were very talented people who for non-academic reasons did not have bright prospects of a career in Europe. One of these was Joseph Perott, whose life can be traced in considerable detail thanks to his relationship with Sonya Kovalevskaya. In 1891 Perott came to Clark University in Worcester, Massachusetts and played an important role in making Clark one of the world's most stimulating centers of mathematical activity during the early 1890's. This talk will present Perott's biography and discuss his relationship to the mathematical community of his time.

4- W.E. Story of Hopkins and Clark

V. Frederick Rickey, University of Vermont (visiting) and Bolwing Green State University.

After his undergraduate training at Harvard, William Edward Story earned his Ph.D. at Leipzig before joining J.J. Sylverter on the faculty at Johns Hopkins when the university opened in 1876. He moved to Clark University when it opened in 1889 and remained there until his retirement in 1921. This paper will trace the details of his career, concentrating on his influence in the transfer of mathematical culture to America and his role in the development of graduate mathematics education in North America.

5- Ancient Optics in Light of a New Arabic Manuscript

J.L. Berggren, Simon Fraser University

A recently-discovered Arabic manuscript shows that the full history of burning mirrors in the ancient or medieval worlds is richer than we thought it to be. It is our aim in this talk to survey that history in the light of information contained in the manuscript.

The manuscript in question, BM ADD 7473, 164^b–172^b, begins with a six-page summary of material from Book I of Apollonios' Conics and then contains the words, "We need nothing else from the first (book of Apollonios), and the remainder is from the book of Datrumus on burning". There follow the statements and proofs of five propositions about reflection of light rays by concave paraboloidal and spherical mirrors, and the treatise concludes with a discussion of burning glasses.

Although the themes of the writing are familiar from the treatises, of

Diokles and Ibn al-Haytham, the propositions are proved differently and the construction of the parabola that is given is not found elsewhere in the ancient or medieval literature. It is based on a lemme found in Archimedes' work. The concluding section, on burning by objects of solid glass or by objects filled with water, contains references to the practices of ancient artisans.

6- Evolution of the Function Concept

Israel Kleiner, York University.

I. Anticipations of the function concept (ca.2000 B.C. - end of 17th century)

II. Euler's Introductio in Analysin Infinitorum (1748)

III. The vibrating string controversy (D'Alembert, Euler, D. Bernoulli, Langrange; ca. 1750-1760)

IV. Fourier and Fourier Series (1807, 1822)

V. Cauchy's contributions (1820's, 1830's)

VI. Dirichlet's definition of function (1820's, 1830's)

VII. "Pathological" functions (Riemann, Wierstrass, et al; ca. 1850's - 1890's)

VIII. Baire's classification scheme (Baire, 1899; Lebesgue, 1905)

IX. Debates concerning the Axiom of Choice (Baire, Borel, Hadamard, Lebesgue, 1905)

X. Recent developments (L2 Functions, ca. 1910; Generalized functions, 1930's - 1940's; Category theory, 1950's - 1960's)

7- Bertrand Russell As a Mathematician

Albert C. LEWIS, Bertrand Russell Editorial Project, McMaster University

Russell's training for the Cambridge Mathematical Tripos in 1893 did not inspire him to do further work in mathematics and did not prepare him for accepting the modern mathematics being done on the Continent. In his later

philosophical work, this was one factor explaining his initial negative reception to Cantor's transfinite numbers. The evidence we have in the Russell Archives seems to point to a lack of interest in mathematics for its own sake. This seems similar to Russell's well-documented distaste for doing experimental physics.

8- Some Aspects of the Relations Between the Philosophy and Pedagogy of Mathematics
David WHEELER, Concordia University

In the talk I want to go further than merely to assert that the way mathematics is taught implies (some sort of) a philosophy of mathematics. Philosophy and pedagogy both scrutinize mathematics; both attempt to be fair to it, to "take it as it is". Do their different viewpoints come together anywhere? Among other examples, I will consider some messages from the work of Lakatos and Gattegno.

9- Kepler's Philosophy of Mathematics: "De Quantatibus"
Giovanna CIFOLETTI, Princeton University

10- Workshop: Pictorial material in the classroom
Louis CHARBONNEAU, Université du Québec à Montréal

A work session on pictorial material useful as support in a course of history of mathematics. Please bring with any material, slides or pictures, you use in your courses. It will perhaps be possible to compile a "kit" that would be made available to our membership at minimal cost.

11- In Search of Mesoamerican Geometry
Francine VINETTE, University of Waterloo

Since Pre-Colombian and early Spanish written materials provide little specific information on mesoamerican knowledge of geometry, this knowledge will have to be extracted from physical evidence of the application of

geometrical concepts, rather than reported from written primary sources. Manifestations of geometrical concepts in Mesoamerican artifacts and site plans will thus be presented along with arguments from different studies in archaeastronomy, geomagnetism, symbolism etc. as justification for the intentional nature of the geometrical concepts displayed.

12- Precalculus and Calculus: A Historical Approach to Teaching
Victor J. KATZ, University of the District of Columbia

Precalculus and calculus can be taught using a historical approach; in fact, these subjects can be better taught that way. The historical connections between the topics provide motivation and show the students the reasons the mathematics was developed. Surprisingly, a historical approach to these courses is also very up-to-date in that it provides the discrete mathematics and the algorithmic approach which many mathematicians and computer scientists insist should be taught to freshman mathematics students.

13- Bourbaki and Bourbakis in Twenty Years of American Mathematical Publications (1935-1954). A Citation Analysis
Liliane BEAULIEU, Université de Montréal

Bourbaki is the pseudonym of a group of (mostly) French mathematicans who collaborated to write an overarching treatise, Eléments de mathématique (1939-), which was intended to provide the working mathematician with unified perception of the tools to his trade by emphasizing the basic structures of "mathematics".

It is widely held that Bourbaki's treatise has a powerful impact on subsequent mathematical development, the peak of its influence being felt in the years 1955-1965.

By looking at citations received by Bourbaki and by the members of the group across twenty years of two American mathematical publications I offer a first approximation to an evaluation of the extent and versatility of Bourbaki's presence in North America.

In this talk, I will present some of the conclusions arising from a comprehensive citation analysis of the Transactions of the American

Mathematical Society and the Annals of Mathematics (1935-1954). Further observations are provided by a look at the citations of Bourbaki for 1955-1969n on the basis of the Science Citation Index.

(This study is part of a more extensive research in progress on the Bourbaki phenomenon, focussing on the French and the American mathematical scenes.)