

# Mentoring Ph.D. Theses and PostDocs in Schlumberger Oilfield Services

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**Schlumberger**

# Outline

- **A brief history of the company.**
- Schlumberger Oilfield Services today.
- Research and Engineering in Schlumberger.
- Supervising Ph.D. theses and PostDocs.

# The Brothers – Founders of the Company



Conrad Schlumberger  
1878–1936  
École Polytechnique  
Work since 1912

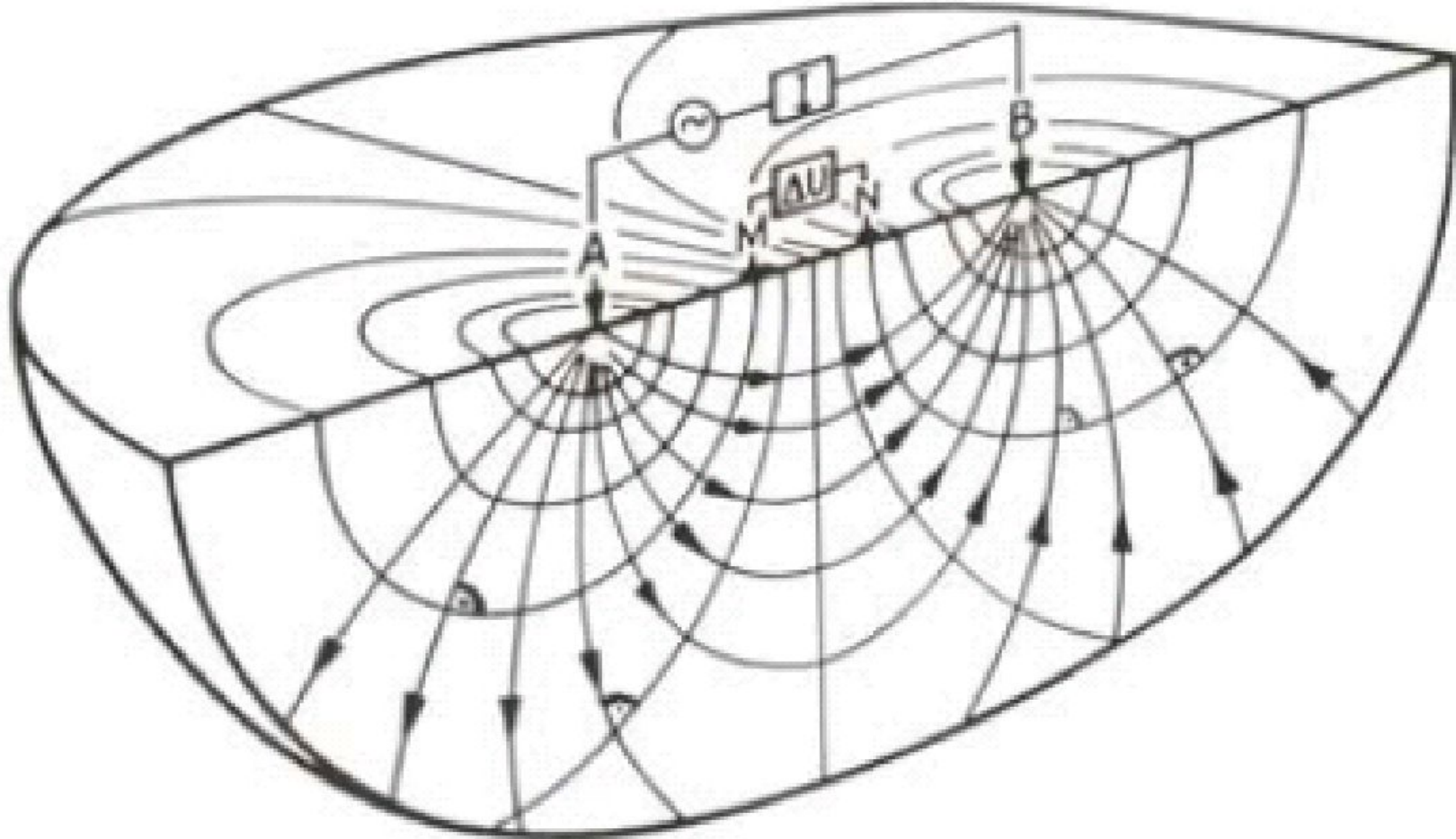
Marcel Schlumberger  
1884–1953  
École Centrale  
Joined in 1919



**Schlumberger**



# Four-Electrode Measurement - Sketch



# La Méthode Schlumberger

- Four-electrode measurements.
- Equipotential lines are not interesting per se!
- Equivalent electric resistivity: **apparent resistivity:**
  - Hypothesis: homogeneous medium – close-form, exact solution;
  - Elimination of the electrode spacing (K-factor);
  - Replacing the equipotential maps by an equivalent-resistivity map
- Map out lines of constant resistivity.

# Research is a Foundation Stone



"I agree to disburse to my sons, Conrad and Marcel, the funds necessary for research study in view of determining the nature of the subsurface, in amount not exceeding five hundred thousand francs.... they must devote themselves to it entirely.

The scientific interest in research must take precedence over financial interests."

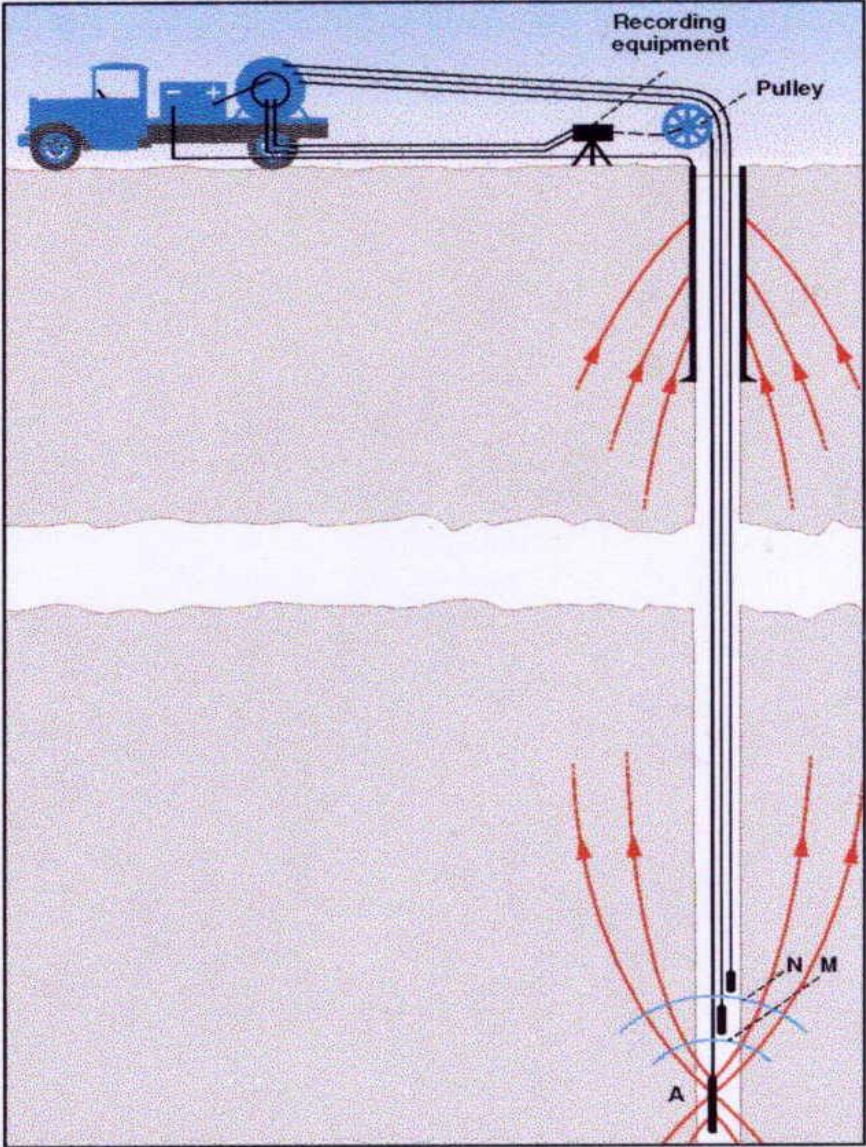
**Schlumberger**  
-Paul Schlumberger,





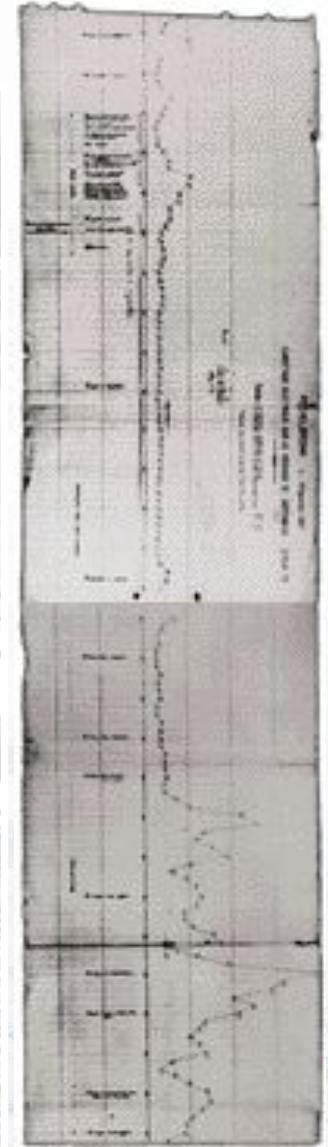


# Wireline Electric Log – the Measurement Principle





# Pechelbronn, 5 September 1927



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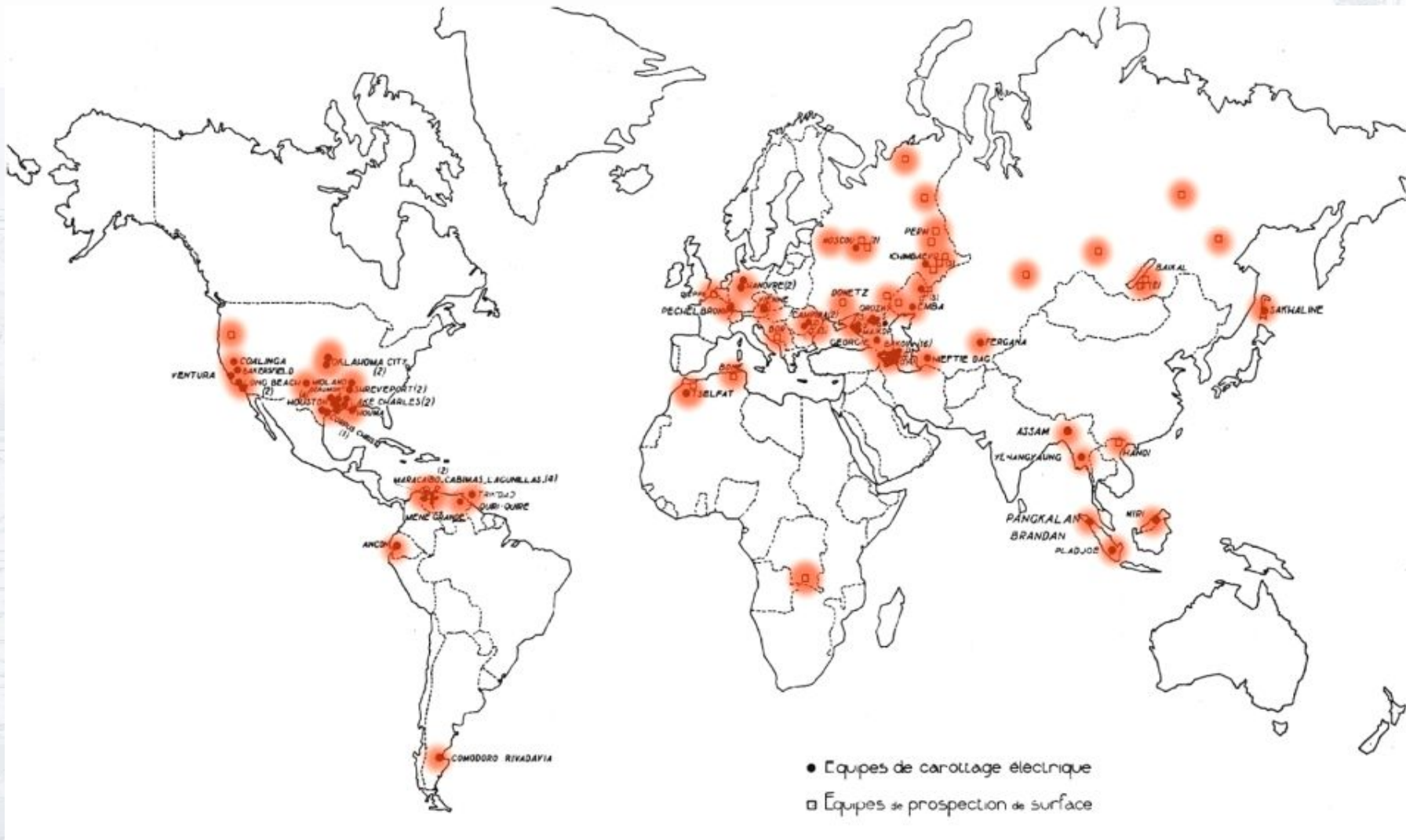
# Truck stuck in the Mud in Louisiana, 1929



**Schlumberger**



# Schlumberger Centers Worldwide - 1935



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# Schlumberger Annual Results

An International Technical Company selling products and services that improve the productivity of our clients.

Revenue: \$23.28 billion in 2007 (19.23 G\$ in 2006; 14.31 G\$ in 2005).

Net income \$5.18 billion (3.70 G\$ in 2006; 2.21 G\$ in 2005).

86,000 employees of 140 nationalities.

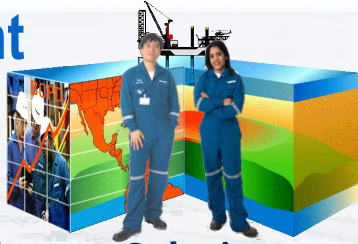
Active in approximately 80 countries.



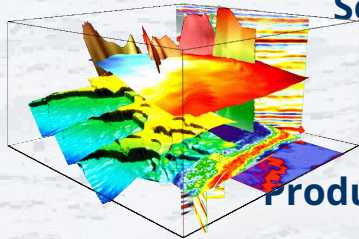
**Schlumberger**

# Technology Portfolio

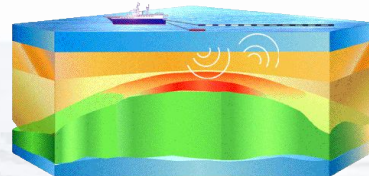
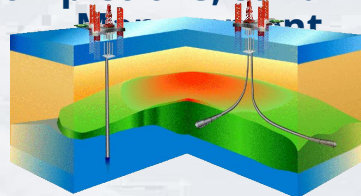
## Reservoir Management



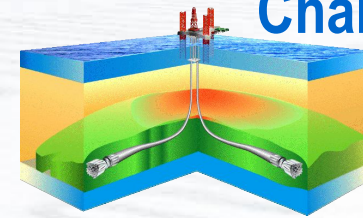
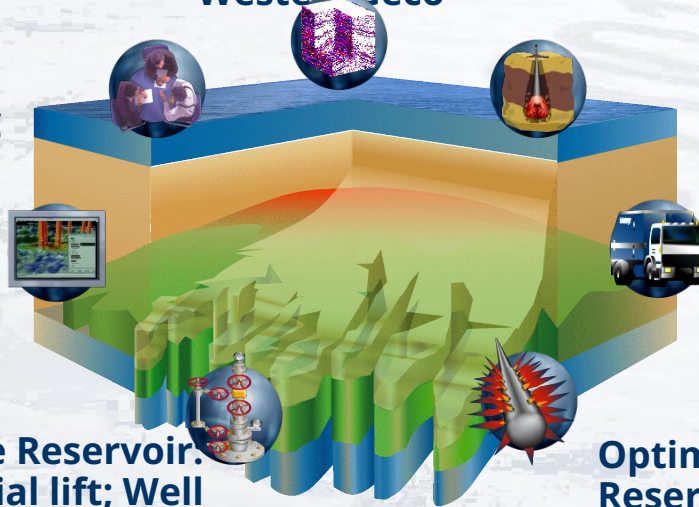
**Schlumberger Solutions:**  
Integrated Project Management; Business Consulting  
**The Digital Oilfield:**  
Schlumberger Information Systems; Data and Consulting Services



**Producing the Reservoir:**  
Artificial lift; Well Completions; Sand Control

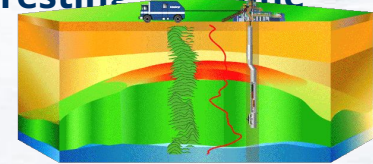


**Defining the Reservoir:**  
WesternGeco

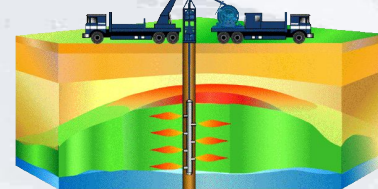


**Accessing the Reservoir:**  
Drilling & Measurements Subsea

**Evaluating the Reservoir:**  
Wireline; Testing; Slickline



**Optimizing the Reservoir:**  
Well Services



## Reservoir Production

**Schlumberger**



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# Recruiting into Research and Development

- Research centers: Ph.D. scientists
  - Mathematicians
  - Physicists
  - Chemists
  - Geoscientists
- Technology centers: Ph.D. scientists, M.Sc. or Ph.D. engineers
  - Electrical engineers
  - Mechanical engineers
  - Software engineers
  - Chemical engineers
- Career limitation for scientists without Ph.D.
  - Lack of autonomous working skills, independent creativity
  - Lack of writing and presentation skills



# Ph.D. Theses in Schlumberger

- Exception – not the rule.
  - We hire Ph.D.s – we do not pay for their education.
  - Heavy personal responsibility-commitment toward Ph.D. candidate.
  - Conflict: corporate confidentiality versus academic need to publish.
- Internal advancement for non-Ph.D. scientists/engineers with exceptional accomplishments.
  - Overcome career-limiting roadblock.
  - Example: Matthieu Simon.
- Sponsoring of Ph.D. theses for specific corporate needs.
  - University as accredited institution to award degree.
  - Scientific problem solution as enabler for product development.
  - Example: saltwater conductivity-permittivity above 100 C.
- Reverse opportunities for adjunct professorships??

# PostDocs in Schlumberger

- Mostly in research centers for exploration of long-term themes.
  - Tie-in to academic research – evolution from pure to applied research.
- A few examples in Europe as Marie-Curie PostDocs.
  - Avoid confidentiality conflict; enable to publish.
  - No clear employment commitment.
  - Accept premature termination due to permanent-job offers.
  - Marginalize from mainstream activities.
- Select topics of marginal business interest.
  - Opportunity to explore new business opportunities.
  - Research participation in consortia with academia & national labs.
  - Example: permanent electrode-resistivity array.
- Define scope rather vaguely.
  - Facilitate change of scope as priorities change.
  - Example: ERAs for gas and for CO<sub>2</sub> storage.



# Summary on Ph.D. theses and PostDocs in SLB

- Recruiting of ready Ph.D.s as mature contributors.
  - Europe is no longer the preferred recruiting ground.
  - Competition with Princeton, Harvard, CalTech, Lomonossov, Xinghua, ...
- Schlumberger-sponsored Ph.D. theses rare and difficult to find.
  - Serious long-term commitment during thesis.
  - No guaranteed benefit to us after thesis – no company loyalty.
  - No employment guarantee after thesis.
- PostDocs as research enablers – introduce new ideas.
  - Opportunity to explore side avenues with no business interest.
  - Mutual evaluation over extended period – no commitment.
- There is no simple answer.

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