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50th Anniversary of the Nobel Prize for Polarography

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50th Anniversary of the Nobel Prize for Polarography

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On December 10, 1959, at 4.30 p.m. in Stockholm, Sweden, Professor Jaroslav Heyrovský received the Nobel Prize for the polarographic method of analysis from the hands of King Gustav Adolph VI (see Figs. 1 and 2). It remains one of only a few prizes for analytical chemistry and was definitely well deserved. The pioneering work of Professor Heyrovský resulted in wide-spread applications of his polarographic methods in analytical laboratories. His work inspired further development of modern electroanalytical methods in the following decades, the development of sensors and biosensors based on electrochemical principles, the combination of powerful separation techniques such as high performance chromatography and electromigration techniques with extremely sensitive and relatively selective electrochemical detection, and more. Even though his first polarograph may look odd nowadays, it was the first recording analytical instrument and it really started a new era in electroanalytical chemistry. Without exaggeration, it can be stated that the present state of electroanalytical chemistry is the result of Professor Heyrovský's research, teaching, organizational work and, last but not least, his world-wide promotion of polarographic method.

We have decided to commemorate this anniversary with a series of papers originating from Czech electroanalytical research groups. These groups continue in the development and wide-spread application of electroanalytical methods, especially in environmental analysis. All these research groups undoubtedly profit from the pioneering work of Professor Heyrovský and all their members are fully aware of the fact that without Professor Heyrovský and his work, today's picture of modern electroanalytical methods would be probably much different and less developed. Nevertheless, in this special issue attention is paid not only to mercury electrodes, which are, according to our opinion, up to now the best electrochemical sensors for determination of electrochemically reducible compounds, but also to some non-traditional electrode materials, such as carbon pastes, boron-doped diamond, or various solid and paste amalgams,

which can in many cases successfully substitute mercury electrodes in environmental analysis. In a way, these reviews are a continuation of papers (1–3) published in the special issue of this journal devoted to professor Jaroslav Heyrovský.

History of the development of the polarographic method from the birth of Professor Jaroslav Heyrovský in 1890 until the Nobel Prize award in 1959 was excellently described by Petr Zuman in this journal (3). The possibilities and limitations of mercury electrodes were reviewed on the occasion of the 80th anniversary of the discovery of polarography (4). The birth day of polarography is February 9, 1922, when it occurred to Professor Heyrovský to measure the current flowing through dropping mercury electrode (see Fig. 3). In June 1922, he published in *Chemické Listy*, journal of Czechoslovak Chemical Society, his first article on electrolysis with dropping mercury electrode, for which he coined the term polarography. The first historical experimental setup is depicted in Fig. 4. His pioneering experiments inspired rapid, further development culminating in the 1950's and crowning with the Nobel Prize.

We sincerely hope that papers published in this special issue will be of interest to all those who believe in the bright future of electroanalytical methods and their usefulness for modern society, even in the third millennium.

ACKNOWLEDGMENT

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FIG. 1. Nobel Prize ceremony in Stockholm on December 10, 1959.

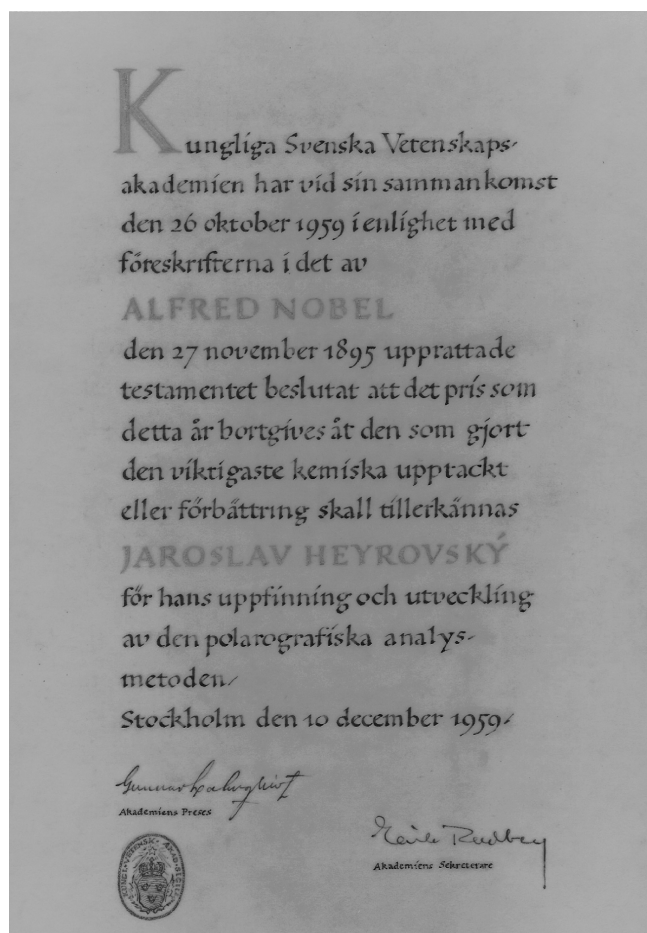


FIG. 2. Nobel Prize certificate.

All work
be made with
the galvanometer!

9. February 1922 afternoon:

$T = 22.5^\circ\text{C}$

now 0.3002	3.06605	102.4
0.300	3.06605	102.7

0.400	3.07150	104.5
0.400	3.07150	105.1

0.500	3.07525	106.6
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0.550	3.0814 (?)	108.0
0.550	3.0794 (!)	107.8
0.550	3.0798 !	108.2

at the maximum is something
happening, but no time to look
for this now!

FIG. 3. Copy of the page from Professor Heyrovský's laboratory notebook.

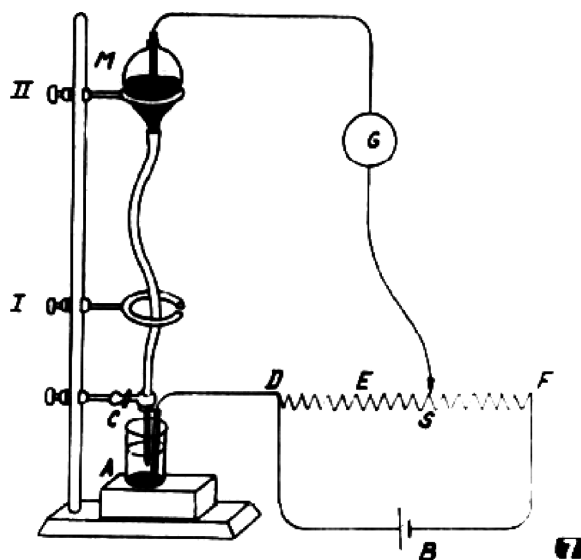


FIG. 4. First experimental polarographic setup.