# The 'Society of Mathematicians' in Maurice Halbwachs

## The Memory of Scientific Activity between Analysis and Synthesis

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**W. Arndt, "Leibniz chooses between the old and the new philosophy", engraving, 1796.**

Halbwachs sitting at his desk, at the **University of Strasbourg** (1924).

**Maurice Halbwachs** (1877-1945) is today known as one of the main continuators of **Durkheim's programme**,

- His sociological legacy has generated numerous **historical interpretations** as well as **sociological inquiries**, starting in the immediate post-WW2 era.
- Among his **most well-known works** are:
  - ***Les cadres sociaux de la mémoire*** (1925). Not translated in English.
  - ***Les Causes du Suicide***, 1931 (eng. tr. 1978)
  - ***The Collective Memory*** (1st ed. 1950 ; complex editorial path).

I defended my **Master's thesis** in June 2024, entitled '**Sociological invention in Maurice Halbwachs**: from Leibniz's philosophy to collective psychology'.

# OUTLINE

I) The enigma of the "society of mathematicians" in Halbwachs's work

II) The mechanisms of perpetuation of mathematical memory

III) Halbwachs's relation to the interwar period and the "crisis of reason".


# I. THE ENIGMA OF THE "SOCIETY OF MATHEMATICIANS"

# A preamble:

## The Durkheimian Programme

**i. Study of the social morphology**
Material structures
Social space in the strict sense

**ii. Study of representations**
Collective representations
Collective memory
Social rules and prohibitions.

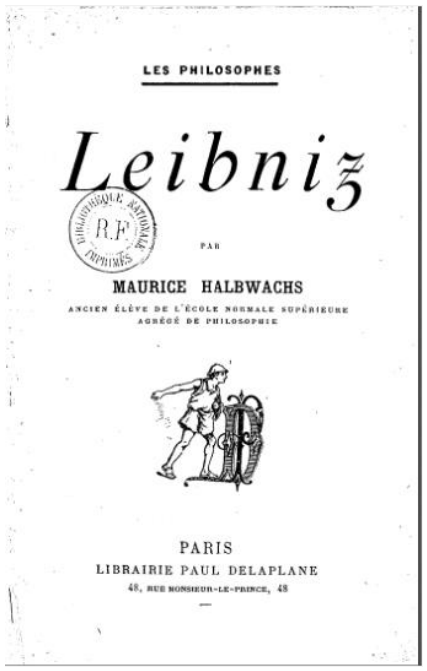
Example : geographical distribution of groups in cities.
the distribution of suicide
Peano's school…

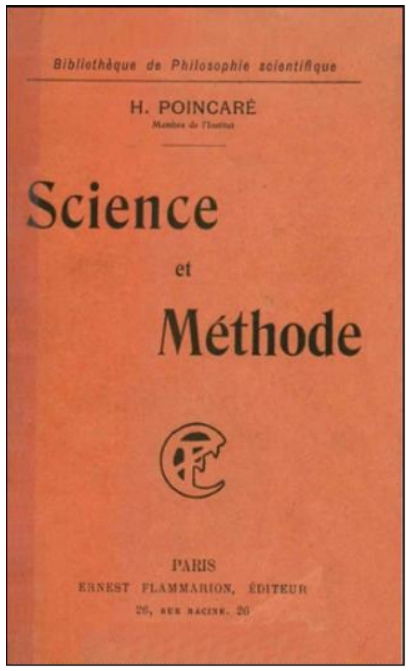
→ Simiand, Mauss, Bouglé, … and Halbwachs: **second durkheimism.**
→ **Diversification of the object** (suicide, salaries, …).

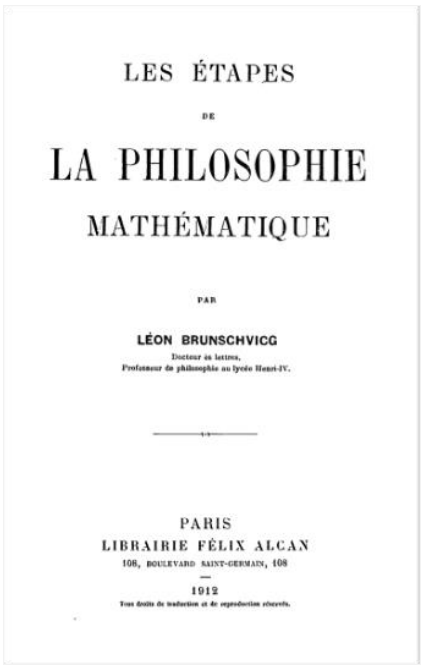
# HALBWACHS'S PHILOSOPHICAL AND SOCIOLOGICAL TRAINING

- Tendency to **generalisations**
- Thèse '**ès Lettres**' : preference for the **clarity of the proof, the rhetoric,** rather than empirical variety.

From left to right :
- Halbwachs, *Leibniz*, 1907.
- Henri Poincaré, *Science et méthode*, 1908.
- Léon Brunschvicg, *The Steps of Mathematical thinking*, 1912.



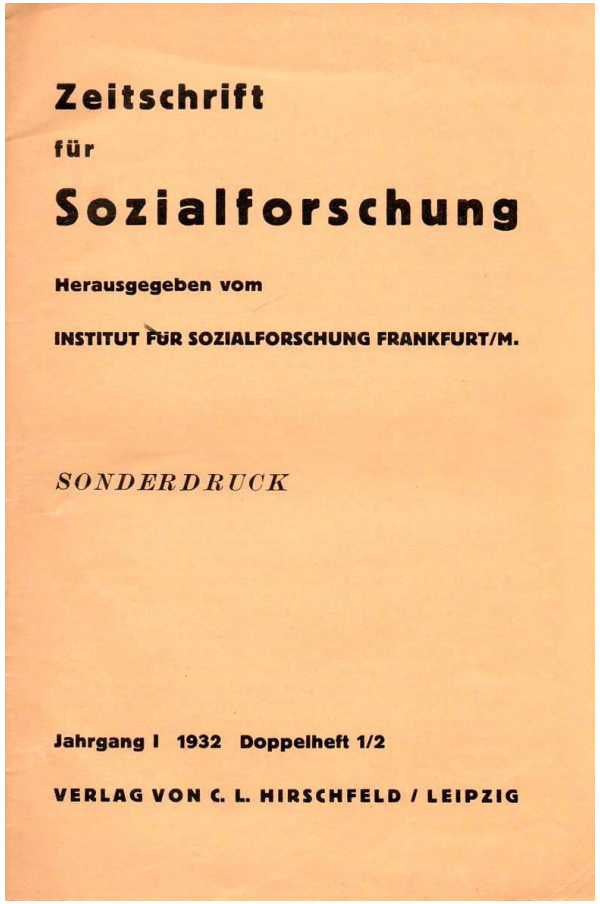



# A 'SOCIOLOGISATION' OF MATHEMATICAL REASONING?

"With mathematical reasoning, we leave formal logic behind (…). It was once believed that a mind left to its own devices could reconstruct all of mathematics, all of geometry. In fact, it would not get very far if it were not part of the **society of mathematicians** *[la société des mathématiciens]*. **This society does indeed exist**; it has its principles, rules, conventions, formulas, language and symbols, which it has developed **gradually over time through collective effort**.

Halbwachs, 'The collective psychology of reasoning', *Zeitschrift für Sozialforschung*, n° 7, 1938, p. 370.



# Geometry as a paradigmatic case of collective knowledge

"We must remember these **conventions** if we want to see things from the group's point of view: we must 'turn our heads in that direction' (as Pascal said*). In other words**, we must enter into the mindset [*disposition d'esprit*] of those who practised geometry before us**.

(…) Therefore, geometers **remember as much as they reason *[raisonnent]***".

Halbwachs, 'Collective memory and space', pp. 212-213 of French edition (missing in Harper, 1980).

# Analytic geometry as the paradigm of analytic-synthetic shifts?

- The introduction of **coordinate methods** did not **abolish** the synthetic constructions of Euclid; it transformed them into collectively remembered devices.
- What originally required a synthetic invention became an **analytic tool**.
- The "purity" of analysis is the **result of this collective memory at work**:

**Intuitive** notion of space : **visual**, qualitative

↓

Mathematisation (17th century) : reduction to **equations**.

↓

Teaching geometry through **axiomatics and principles** (19th century): preference of analysis over synthesis.

# The Leibnizian motive of Halbwachs's epistemology of mathematics:

"However, **analysis is rarely pure**; most often, in searching for means [for analysis], we come across devices invented long ago by accident under the guidance of reason, either by ourselves **or by others, which we encounter in our memory or in the writings of others, as in a table or a directory**; and we apply them, which is **a matter of synthesis**".

– Leibniz, "Of universal synthesis and analysis", GP VII, 297, around 1683.

"Mathematical proof **is only an analysis in appearance and in retrospect**. It involves synthesis, that is, the combination of several propositions that have been established by separate groups of researchers. Every new problem is, in fact, a question posed to a group of mathematicians by all the others".

– Halbwachs, 1938.

# II. MECHANISMS OF PERPETUATION

- This **rationalist heritage** of Halbwachs should be considered to rigorously understand his **sociological principles**.
- Hence his **conceptualisation of the mathematical community** is:
  1) **Sociological** : the mathematical community and knowledge are a **social fact** which constraints the individual minds.
  2) **Realist/'rationalist empiricism'**: mathematical knowledge derives, at least partly, from social experience.
  3) **'Memory-based'** (*mémorielle*) : the unity of the mathematical community relies on its collective memory, i.e. accepted proofs, conventions, axiomatics.

# From analysis to synthesis, through memory?

| Mathematical reasoning & activity | Its sociological form |
|---|---|
| **Analysis** : following axioms, principles & rules to deduce propositions. | **Teaching mathematics** (coercive norm + existence of institutions) |
| **Memory of premisses**: through conventions, symbols and a language. | **Collective memory** based on **repetition and incorporation**. |
| **Synthesis**: the *use* of theses memorised conventions to produce non-analytical propositions. | Social **innovation** (and even transgression.) |

# III. HALBWACHS'S RELATION TO THE INTERWAR PERIOD (1918-1945)

## SOME REFLECTIONS

• **Bachelard** knew Halbwachs's work.
→ This neglected fact helps reopen the question of **interwar reconstruction of scientific reason.**

• Both thinkers contributed (each in his own way) to the **epistemological rearrangement** of scientific categories after the Einsteinian revolution.

• This rearrangement requires a **rigorous account of the "memory of reason"**:
– scientific reasoning as historically layered,
– and collectively stabilised.

# THANK YOU!