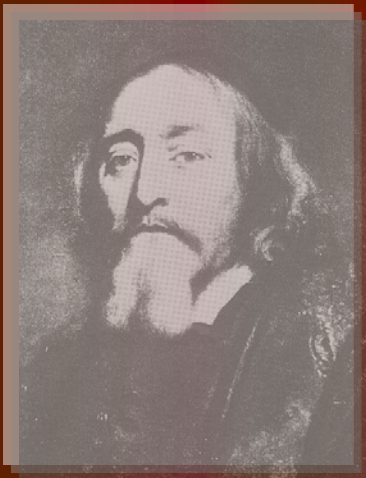
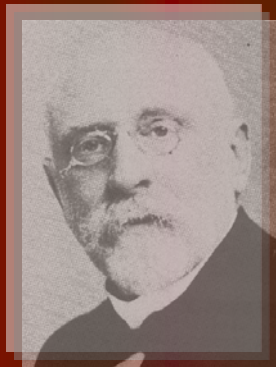


Personalities of Middle European thermal physics (Bohemian approach to “warmness”)

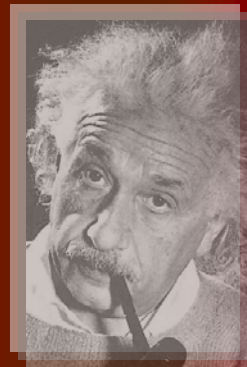
From Komenský to Strouhal, Einstein up to Škramovský



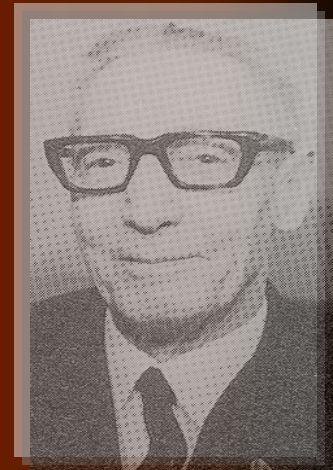
1592 - 1670



1850 - 1922



1879 – 1955



1901 – 1983

Jaroslav and Věra Šesták

Institute of Physics AV ČR, Prague

West Bohemian University, Pilsen

Man and fire, how it get started!

**Signs of first man-maintained
fire (Koobi Fora, Kenya) $\approx$ 1.5 mil**

First fireplace $\approx$ 300 000 BC

etaps: no fire

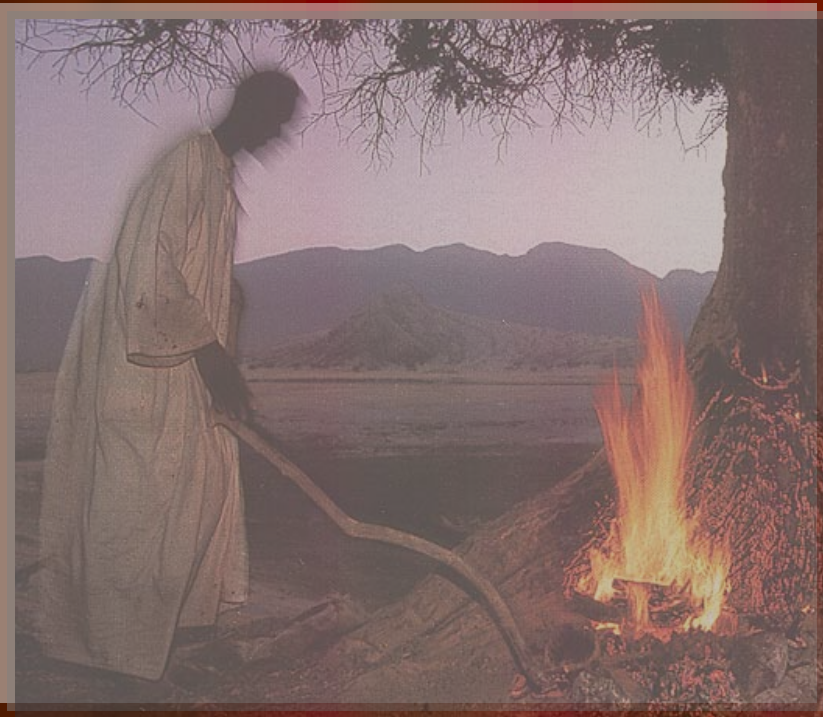
acquainting fire

making fire

exploting fire

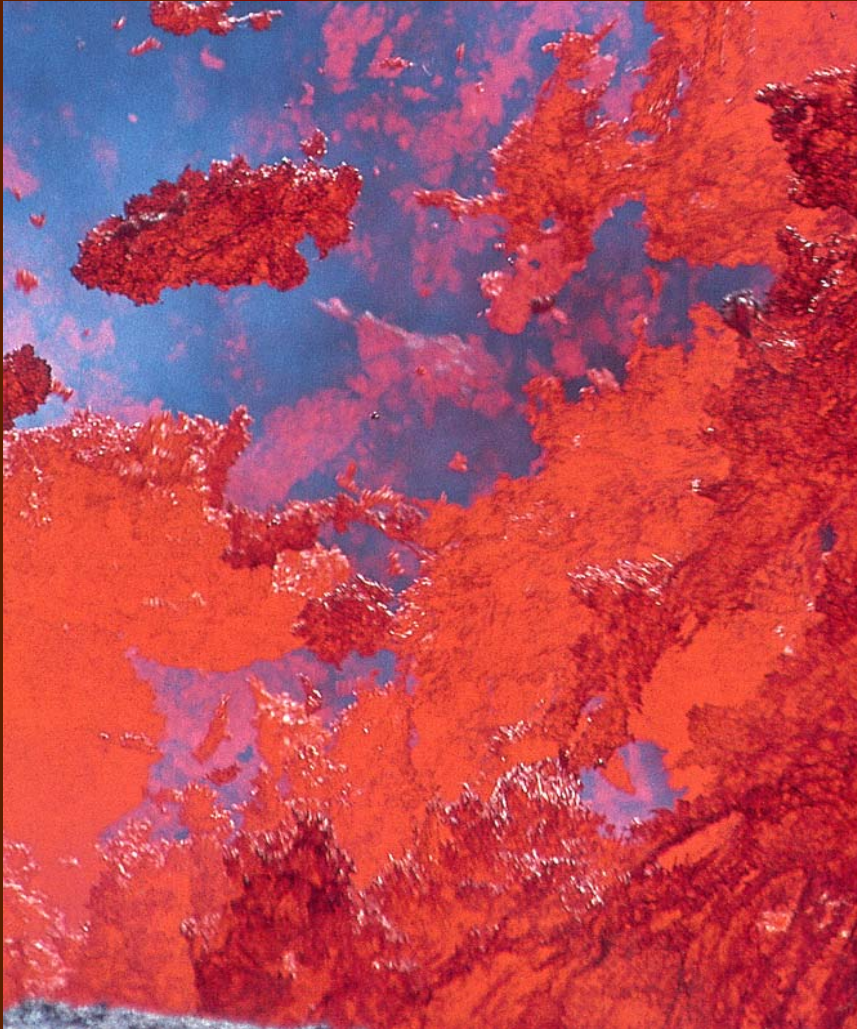
Fire as manufacturing tool

instrumental reagent



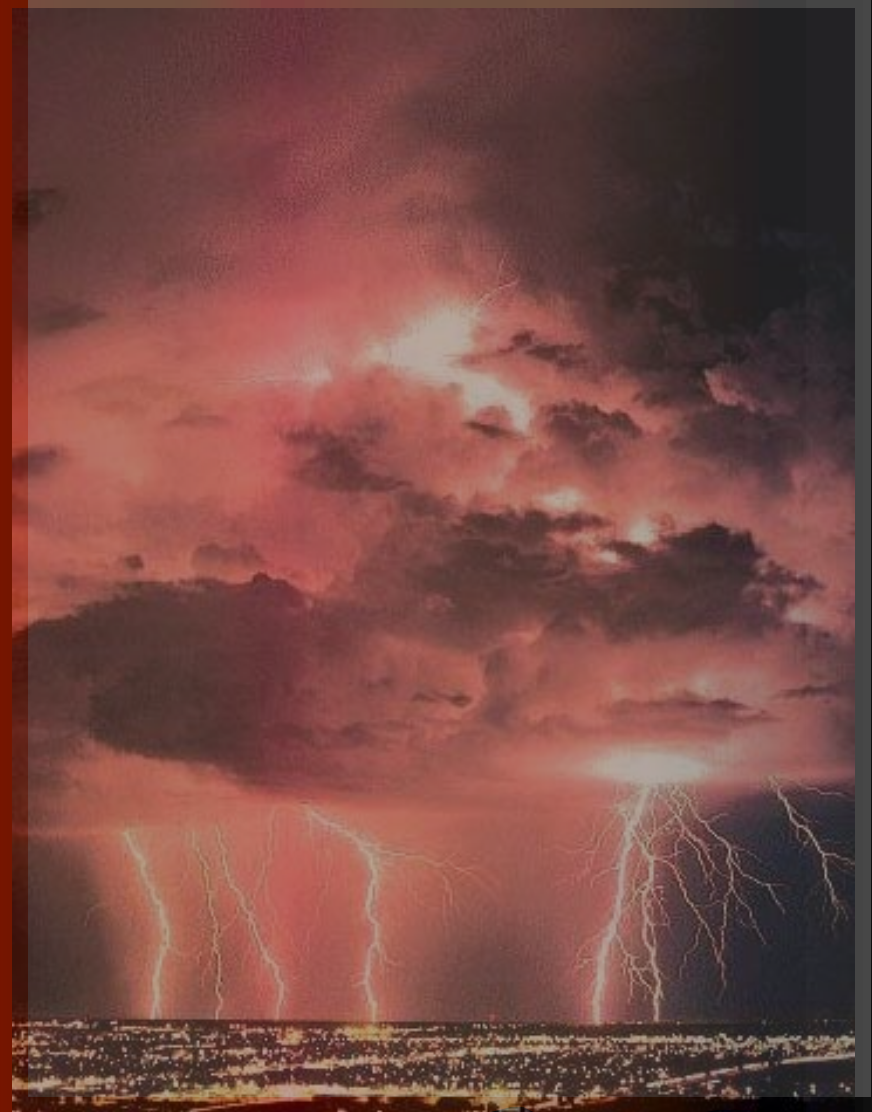
heat = fire

cold = ice

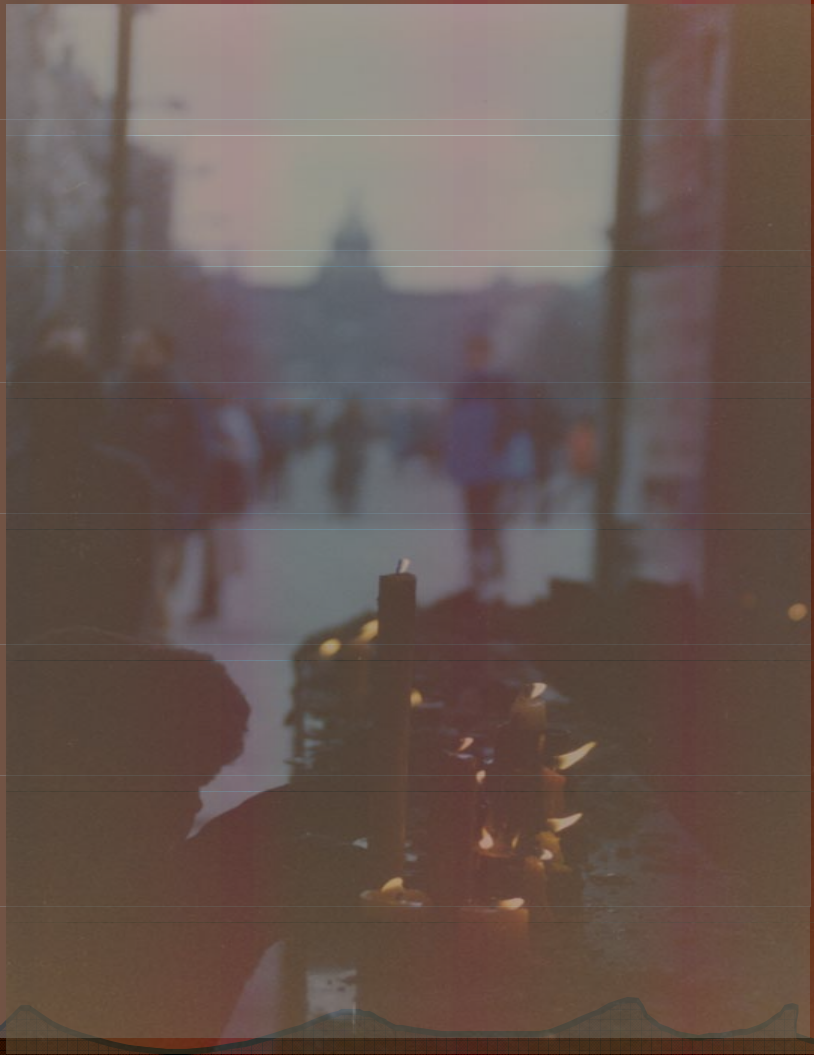


Science of heat

Natural power and threat

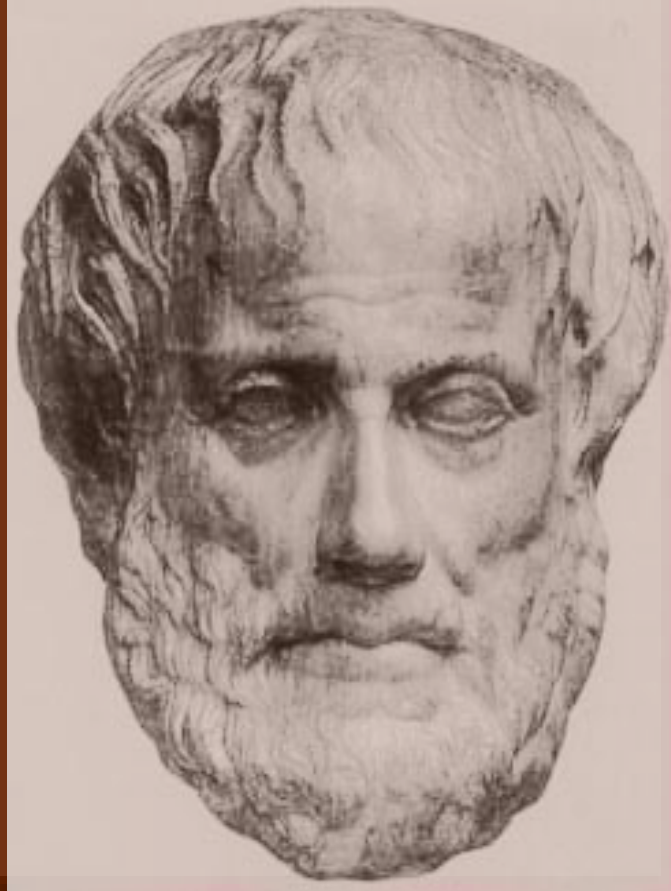


Fire as belief, mission, blessing and conviction in religion, politics and in everyday life



Early Greek philosophers:

Qualities and quantities



air

humidity

dryness

water

form-ethér

fire

coldness

warmness

earth

Aristoteles 384 - 322 BC

Early Bohemia

Heat: calor, fervor a ardor

Cold: frigus, algor and ?? tempor

DISQUISITIONES
DE
CALORIS
ET
FRIGORIS
NATURA.

Cujus cognitio vera in referenda
multa naturæ arcana cla-
vis erit.

In prodromum nova editionis Physicæ
ad lumen divinum restituendæ,

A JOH. AMOS KOMENSKÝ
ante hæc luci datæ.

Editio secunda.



9 8 N 5.
Apud JOHANNEM COLLNERUM,
ANNO 1678

44



1592-1670

"to observe clearly the effect of heat and cold, a visible object should be subjected to heating and subsequent cooling, the sensible changes made by heat and cold will then be visible to the eye"

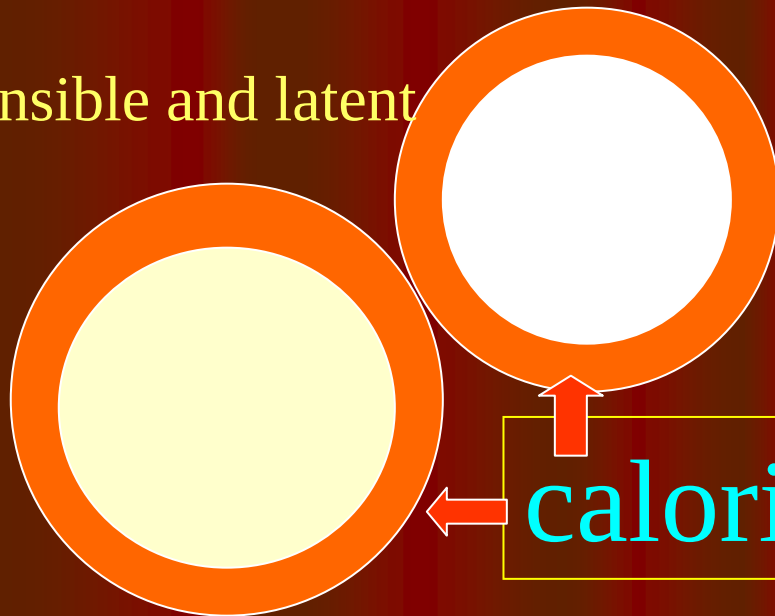
Reneissance :

**Flogiston (fuel) and
Calorikum (medium)**

Becher, Stahl → phlogistom (terra pinquis)

Metal = CALX + Phlogiston

Sensible and latent



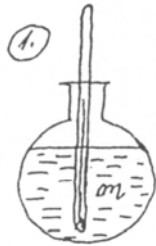
Logarithmic dependence between
Amount (quantity) and intensity

caloricum

← Black, Irving, Sheele
Pristley, Cavendish

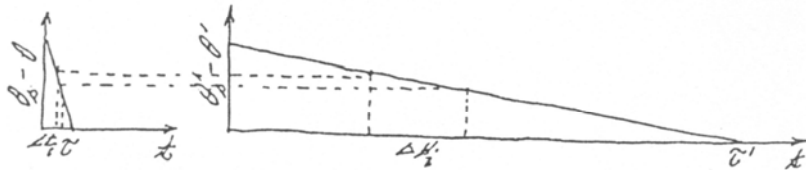
12. 1761; referat v. Philosophical Club, Glasgow" 23. 4. 1762)

$$\Lambda = \lambda / c ; [\Lambda] = 1^\circ \text{F}.$$



1 ounce = 8 drachmes $\approx 28,8 \text{ g}$
 1 drachme = 3 scruples $\approx 3,6 \text{ g}$
 1 scruple = 20 grains $\approx 1,29 \text{ g}$
 1 grain $\approx 0,064 \text{ g}$

$$\lambda_{2\mu} = 334,1 \text{ J} \cdot \text{g}^{-1} \rightarrow \Lambda = 79,8^\circ \text{C} \rightarrow 143,6^\circ \text{F}$$



$$m = m' = 6 \text{ ounces}$$

$$\theta_s = \theta'_s = 47^\circ \text{F}; \theta_0 = \theta'_0 = 33^\circ \text{F}; \theta_c = \theta'_c = 40^\circ \text{F}; (\theta_c - \theta_0)_i = \Delta \theta_{\text{ex}} = 7^\circ \text{F}$$

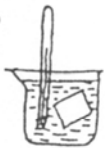
$$\tau = 0,5 \text{ h}; \tau' = 10,5 \text{ h}; \tau/\tau' = 21; \Delta t_i = (\tau/\tau') \Delta t_i;$$

$$\delta \theta_i = k \cdot (\theta_s - \theta_i) \cdot \Delta t_i; \delta \theta'_i = k (\theta'_s - \theta'_i) \cdot \Delta t'_i = (\tau/\tau') \cdot k \cdot (\theta_s - \theta_i) \cdot \Delta t_i$$

$$\Delta \theta'_{\text{tot}} = \frac{\tau'}{\tau} \left[k \sum_i (\theta_s - \theta_i) \cdot \Delta t_i \right] = \frac{\tau'}{\tau} \cdot \Delta \theta_{\text{ex}} = 21 \cdot 7^\circ \text{F} = 147^\circ \text{F}$$

$$\Lambda = 147^\circ \text{F} - 7^\circ \text{F} = 140^\circ \text{F} (\rightarrow 77,8^\circ \text{C} \rightarrow 325,7 \text{ J} \cdot \text{g}^{-1}).$$

②



$$m(\text{H}_2\text{O}, s) = 119 \text{ h.d. (half drachm)}$$

$$m(\text{H}_2\text{O}, l) = 135 \text{ h.d.}$$

$$m(\text{H}_2\text{O}, s, l) = 254 \text{ h.d.}$$

$$m(\text{gl.}) = 16 \text{ h.d.} \Rightarrow m(\text{H}_2\text{O}, l, s, \text{gl.}) = 8 \text{ h.d.}$$

$$\theta(\text{H}_2\text{O}, s) = 32^\circ \text{F}; \theta(\text{H}_2\text{O}, l) = \theta(\text{gl.}) = 190^\circ \text{F}; \theta(\text{H}_2\text{O}, l, s, \text{gl.}) = 53^\circ \text{F}$$

$$c = Q(\text{H}_2\text{O}, l, \text{h.d.}, \Delta \theta = 1^\circ \text{F}); \lambda = Q(\text{H}_2\text{O}, s \rightarrow l, \text{h.d.})$$

$$[m(\text{H}_2\text{O}, l) + m(\text{H}_2\text{O}, l, \text{gl.})] \cdot c \cdot [\theta(\text{H}_2\text{O}, l) - \theta(\text{H}_2\text{O}, s, l, \text{gl.})] =$$

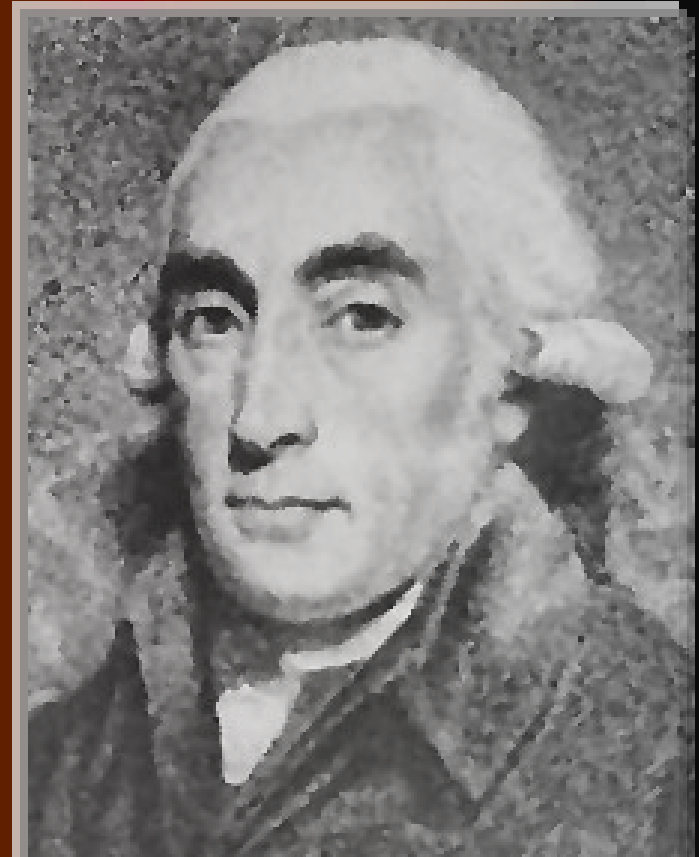
$$= m(\text{H}_2\text{O}, s) \cdot \lambda + m(\text{H}_2\text{O}, s) \cdot c \cdot [\theta(\text{H}_2\text{O}, l, s, \text{gl.}) - \theta(\text{H}_2\text{O}, s)] ;$$

$$(135 + 8) \text{ h.d.} \cdot c \cdot (190 - 53)^\circ \text{F} = 119 \text{ h.d.} \cdot \lambda + 119 \text{ h.d.} \cdot c \cdot (53 - 32)^\circ \text{F}$$

↓

$$\frac{\lambda}{c} \cdot \Lambda = \frac{143 \text{ h.d.}}{119 \text{ h.d.}} \cdot 137^\circ \text{F} - \frac{119 \text{ h.d.}}{119 \text{ h.d.}} \cdot 21^\circ \text{F} = 143,6^\circ \text{F}$$

Specific heat, latent heat and temperature launching thermometry and calorimetry



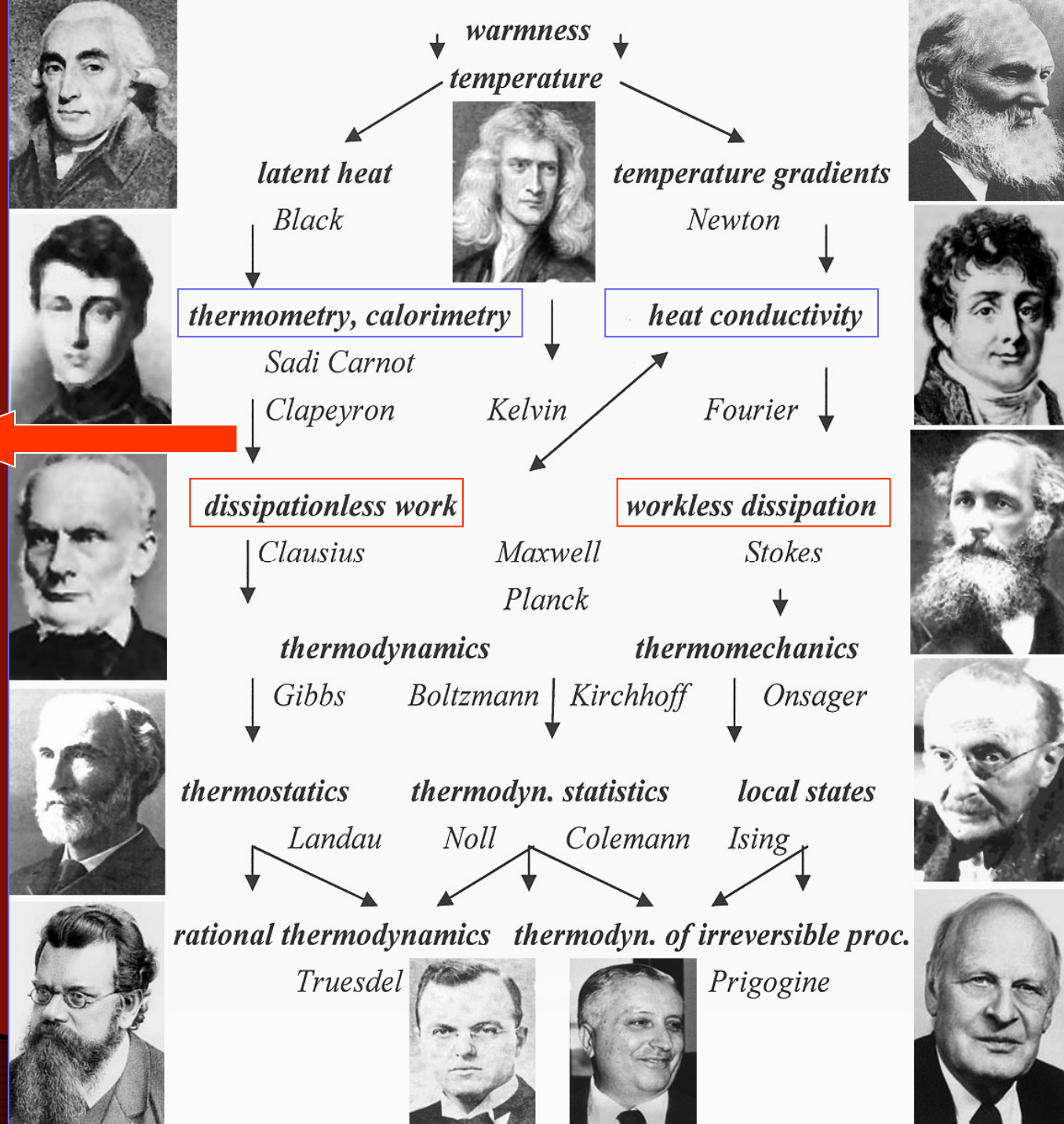
J. Black (1728-1799)

J. Irvine (1733-1791)

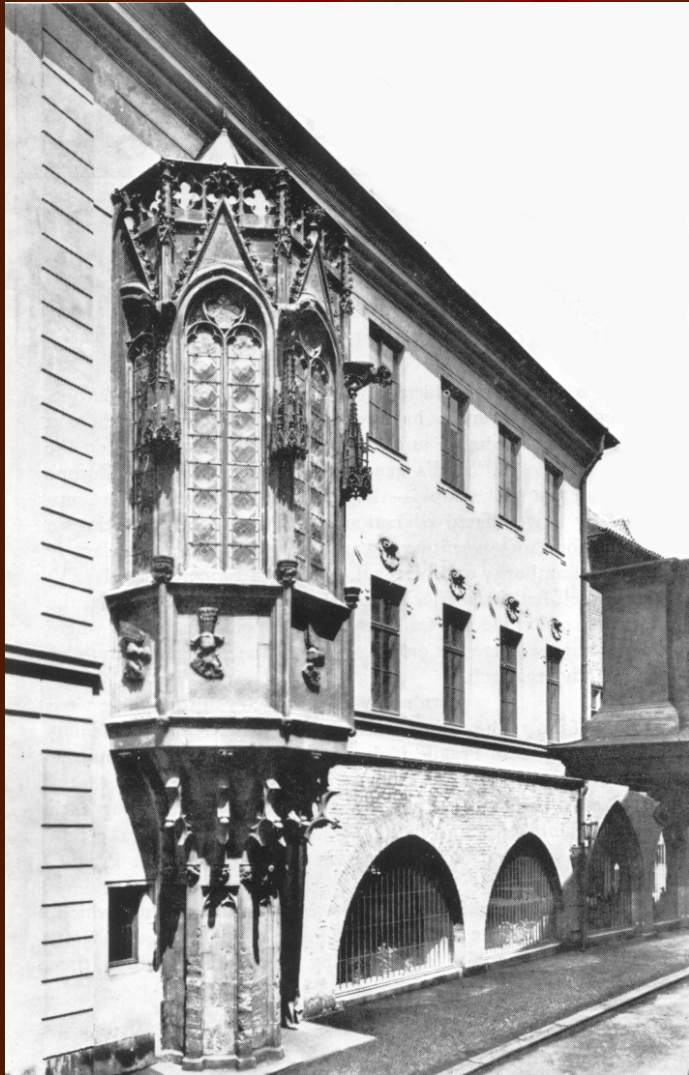
Gradual birth of the idea of thermal analysis



Cooperation
Learning !!



SIX CENTURIES OF PHYSICS IN PRAGUE



Just after the foundation of the **Charles University** by Emperor Charles the IV. (1348) the medieval kinematics was brought to Prague University by **Johannes de Holandria**, an Oxfordian from Merton College, in 1368. It provided **Merton theorem** of uniform acceleration, which was formulated during his stay in Prague. Later **Jan Sindel** (1375-1456) was studying the planetary motion and his **astronomical tables** were greatly appreciated by **Tycho de Brahe** at the end of the 16th century. (1)

Karolinum – historical building

Some Bohemian forefathers of “thermal” thinking



Hájek Tadeáš (from Hájků) (1526 - 1600)

Agricola Georgius (Georg Bauer)

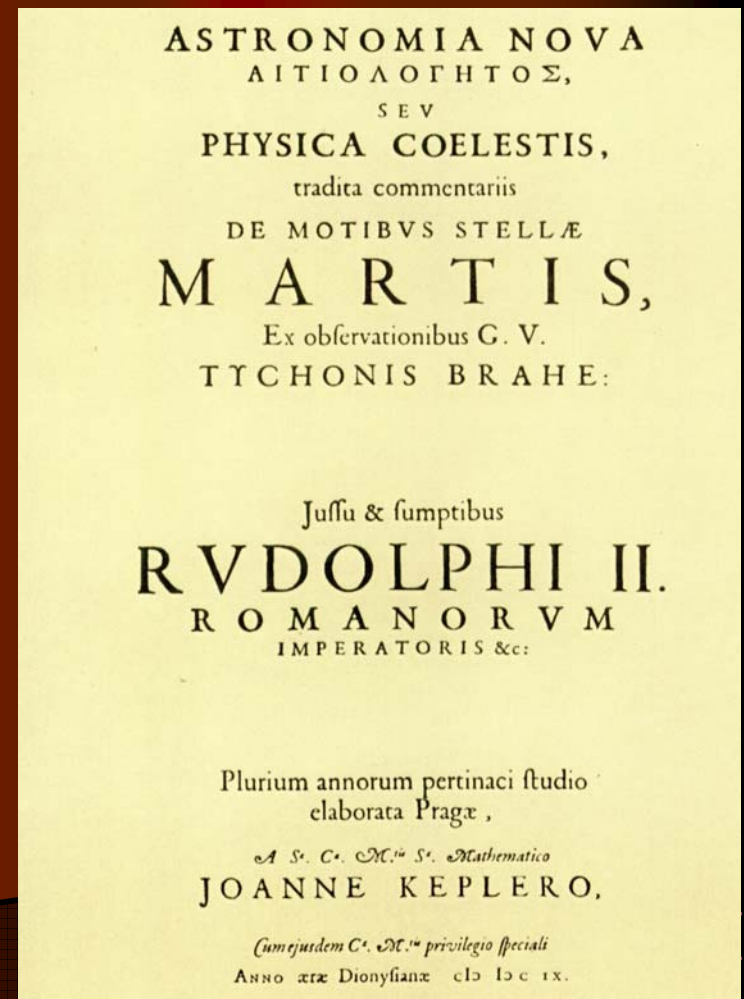
(1494 - 1555)

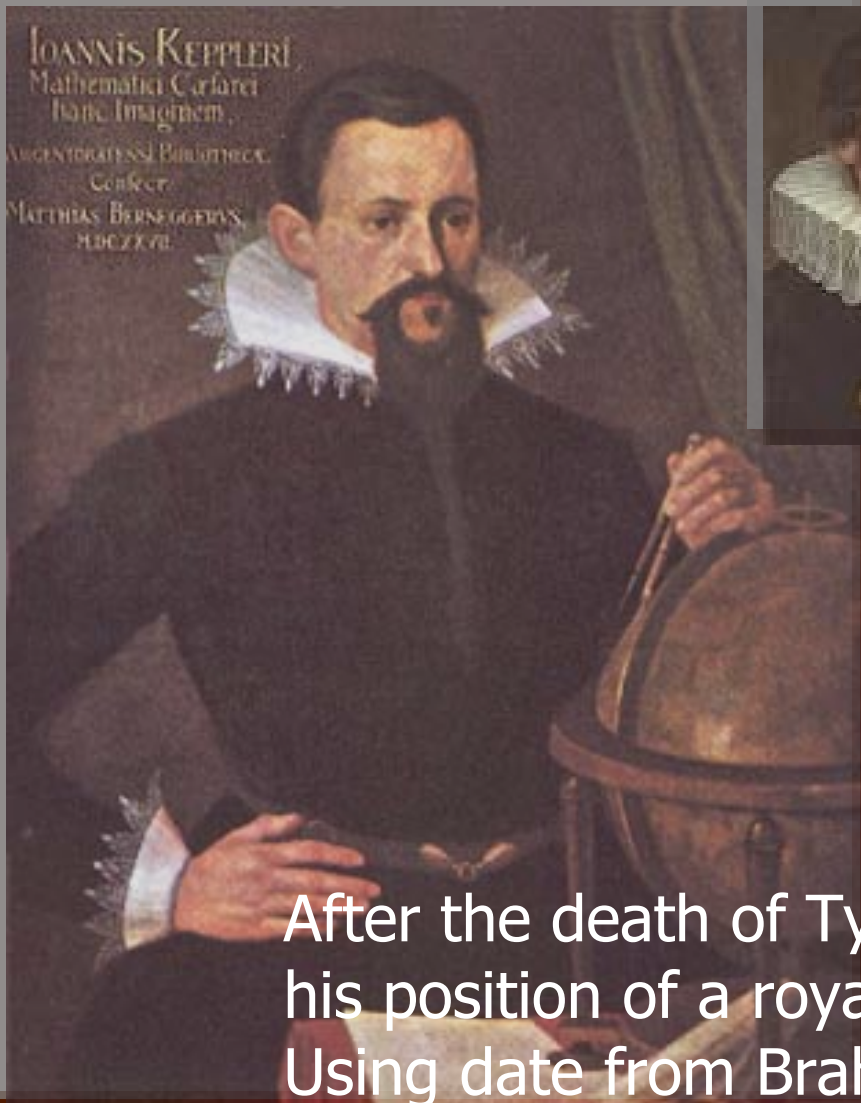
Marcus Marci Jan (from Kronland)

(1595 - 1667)

Diviš Prokop (Procopius) (1696 - 1765)

During the rule of Rudolph the II., the Emperor of the Holy Roman Empire, there were in Prague, the capital of the Empire, very strong groups of "natural scientists" - alchemists, astronomers and physicists. Among the most outstanding ones were Tycho de Brahe and Johannes Kepler whose astronomical observations and calculations were published in the well-known Rudolphine tables.





Kepler Johannes - the orbit of a planet/comet about the Sun is an ellipse with the Sun's center of mass at one focus

Born: 27 Dec 1571 in Weil der Stadt, Württemberg, Holy Roman Empire (now Germany)

Died: 15 Nov 1630 in Regensburg (now in Germany)

After the death of Tycho de Brahe, Kepler substituted his position of a royal mathematician in Prague 1601. Using data from Brahe Kepler determined elliptic orbit of Venus. In 1609 – in the treatise "*Astronomia Nova*" Kepler published his two first laws, which follow the motion of planets. He left Prague in the year 1612

Little bit later, **Marcus Marci de Kronland** (1595-1667) became Professor at the Prague University and was studying **spectral dispersion of light** and in this field he is a predecessor of Isaac Newton.

IOANNES MARCVS MARCI PHIL: & MEDIC: DOCTOR
et Professor natus Landscronæ Hernandurorum in Boëmia
anno 1595. 13 Iunij.

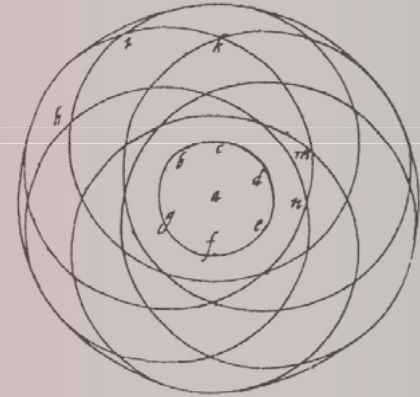


Jan Marcus Marci

154

DE ARCV

Sol V G. in cuius ambitu fumantur sex puncta radiantia *b c d e f g*, & ex singulis punctis circuli maximi sphaerae luminosae describantur.



Igitur mediū in *b* non nisi unam lucem habebit ex puncto *b* sphaericè propagatam: in *i* verò duas ex *c* & *b*, in *k* tres ex *b c d*; in *l* quatuor ex *b c d e*; in *m* quinque ex *b c d e f*: demum in *n* sex ab omnibus punctis *b c d e f g* gradatione aggregatā.

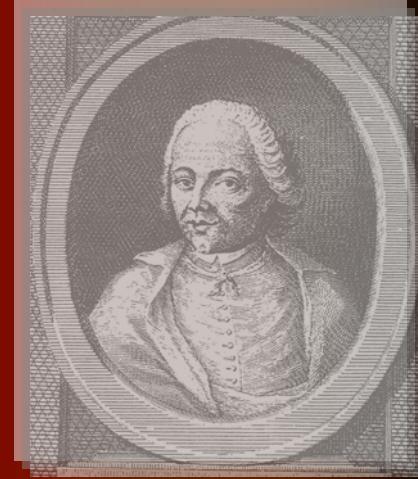
Et quod de luminoso dico, idem de objecto colorato dicendum. Quod ergo attinet species inter duo, plurave specula multiplicatas, videntur omninò tot inesse, quot esse possunt inter eadem specula æqualia segmenta: quæ simul sumpta adæquent semidiametrum sphaerae luminosae. Idcirco enim fieri videntur illæ repercussiones toties repetitæ, ut illis recurribus, & meandris aliquo modo compenset iter naturæ debitū.

Probatur, Radij incidentes & reflexi necessariò à se differunt: siquidem longè diversas habent affectiones, & alium modum repræsentandi; at verò radij reflexi, dum iterato speculo alliduntur, non aliter se habent ad radios inde secundò reflexos, quàm primi ad secundos, sive incidentes primi ad primò reflexos; nec est ratio, cur hos, non illos à se differre dicamus.

Secundò objectum inter duo specula positum exhibet simulachra non ejusdem claritatis: eò enim obscuriora, quò magis recedere videntur à speculo; at species eadem non potest simul clarè & obscurè idem objectum repræsentare: necesse ergo illas species inæqualis claritatis à se differre. Ita

in spe-

- The theory at of **Divisch's** and Oetinger's belongs to pioneering times citing "**The Light of the First Day of Creation**" (האור של יום אחד), which is regarded to be synonymous to the electromagnetism, which is an inherent quality of all things and the whole Universe is permeated with this essence manifesting itself by electric and thermal phenomena.
- P. Divisch, *Längst verlangte Theorie von der meteorologischen Electricite, Magiam Naturalem benahmet*, (Tübingen, Verlag J. H. P. Schramm, 1765)
- It is in an agreement with the modern idea of electromagnetic background radiation introduced by Polish scientists **Hendrik B. Casimir**



●(1696-1765)

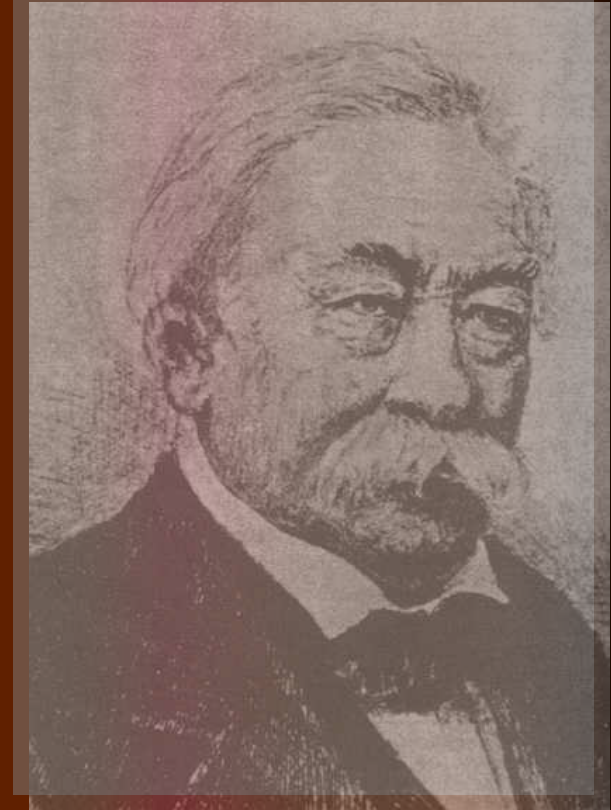


●(1909-1980)

Ignác Born (1742 – 1791)



Mineralogy, scientific society



Jozef M. Petzval (1807 – 1891)

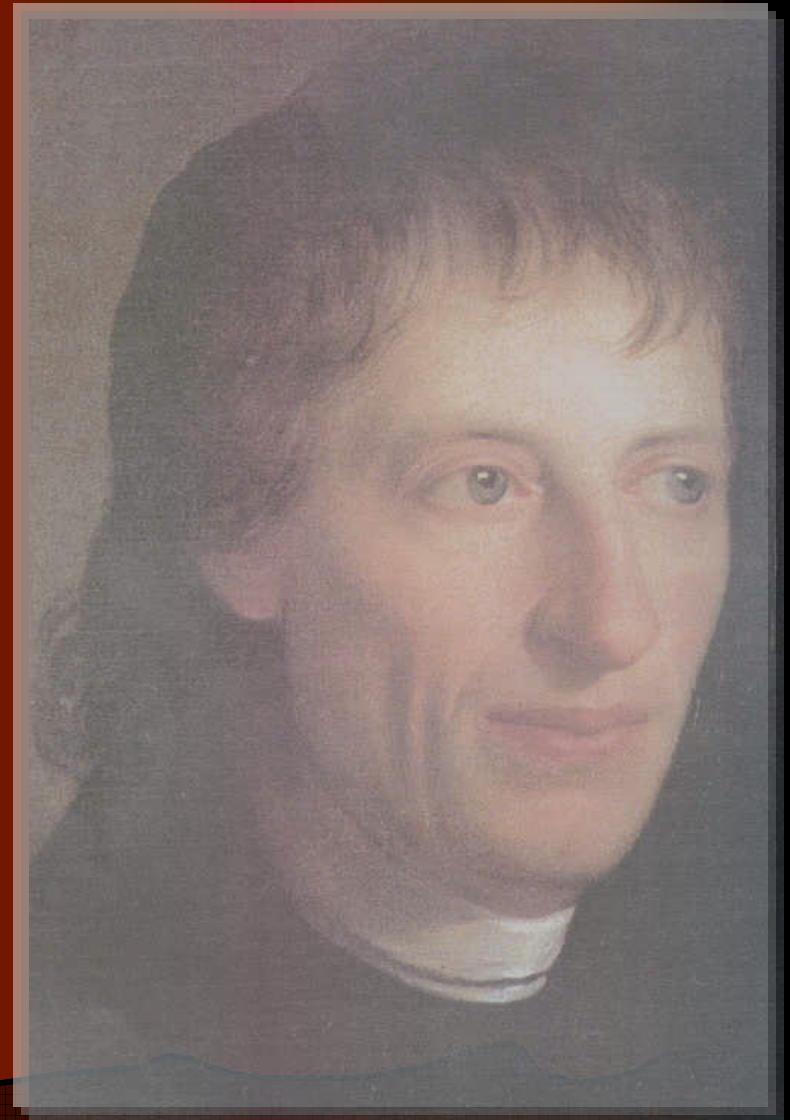
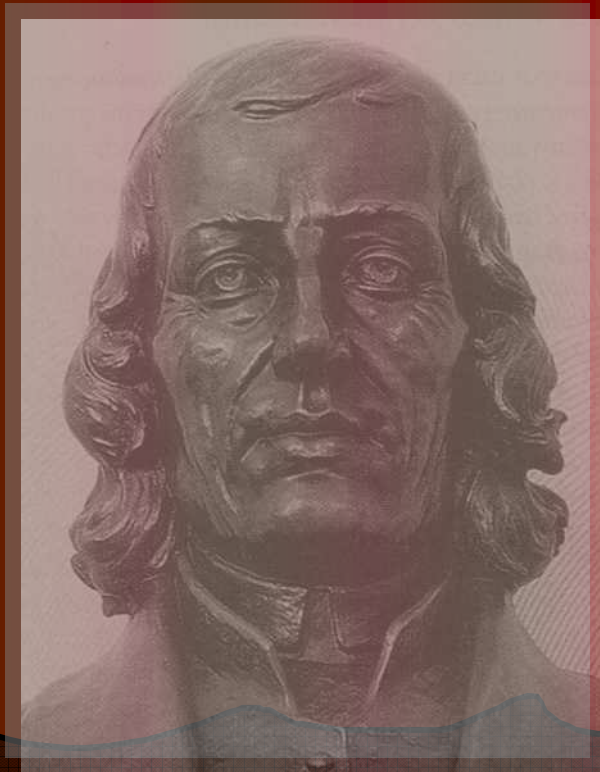
Mathematics, optics – Petzval'd law,

SIX CENTURIES OF PHYSICS IN PRAGUE

Bernard Bolzano

(1781 – 1848)

teology & mathematics





Ueber das
farbige Licht der Doppelsterne
und einiger anderer
Gestirne des Himmels.

Versuch einer das Bradley'sche Aberrations - Theorem als integrierenden Theil in sich schliessenden allgemeineren Theorie.

Von

Christian Doppler,

Professor der Mathematik und praktischen Geometrie am technischen Institute und ausserordentl. Mitglied der k. böhm. Gesellschaft der Wissenschaften.

Christian Doppler (1803-1853)

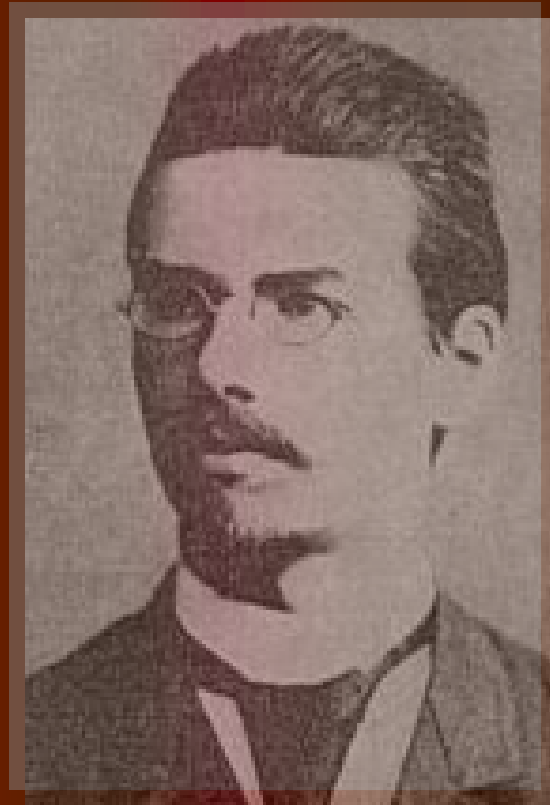
was for a long time Professor of mathematics and practical geometry at the Prague's Polytechnic (1837-1847).

Václav Šimerka (1819 – 1887)



Czech priest and mathemat. who introduced valuation in psychology (logarithmic connotation of feelings) providing basis for the theory of information

Czech born discoverer of cholesterol (including its metamorphosis and stoichiometry formulae $C_{27}H_{46}O$) known for introducing the field of liquid crystals (latter widespread by *Otto Lehmann*)



Friedrich Reinitzer (1857 – 1927)

Ernest Mach

(1838 – 1916)

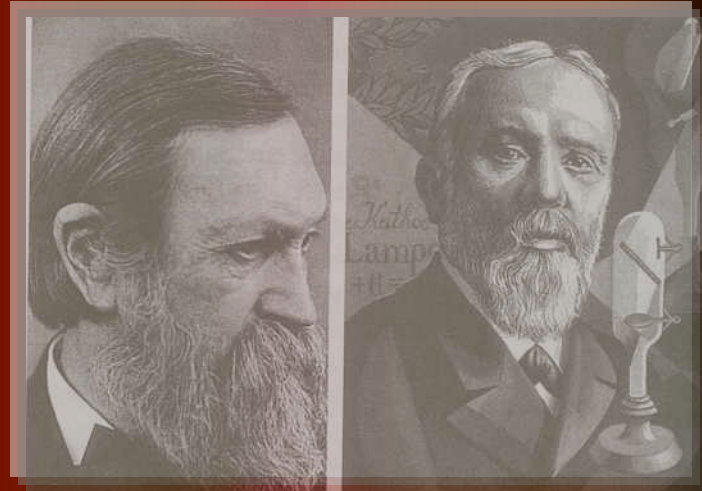
positivism



Dr Ernst Mach

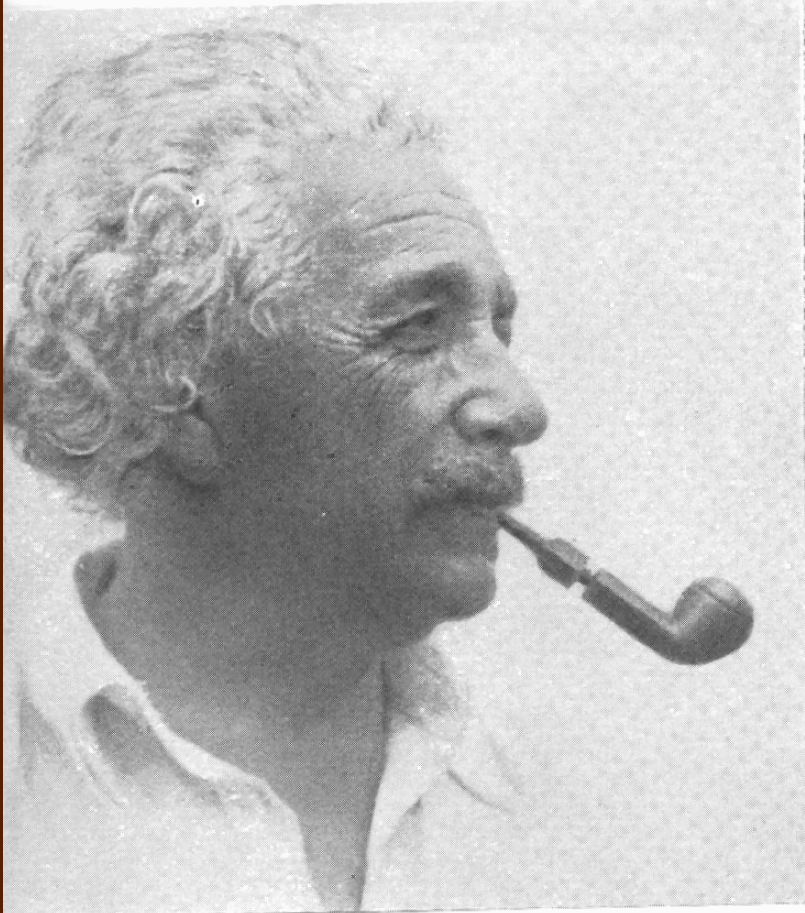
Ivan Puluž

(1845 – 1918)



(1838 – 1916) Aust. phil. and phys., known for his discussion of Newton's Principia and critique of conceptual monstrosity of absolute space (book 'The Science of Mechanics' 1883)

Einstein Albert (1879 – 1955)



INVESTIGATIONS ON THE THEORY OF THE BROWNIAN MOVEMENT

BY

ALBERT EINSTEIN, PH.D.

EDITED WITH NOTES BY

R. FÜRTH

TRANSLATED BY

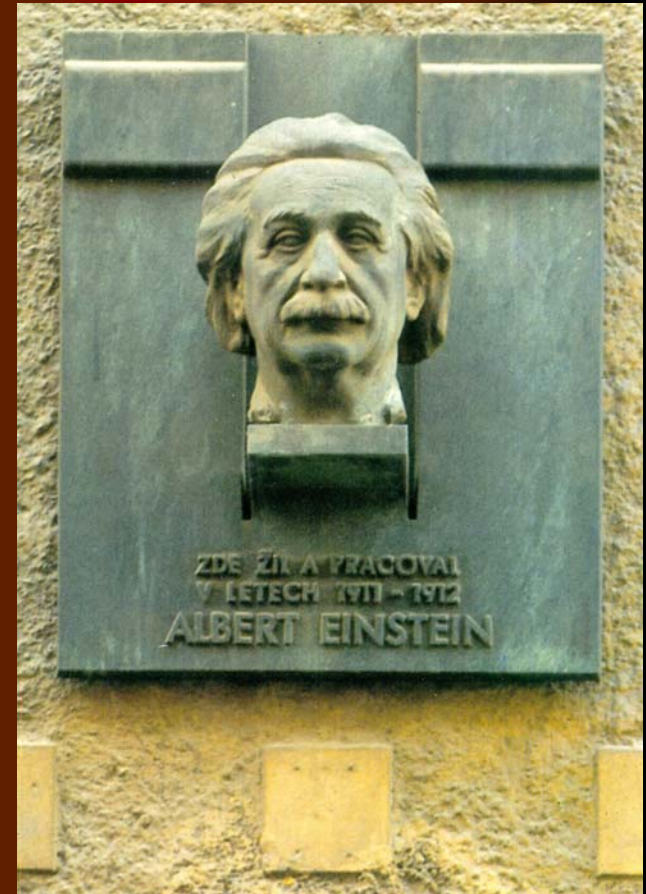
A. D. COWPER

WITH 3 DIAGRAMS

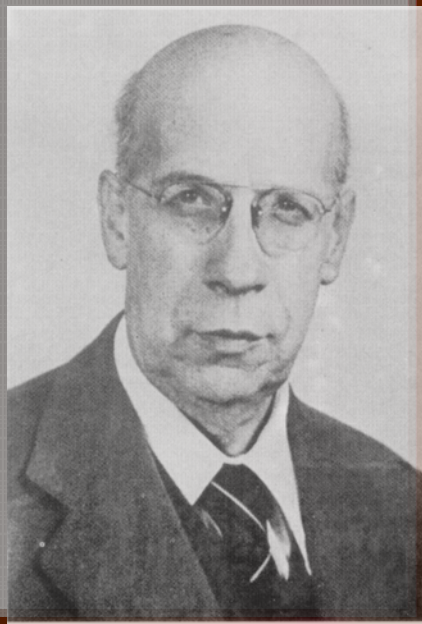
Ger. phys., originator of theories of relativity, laws of motion and rest, simultaneity and interrelation of mass and energy, quantum theory of photoelectric effect, theory of specific heats, Brownian motion, etc. (book 'Builders of the Universe' 1932)



Albert Einstein

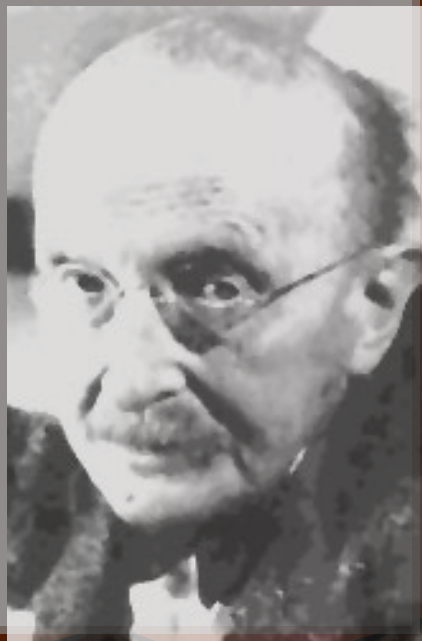


Very fruitful was the second half of the nineteenth and the first half of the twentieth century in Prague. Professors **Ernest Mach** introduced **positivism**, **Albert Einstein** developed **general theory of relativity**, **Philipp Frank** pioneered **scientific empirism**, were working at the Prague University for 28, 2 and 27 years respectively. (There was also rich cultural life in Prague - Max Brod, Franz Kafka - at that time.)



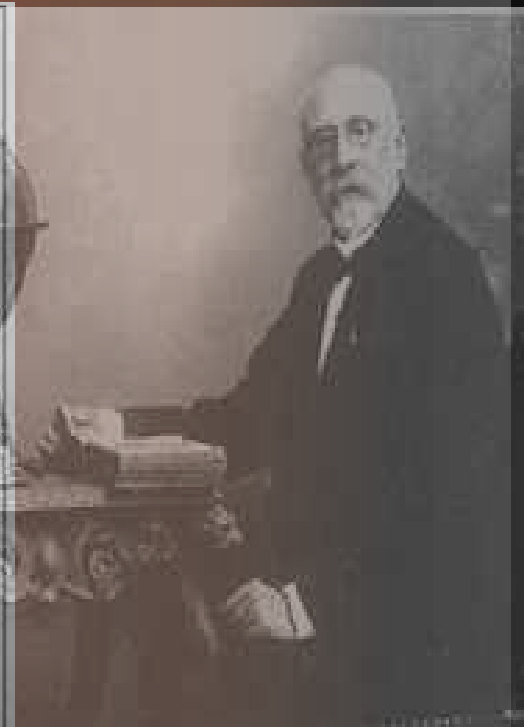
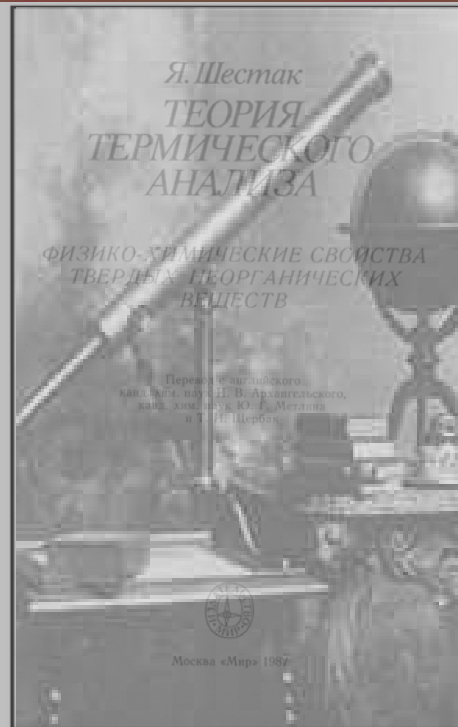
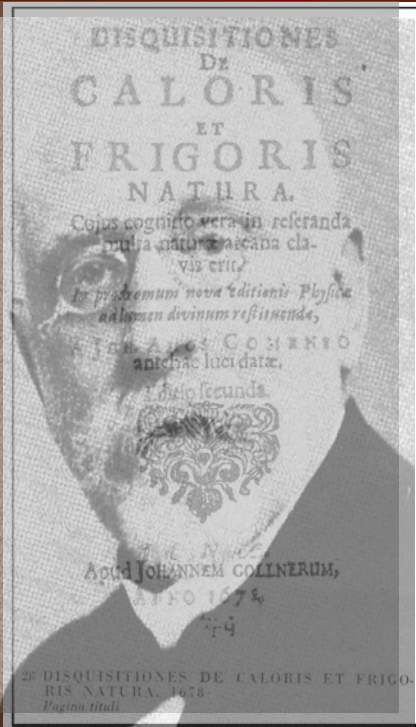
Philipp Frank pioneered scientific empirism

In the *Planck's* article published in [Ann. Phys. 26(1908)1], he assumed that the First and Second Law of thermodynamics keep their form in all inertial frames. At the same time he showed that if Q_0 is the heat of a system at rest with its inertial frame, K_0 , then a distinct inertial reference frame, $K > K_0$, moving with the uniform velocity, u , in respect to K_0 , would ascribe to this system a lower heat content according to $\partial Q = \partial Q_0 \sqrt{(1-u/c)^2}$. Assuming the invariance of entropy, *Planck* also concluded that temperature should transform in the same way as the heat. It, however, was latter challenged by *Ott* [Z. Phys.175(1963)70] by the opposite result, $T = T_0 / \sqrt{(1-u/c)^2}$, due to his different definitions of the forces and impulses, yet the *Planck* expression is regularly used fore the *Lorenz* transformations of heat



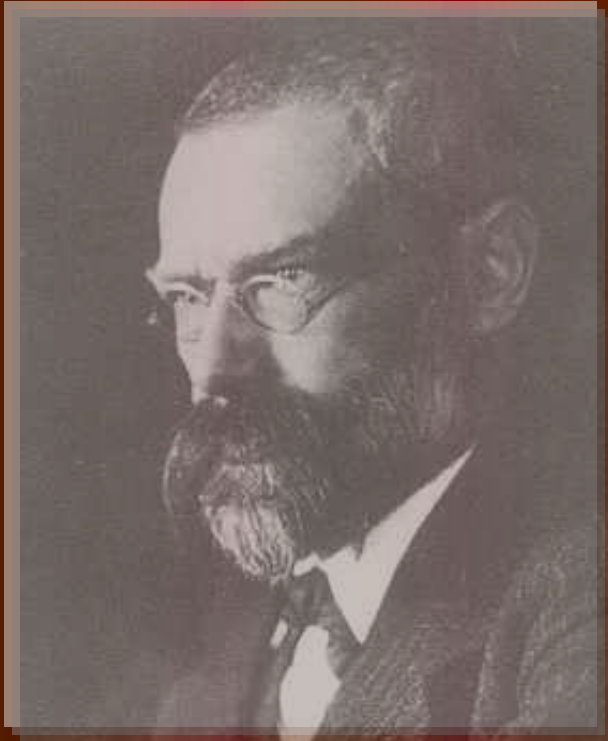
Max Carl Planck (1858 – 1947) blackbody radiation, Planck constant

Čeněk Strouhal (1850 – 1922)



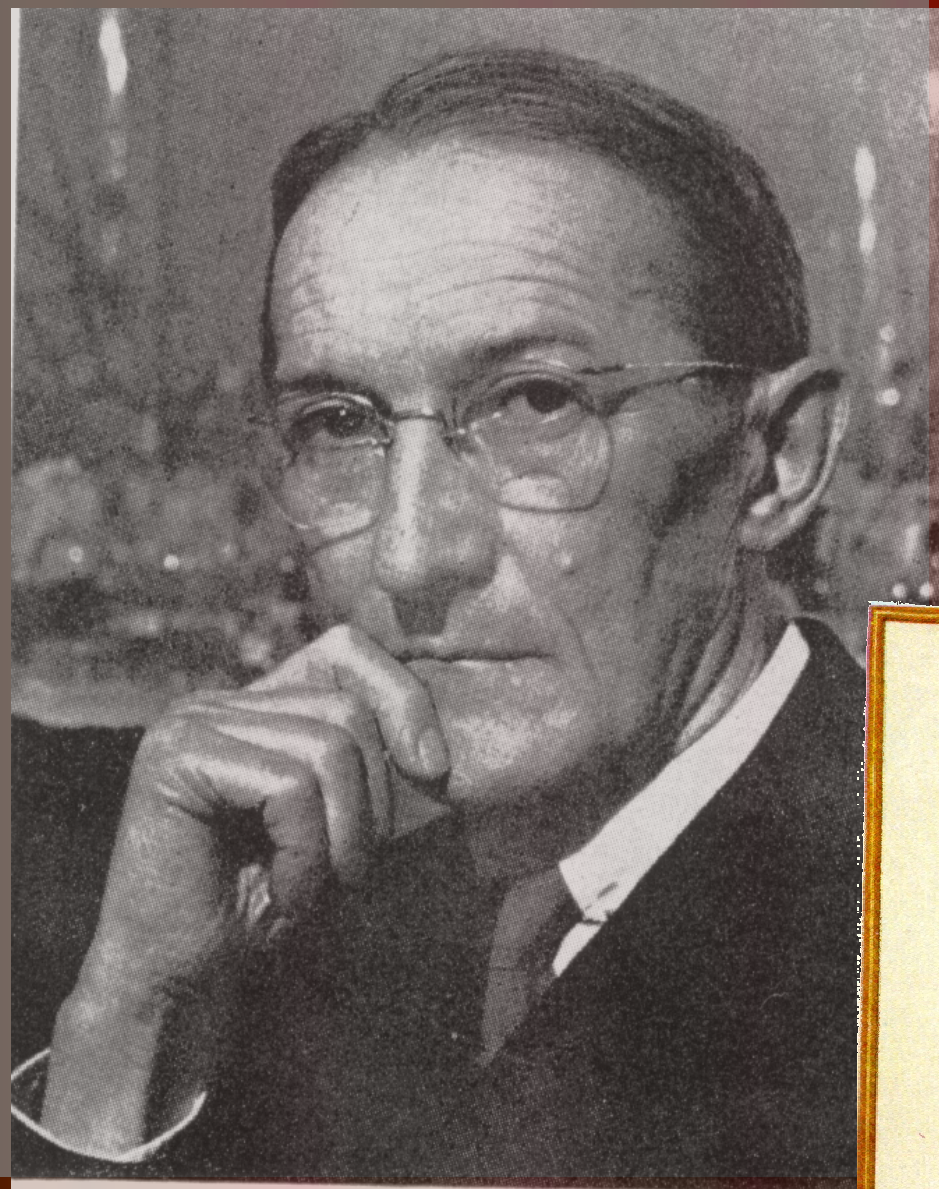
Czech phys., first professor of experimental physics to the Czech Technical University, known for work in acoustics (Strouhal's eddy pitch) and thermodynamics ('Thermics' Praha 1906)

František Wald (1861 – 1930)



Albert Regner (1905 – 1970)

Pioneered modern applied thermodynamics



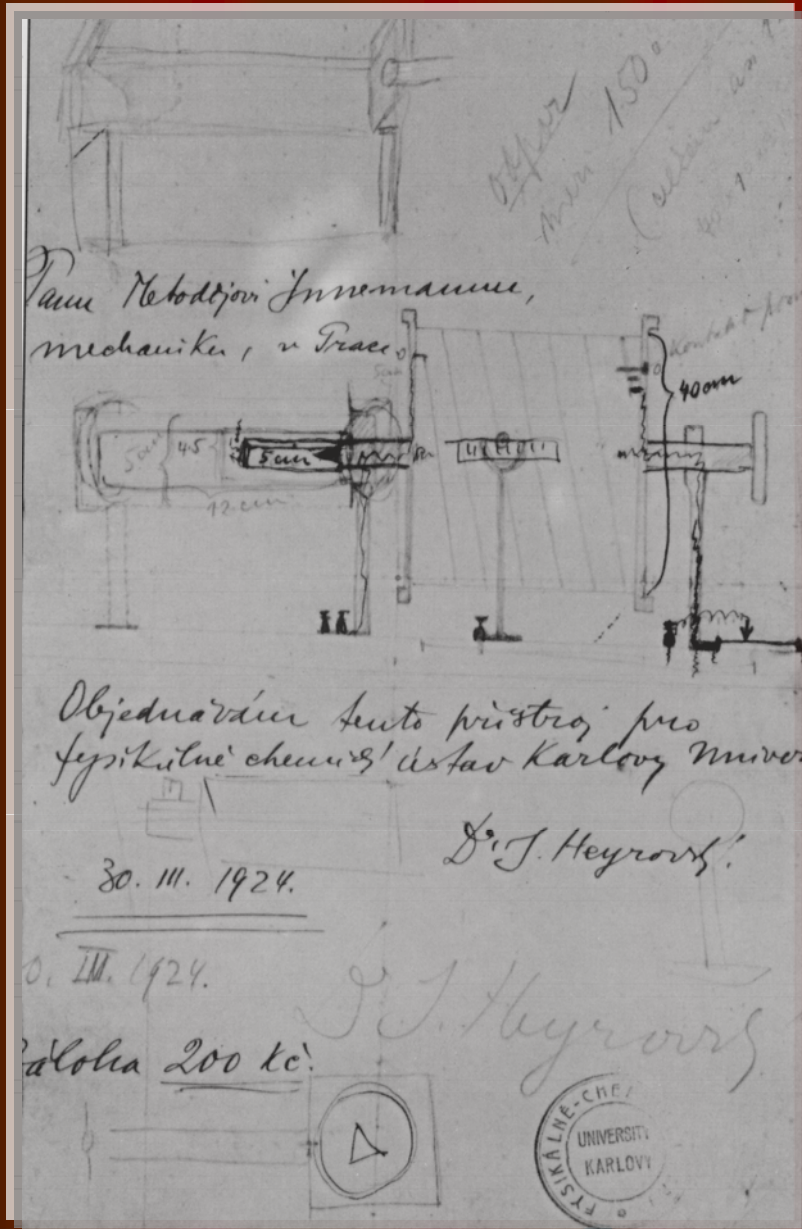
Jaroslav Heyrovský

(1890 – 1967)

Czech phys. chemist who
discovered polarography



Nobel price



Heyrovsky's order of a part of the polarography equipment, then available for CZK 200,- (about ~7 USD)

Reinhold Fürth (Charles University later Birkbeck College in London), founder of statistical interpretation of quantum physics

Prof. & Mrs. Fürth,

conference in Copenhagen

*Reinhold Fürth was born on 20 October 1893 in Prague. He studied mathematics and physics in the German part of Charles University of Prague.

He received his doctor degree (1916) under the supervision of A. Lampa and P. Frank for the work dealing with opalescence in liquid binary mixtures. In 1931 he accepted a call to a full professorship in his alma mater staying there till 1939, when he was as Jew on the basis of Nuremberg laws expelled from the University. During this Prague period there appeared his most valuable works related to the experimental and theoretical investigations on Brownian motion and also the fundamental paper [7] on formal analogy between description of quantum mechanical and classical stochastic processes. After his emigration (1939) he worked together with M. Born in Edinburgh. In the years 1947-1961 he accepted a Chair of Theoretical Physics in the Birkbeck College in London. He died 17 July 1979 at Chislehurst (UK).

He was editor of works of A. Einstein [5] and M. von Smoluchowski [6] and author of the following books.

Schwankungserscheinungen in der Physik (Vieweg u. Sohn, Braunschweig, 1920)

Einführung in die Theoretische Physik (Springer Verlag, Wien, 1936)

Fundamental Principles of Modern Theoretical Physics (Clarendon Press, Oxford, 1970)





Contact gel lenses

Otto Wichterle (1913 – 1998)

Drahoslav Lím (1925 – 2003)



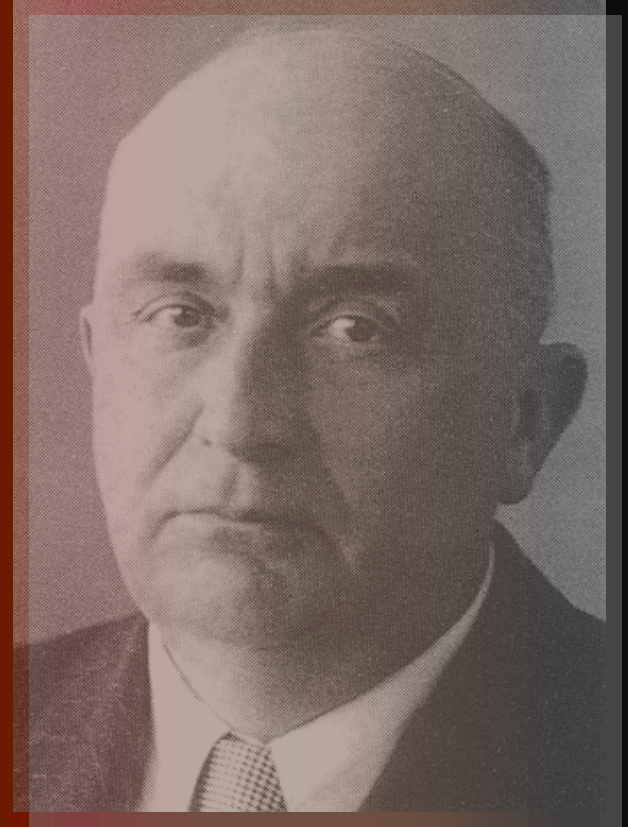
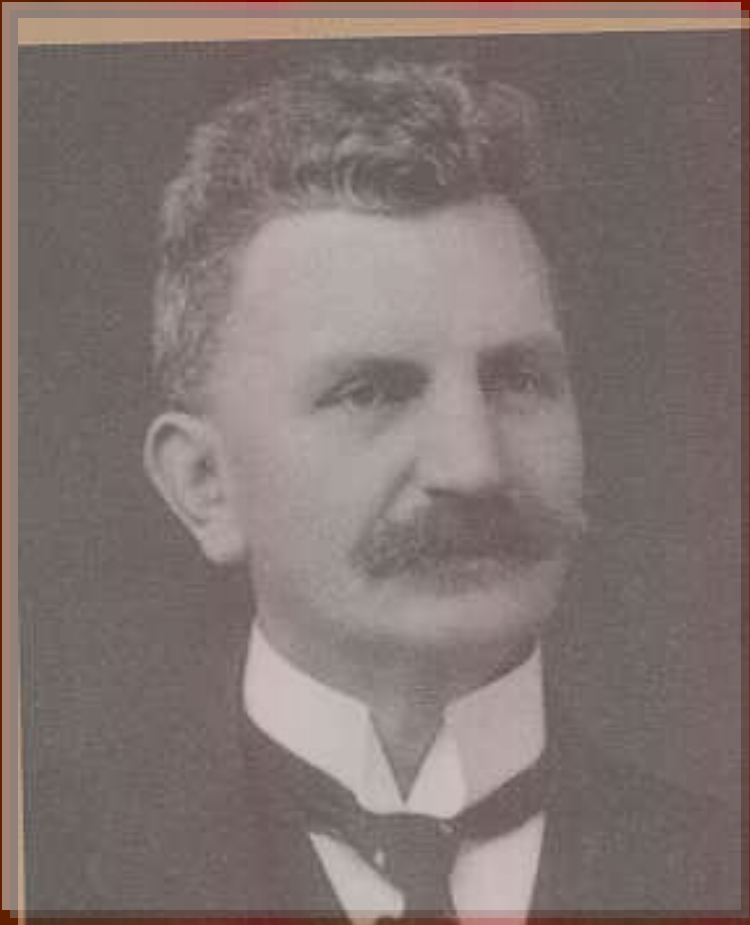
- *Strouhal Čeněk (Vincenc) (1850–1922)*
- *Wald František (1861-1930)*
- *Regner Albert (1905–1970)*

- *Burian Josef (1873-1942)*
- *Kallauner Ottakar (1886-1972)*
- *Matějka Josef (1892-1960)*
- *Bárta Rudolf (1897–1985)*
- *Škramovský Stanislav (1901-1983)*

- *Jesenak Viktor (1926-2000)*
- *Malinovský Milan (1920-1999)*
- *Šatava Vladimír (1924 -)*
- *Proks Ivo (1922 -)*

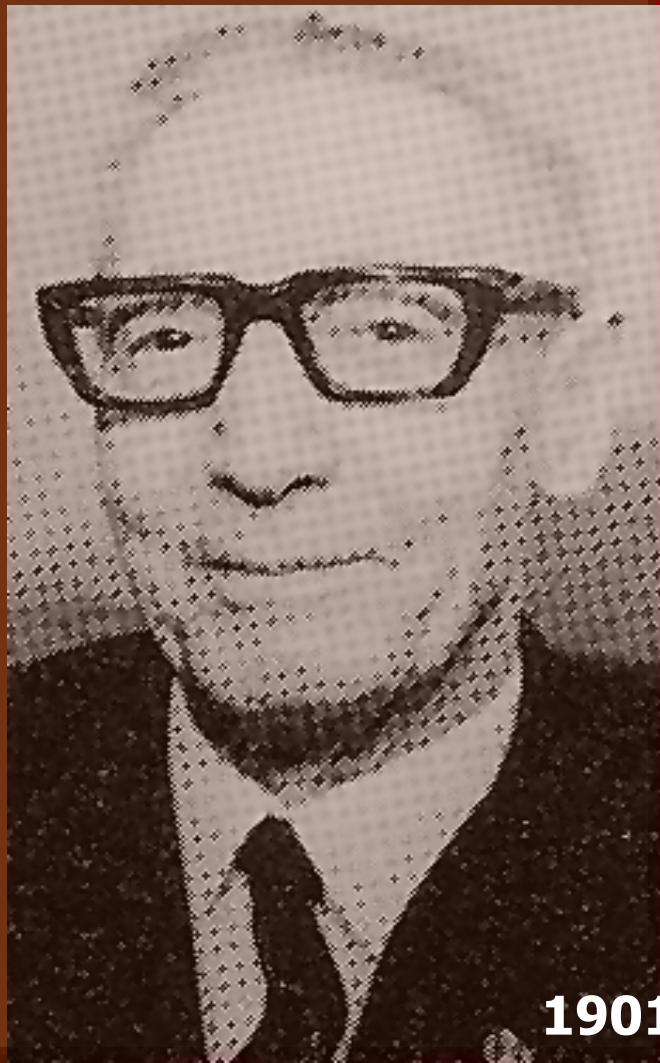
**Whom we
should not
forget them
in the
modern
history of
thermal
analysis**

Josef Burian (1873 – 1942)



Rudolf Bárta (1897 – 1985)

Basis of experimental thermal analysis – DTA of clay minerals



1901 – 1983

Stanislav Škramovský

father of statmography

modern construct later called
thermogravimetry

Some unique methods of thermal analysis

Introduced by Czech-Slovak scientists

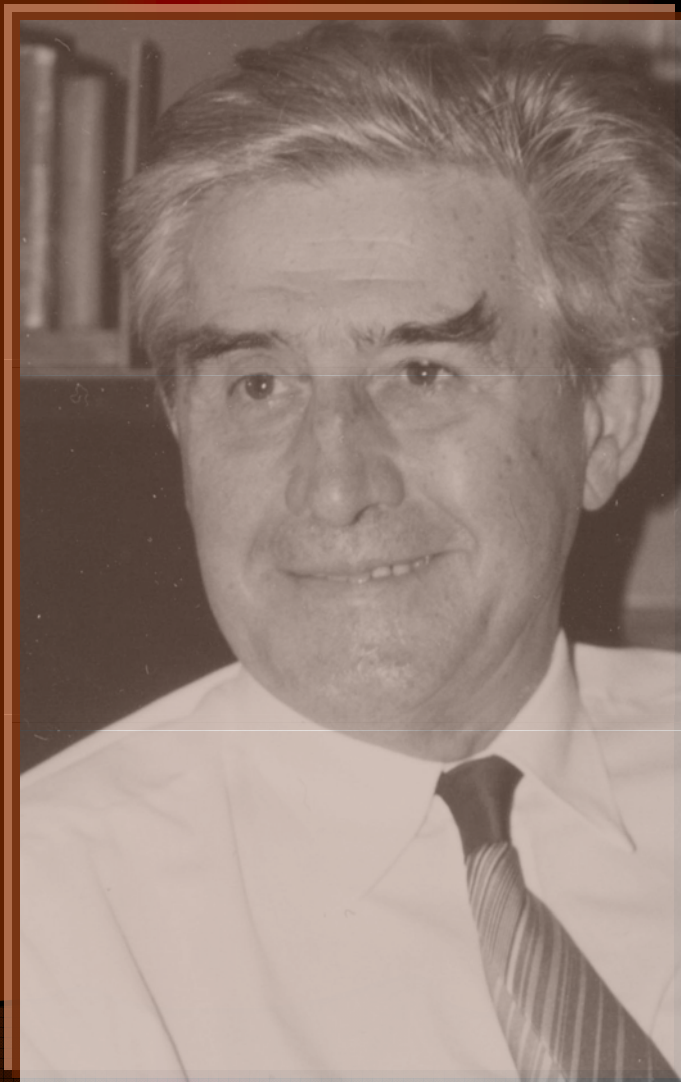
I. Proks (Periodic TA),
J. Brandštetr (Enthalpiometry),
J. Komrska (Permeability TA),
A. Bergstein (Dielectric TA),
S. Chromý (Photometric TA),
V. Šatava (Hydrothermal TA),
V. Balek (Emanation TA),
M. Vaniš (Accelerated TA).



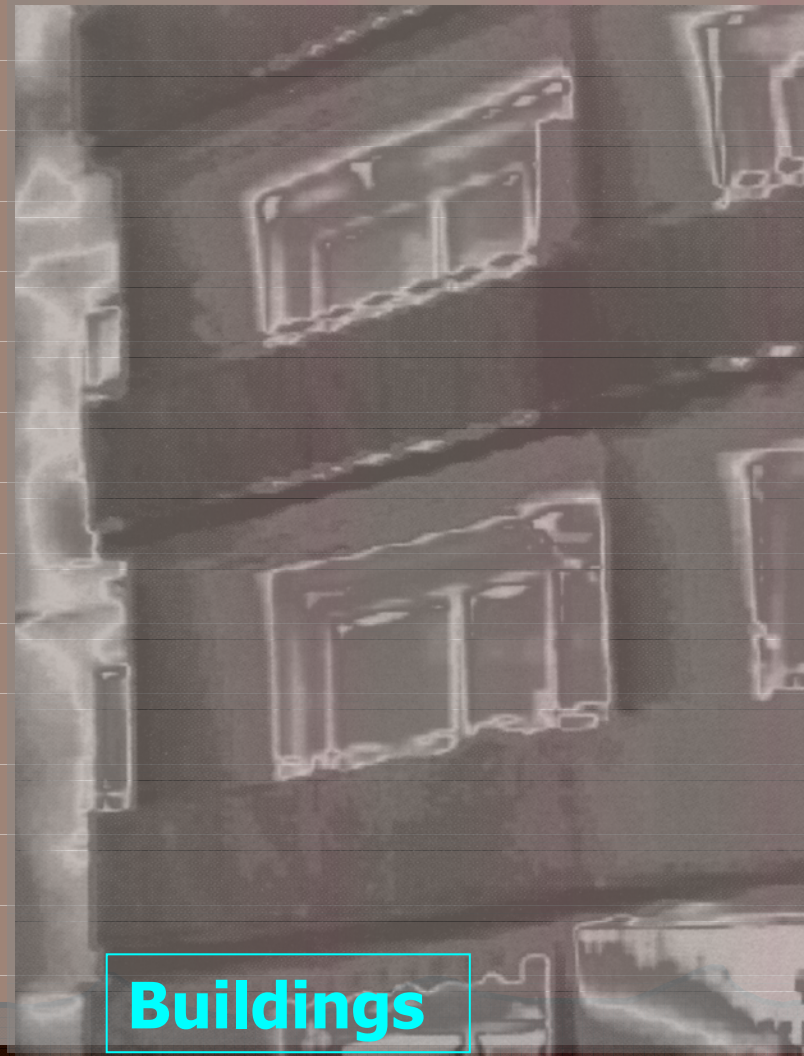
Ivo Proks (1926 -)

Vladimír Šatava (1922 -)

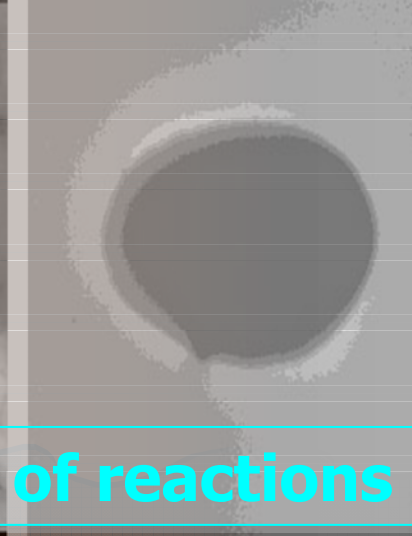
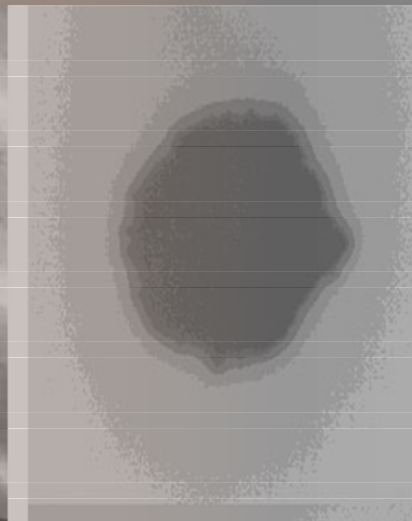
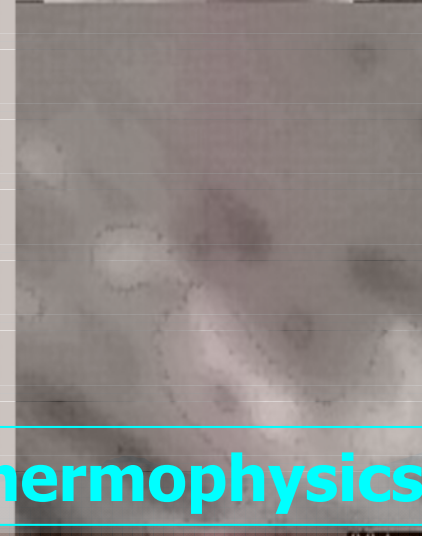
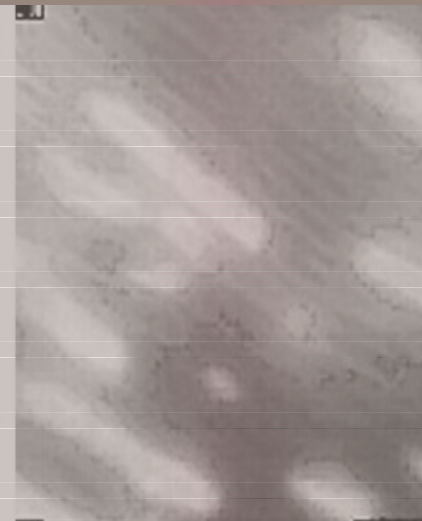
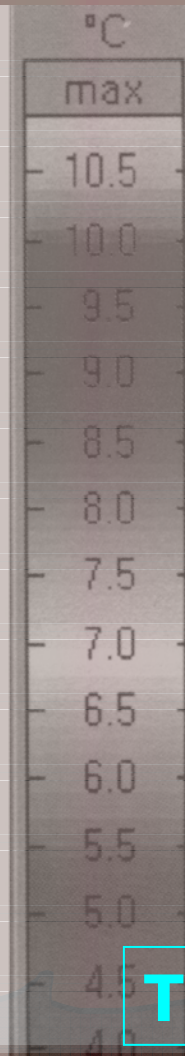
Theoretical basis of thermal analysis



Progression of thermal state, searching of T-gradients in infra-spectral regions (thermography):

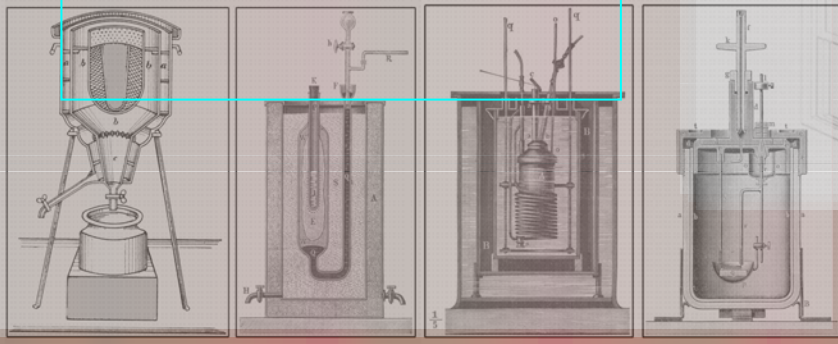


Buildings

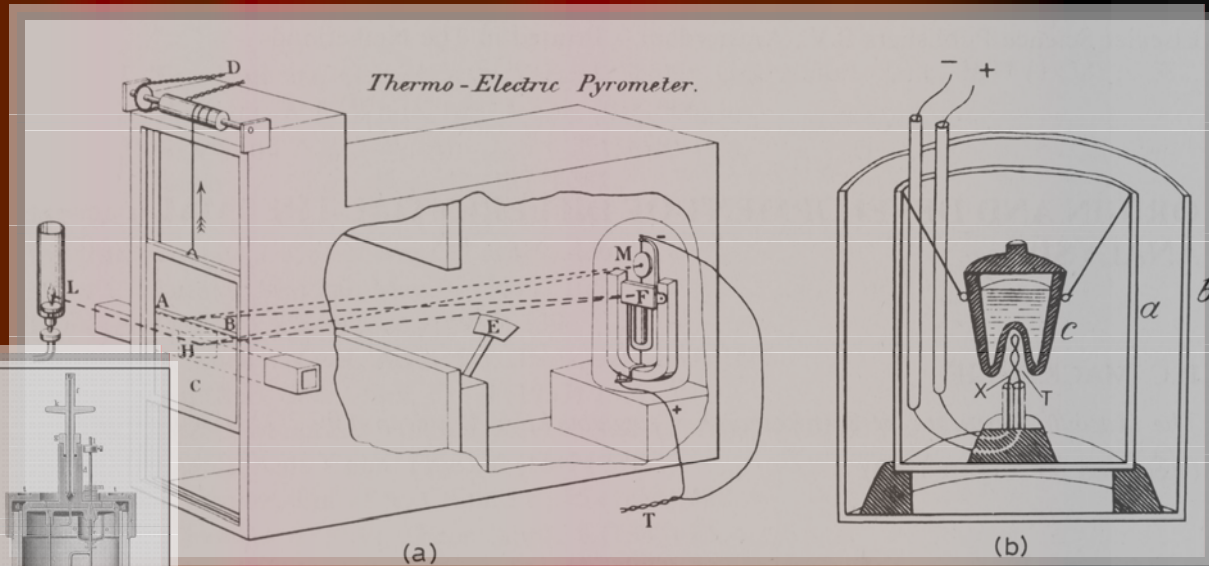


Thermophysics of reactions

Gradual origin of instrumentation for thermal analysis

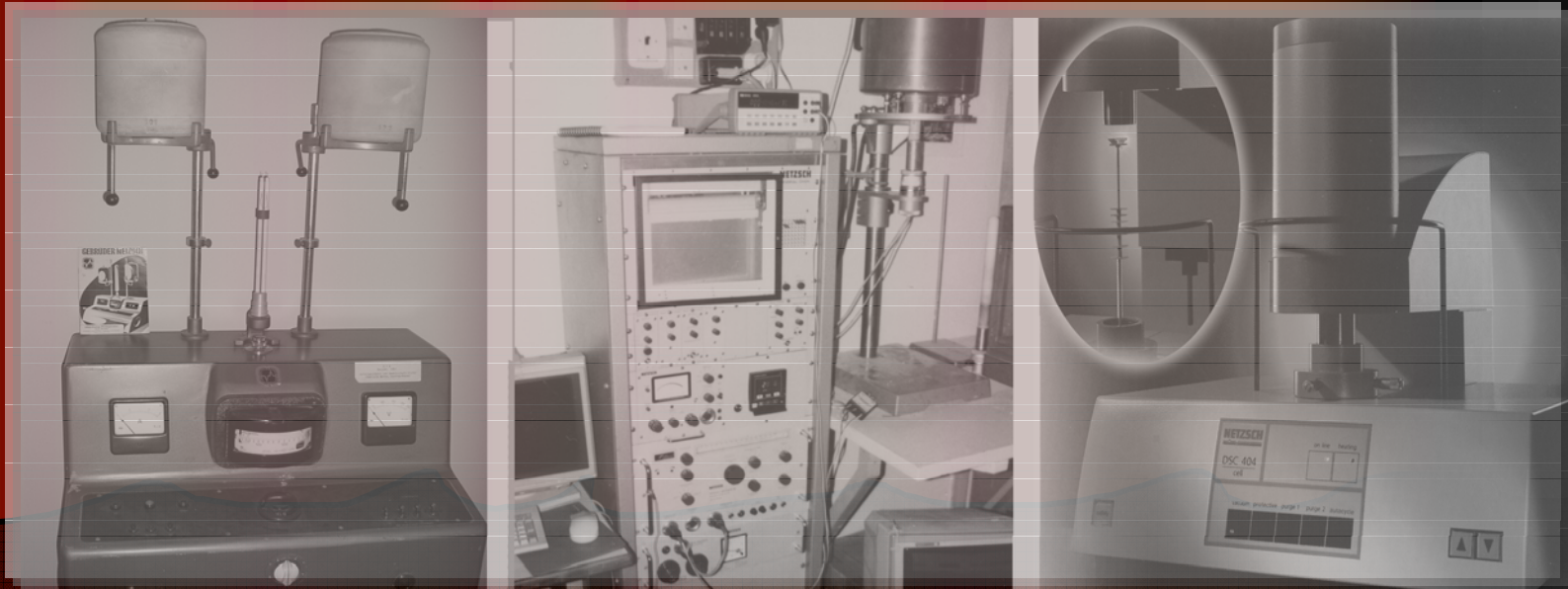


Calorimeters from 1780 to 1850



Thermoelectric Pyrometer by Robert-Austen 1881

Popular Netzsch: from early 1950's to the 21st Century

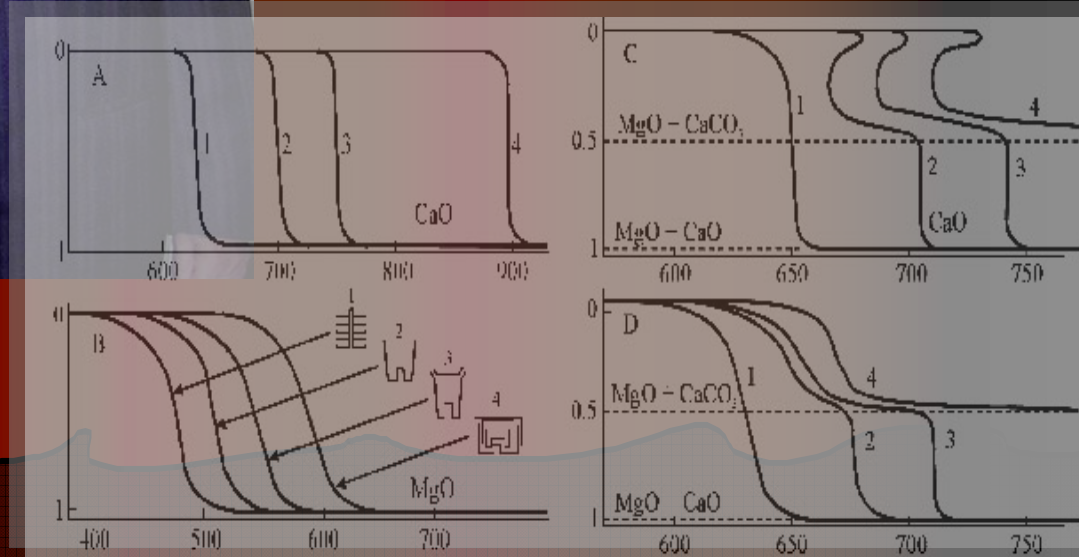


Fruitful history of Hungarian TA Science



Late F. Paulik: Co-inventor and propagator of new combined TA technique called “derivatograph” and author of several book on theory and practice of thermogravimetry and complementary TA techniques

G. Liptay, book: Atlas of TA curves & Who is who in TA



Date of Conference	Chairman	Treasurer	Meeting Place
September 1946	H. M. Huffman	US Calori- metry Confe- rences	Chicago, IL
April 1947	H. M. Huffman		Atlantic City, NJ
April 1948	D. R. Stull		Chicago, IL
September 1949	D. R. Stull		Cambridge, MA
September 1950	G. Waddington		Evanston, IL
September 1951	E. J. Prosen		New York, NY
September 1952	W. DeSorbo		Washington, DC
September 1953	E. F. Westrum, Jr.		Chicago, IL
September 1954	H. A. Boorse		Schenectady, NY
September 1955	D. H. Andrews		Minneapolis, MN
September 1956	D. N. White	C. E. Messer C. E. Messer G. T. Furukawa G. T. Furukawa G. T. Furukawa R. H. Busey R. H. Busey R. H. Busey R. H. Busey R. H. Busey R. H. Busey W. D. Good W. D. Good W. D. Good W. D. Good W. D. Good D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough	Baltimore, MD
September 1957	J. P. McCullough		Portsmouth, NH
September 1958	D. W. Osborne		Chicago, IL
September 1959	J. E. Kunzler		New Haven, CT
September 1960	J. A. Morrison		Gatlinburg, TN
August 1961	G. T. Armstrong		Ottawa, Canada
August 1962	W. N. Hubbard		Berkeley, CA
October 1963	R. Hultgren		Bartlesville, OK
October 1964	O. J. Kleppa		Gaithersburg, MD
August 1965	D. L. Hildenbrand		Ames, IA
June 1966	C. E. Vanderzee	R. H. Busey R. H. Busey R. H. Busey R. H. Busey R. H. Busey R. H. Busey W. D. Good W. D. Good W. D. Good W. D. Good W. D. Good D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough	Boulder, CO
June 1967	G. C. Sinke		Thousand Oaks, CA
August 1968	E. D. West		Midland, MI
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October 1970	J. M. Sturtevant		Gaithersburg, MD
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July 1972	H. Watts		Park City, UT
June 1973	H. E. Flotow		Worcester, MA
July 1974	R. L. Biltonen		Knoxville, TN
July 1975	S. J. Gill		Seattle, WA
September 1976	L. G. Hepler	D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough D. J. Eatough	Argonne, IL
July 1977	W. D. Good		Sherbrooke, Canada
July 1978	J. T. S. Andrews		Logan, UT Kent
July 1979	G. K. Johnson		OH Eufaula, AL
August 1980	G. Bertrand		Gaithersburg, MD
October 1981	C. R. Jolicoeur		Snowbird, UT
July 1982	P. A. G. O'Hare		Williamsburg, VA

Good news - early traces of organized calorimetry from the overseas

**Robert C.
Mackenzie**

Paul D. Garn

Rudolf Barta



**Prague
1958:
did
they
started
idea of
ICTA?**

5th Congress of Czech natural scientists

and physicists, Prague 1914

(already involving some aspects of thermometric studies)

0th Thermography Discussions,

Prague 1955

1st Thermography Day,

Prague 1956

2nd Conference on Thermography,

Prague 1958

3rd Conference on Thermography, Prague 1961

4th Conference on DTA,

Bratislava 1966

5th Conference on DTA,

Smolenice 1970

6th Czechoslovak Conference on TA: TERMANAL, High Tatras 1973

7th , 8th and 9th TERMANALs,

High Tatras 1976, 1979 and 1982

10th TERMANAL and 8th ICTA,

Bratislava 1985

First conference on thermal analysis in London, April 1965

INTERNATIONAL SYMPOSIUM ON THERMAL ANALYSIS

13th and 14th April, 1965



CHEMISTRY DEPARTMENT
NORTHERN POLYTECHNIC
HOLLOWAY ROAD - LONDON - N.7

WEDNESDAY, 14th APRIL

MORNING SESSION

Chairman: Dr. R. C. MACKENZIE

- 9.30 a.m. Theatre A "The Causes of Error in Thermogravimetry"
Dr. M. HARMELIN (C.N.R.S., Paris)
- 10.45 a.m. Coffee
- 11.15 a.m. Theatre A "Miscellaneous Thermal Methods"
Prof. W. W. WENDLANDT (Texas Technological College)
- 12.30 p.m. Lunch

AFTERNOON SESSION

- 2.00 p.m. Theatre A Chairman: Dr. J. P. REDFERN
"Kinetic Studies by Thermogravimetry"
Dr. G. GUIOCHON (Ecole Polytechnique, Paris)
- 3.00 p.m. Tea
- 3.30 p.m. Theatre B "Applications of Thermal Analysis to Inorganic Compounds II" (Papers B/5-9)
Chairman: Dr. M. J. FRAZER
- Theatre C "Applications of Thermal Analysis to the Study of Organic Compounds (including Polymers)" (Papers C/5-9)
Chairman: Mr. D. A. SMITH
- Theatre D "Techniques of Thermal Analysis II" (Papers D/5-9)
Chairman: Dr. R. C. MACKENZIE

Close—5.30 p.m.

TUESDAY, 13th APRIL

MORNING SESSION

Chairman: Dr. J. P. REDFERN

- 9.20 a.m. Theatre A Introduction by Dr. W. Gerrard
(Head of the Chemistry Dept., Northern Polytechnic)
- 9.30 a.m. Theatre A "Atmosphere Effects in Differential Thermal and Thermogravimetric Analysis"
Prof. P. D. GARN (University of Akron, Ohio)
- 10.45 a.m. Coffee
- 11.15 a.m. Theatre A "Derivatography"
Prof. L. ERDEY (Technical University of Budapest)
- 12.30 p.m. Lunch

AFTERNOON SESSION

- 2.00 p.m. Theatre A "General Aspects of Thermal Analysis" (Papers A/1-4)
Chairman: Prof. P. D. GARN
- 3.30 p.m. Tea
- 4.00 p.m. Theatre B "Applications of Thermal Analysis to Inorganic Compounds I" (Papers B/1-4)
Chairman: Prof. W. W. WENDLANDT
- Theatre C "Applications of Thermal Analysis to Polymer Studies" (Papers C/1-4)
Chairman: Mr. D. A. SMITH
- Theatre D "Techniques of Thermal Analysis I" (Papers D/1-4)
Chairman: Dr. B. R. CURRELL

Close—5.30 p.m.

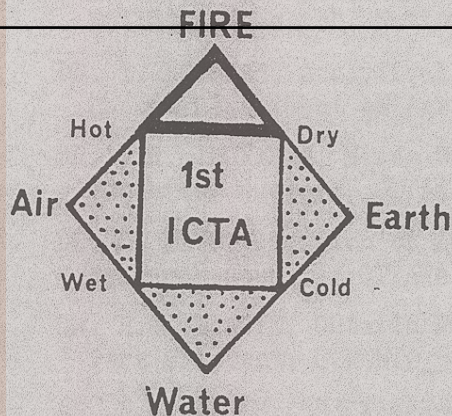
KEY LECTURES "A"

"General Aspects of Thermal Analysis"

Chairman: Professor P.D. Garn

Theatre A Tuesday: 2.00 - 3.30 p.m.

- A1 "The Standardisation of Experimental Conditions in Thermal Analysis"
F. Paulik and J. Paulik (Technical University of Budapest)
- A2 "Procedural Variables Influencing the Thermogravimetric Study of Polymer Decomposition"
D.A. Smith (National College of Rubber Technology, London)
- A3 "The Use of Thermal Standards in Thermogravimetric Analysis"
C.J. Keatch (John Laing Research and Development Ltd., Boreham Wood)
- A4 "The Error of Kinetic Data Obtained from Thermogravimetric Traces at a Rising Temperature"
J. Sestak (Institute of Solid State Physics, Czechoslovakia)



FIRST INTERNATIONAL CONFERENCE ON THERMAL ANALYSIS

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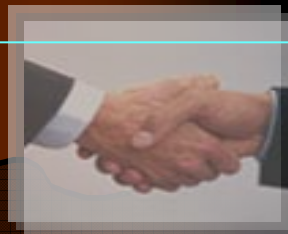
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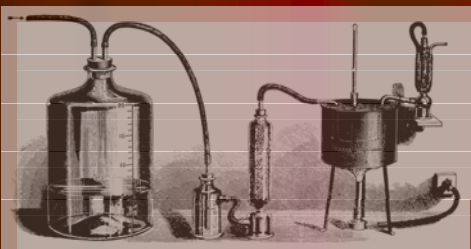
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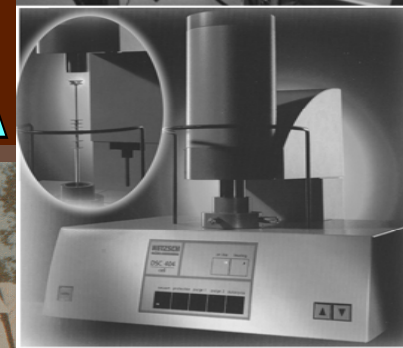
ABERDEEN SCOTLAND
6th - 9th SEPTEMBER 1965

**International Confederation
established**





From the first “thermal”
steps to advance thermal
analysis, and
instrumentation:
up to foundation of ICTA



International Confederation for Thermal Analysis - ICTA

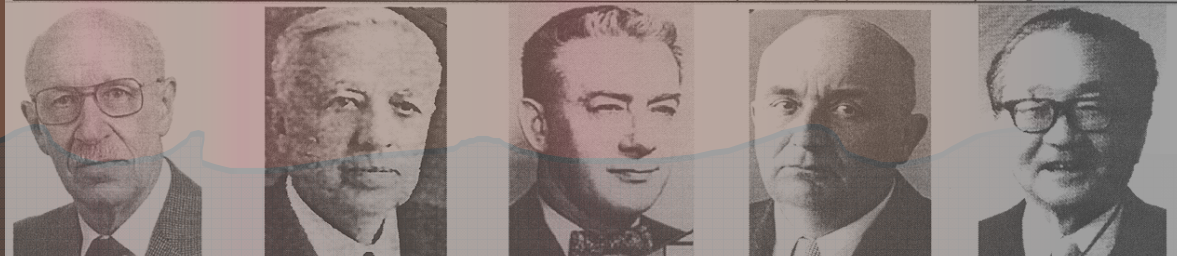
First steps



Original purpose:

**Ease the cooperation
between the West and
the East scientists**

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thermochimica acta

*An International Journal concerned with
the broader aspects of thermochemistry
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VOLUME 1 (1970)

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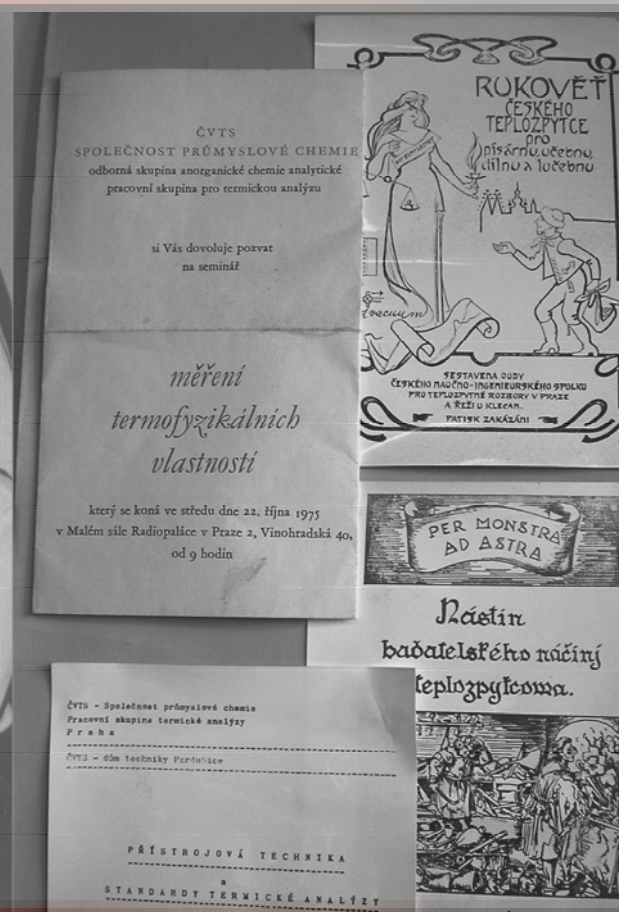
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Czech metropolitan society for studying warmth, 1974



The other pioneers: Z. Šolc, V. Velich (Pardubice). J. Brandštetr (Brno), O. Taraba (Ostrava), R. Bárta, V. Šatava, A. Blažek (Praha), atd.....)

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8th ICTA and 10th TERMAL, Bratislava 1985

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Š. Svetík, Conference Affairs,
Slovak Technical University, Bratislava;
+ late **P. Králík**, Conference Affairs,
Technical University, Košice;



Bratislava August 1985

One of the topmost achievements of the Czech-Slovak thermoanalysts was the organization of the **8th ICTA in Bratislava**, August 1985.

Factually, it was a brave attempt to prepare and carry out an open international conference in communistic Czechoslovakia where a democratic presentation was yet sanctioned and where a "socialistic preferences" were enforced. In spite the political pressure and under the close watch of secret police the invited plenary lectures were equally aimed also at the Western scientists:

R.C. Mackenzie, Scotland and I. Proks, Slovakia; T. Ozawa, Japan; G. Lombardi, Italy Z.G. Szabo, Hungary, E. Gmelin, Germany; V. Jesenak, Slovakia; V.V. Boldyrev, USSR; B. Wunderlich, USA and H.G. Wiedemann, Switzerland - the latter two were the first immigrant scientist from the past East Germany to be invited as honorary guests).

It was also for the first time that the scientist from so called 'hostile capitalistic countries' were allowed to visit Czechoslovakia (such as *S. Yariv* from Israel or *M.E. Brown* from South Africa)



Late Prof. Vladislav Lazarev awarding ICTA founder late Dr. Robert Mackenzie

**Prof. M. Malinovský &
Prof. Gianni Lombardi**



**Dr. Harry McAdie &
Prof. Milan Malinovský**

Venda Tomková + Viktor Jesenak + Vladimír Šatava





Scandinavian representatives

Slade Warne & Hirshi Suga



Late Cyril Keatch & Ryohei Otsuka

Historical resources

DISQUISITIONES DE CALORIS ET FRIGORIS NATURA.

Cujus cognitio vera in referenda
multa naturæ arcana cla-
vis erit.

*In prodromum nova editionis Physica
ad lumen divinum refertenda,*

A JOH. AMOS COMENIO
ante hac luci data.

Editio secunda.



APUD JOHANNEM COLLINERUM,
ANNO 1678

44

28 DISQUISITIONES DE CALORIS ET FRIGORIS NATURA. 1678
Pagina tituli

SBORNÍK
JEDNOTY ČESKÝCH MATHEMATIKŮ
V PRAZE.

THERMIKA.

Sepsal

s. k. dvorní rada
DR. ČENĚK STROUHAL,
professor exp. fysiky na české universitě K. F.

Vydáno podporou české Akademie císaře Františka Josefa pro vědy,
slovesnost a umění.



V PRAZE 1908.
NÁKLADEM JEDNOTY ČESKÝCH MATHEMATIKŮ.

Я. Шестак ТЕОРИЯ ТЕРМИЧЕСКОГО АНАЛИЗА

ФИЗИКО-ХИМИЧЕСКИЕ СВОЙСТВА
ТВЕРДЫХ НЕОРГАНИЧЕСКИХ
ВЕЩЕСТВ

Перевод с английского
канд. хим. наук И. В. Архангельского,
канд. хим. наук Ю. Г. Метлина
и Т. И. Щербак



Москва «Мир» 1987

Jaroslav Šesták

Heat, Thermal Analysis and Society



RECLEN'S TM

Theoretical background of thermal analysis

Thermal Analysis

W.W.Wendlandt

Bernhard Wunderlich

*The University of Tennessee at Knoxville, Knoxville, Tennessee
and
Oak Ridge National Laboratory, Oak Ridge, Tennessee*



ACADEMIC PRESS, INC.
Harcourt Brace Jovanovich, Publishers
BOSTON SAN DIEGO NEW YORK

1974

COMPREHENSIVE ANALYTICAL CHEMISTRY
Edited by

G. SVEHLA, PH.D., D.SC., F.R.S.C.
*Reader in Analytical Chemistry
The Queen's University of Belfast*

VOLUME XII

THERMAL ANALYSIS

PART D

THERMOPHYSICAL PROPERTIES
OF SOLIDS

THEIR MEASUREMENTS AND THEORETICAL
THERMAL ANALYSIS

by
JAROSLAV ŠESTÁK

*Institute of Physics
of the Czechoslovak Academy of Sciences,
Prague*



ELSEVIER
AMSTERDAM OXFORD NEW YORK TOKYO
1984

1984

KLAUS HEIDE

Dynamische thermische Analysen- methoden

1979

Generalised Approach to Thermal Analysis

Science of Heat and
Thermophysical Study

by
Jaroslav Šesták



Institute of Physics of the Academy of Sciences
of Czech Republic, Division of Solid-State Physics,
Cukrovarnická 10, CZ - 162 53 Praha 6



University of Western Bohemia, Faculty of Applied
Sciences, Univerzitní 8, CZ - 306 14 Pilsen,
both Czech Republic

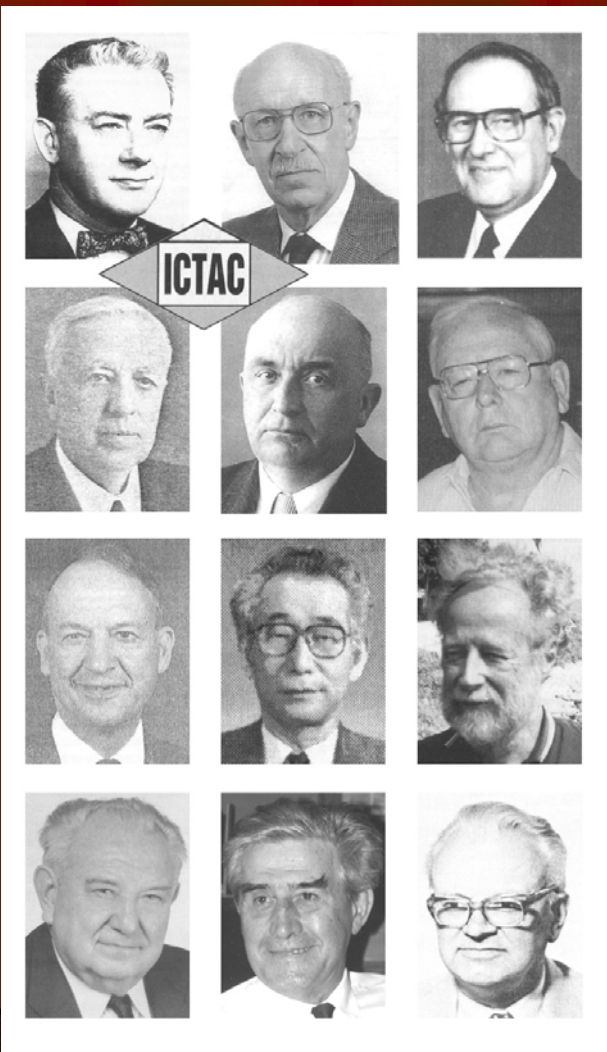


Amsterdam - Oxford - New York - Tokyo 2005

2005

Aspects of classically assumed thermal analysis

Murphy
Mckenzie
Wendladt
Berg
Bárta
Garn
Dollimore
Ozawa
Flynn
Paulik
Šatava
Proks



- Rather sophisticated stage of thermo-analytical instrumentations (approaching inexpert “push-and-bottom” degree)
- Since 1962 almost orthodox book contents on repetitious treatises of thermal analysis and its instrumentation (currently often well substituted by manufacturer manuals)
- Little care to go explaining the deeper theoretical basis of thermal analysis, thermometry, calorimetry and backing role of thermodynamics and thermal physics
- Safeguarding of rather narrow apprehension of thermal analysis as a mechanical tool to measure curves and find their interpretation
- computer assisted (gradually full assessment) job (of surplus scientists)

Thanks (it's really the end)

