

MICHAEL D. GORDIN

SCIENTIFIC BABEL

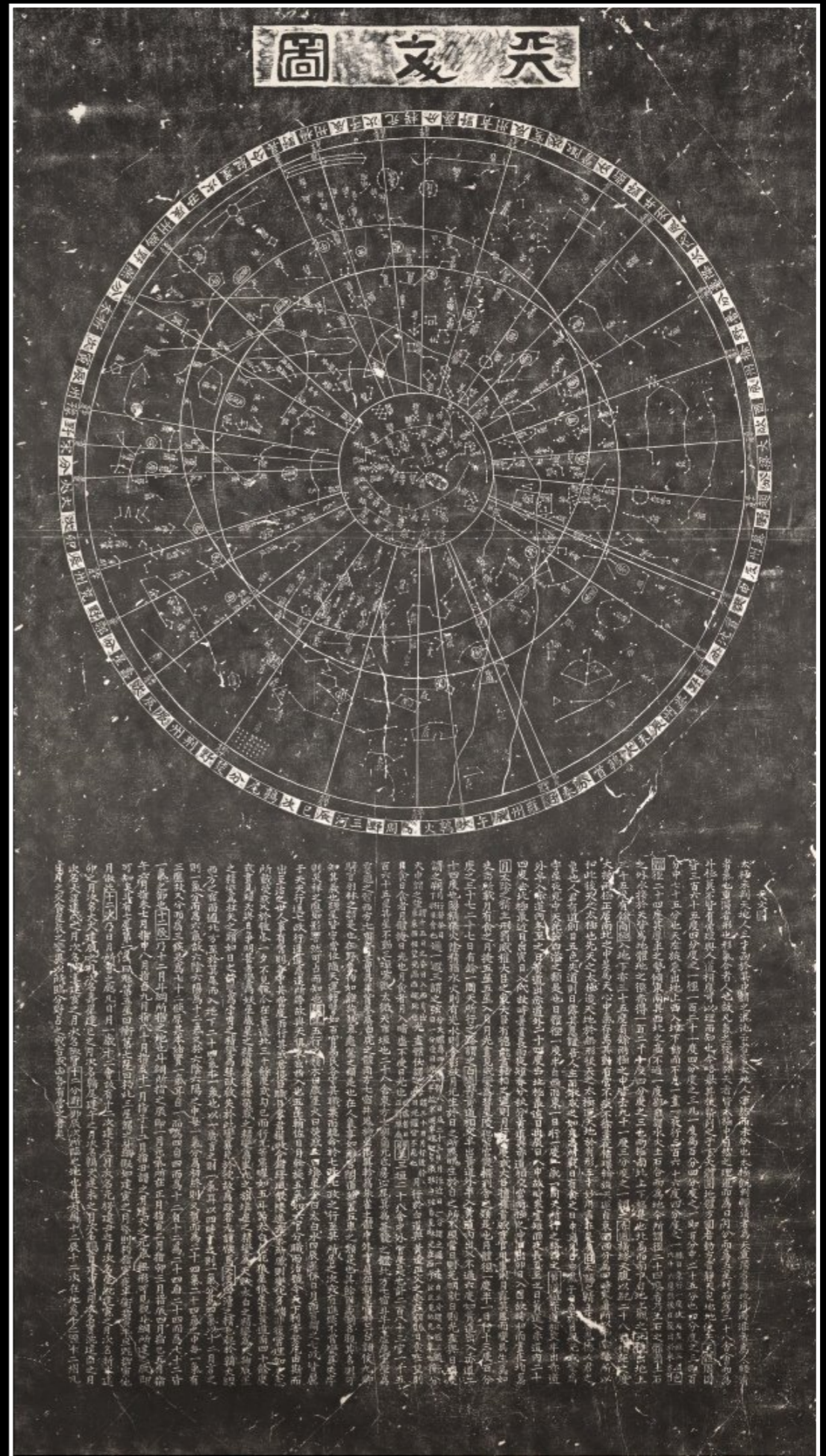
How Science Was Done
Before and After Global English

The Inevitability of Translation in Scientific Communication

Michael D. Gordin
Princeton University

Helsinki Initiative Webinar
1 December 2023

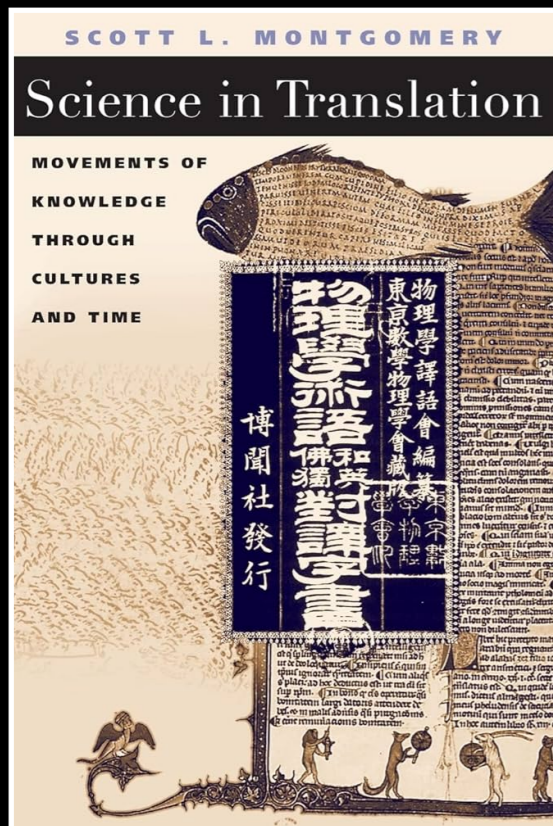
The East



氏召孔子欲往而卒不行。有答子路定公
 以孔子為中都宰。一年四方則之。遂為司
 空。又為大司寇。十年辛丑。相定公會。齊侯
 于夾谷。齊人歸魯侵地。十二年癸卯。使仲
 由為季氏宰。隨三都收其甲兵。孟氏不肯
 隨。成圍之。不克。十四年乙巳。孔子年五十
 六。攝行相事。誅少正卯。與聞國政。三月魯
 國大治。齊人歸女樂。以沮之。季桓子受之。



The West



Ἄριστοτέλης

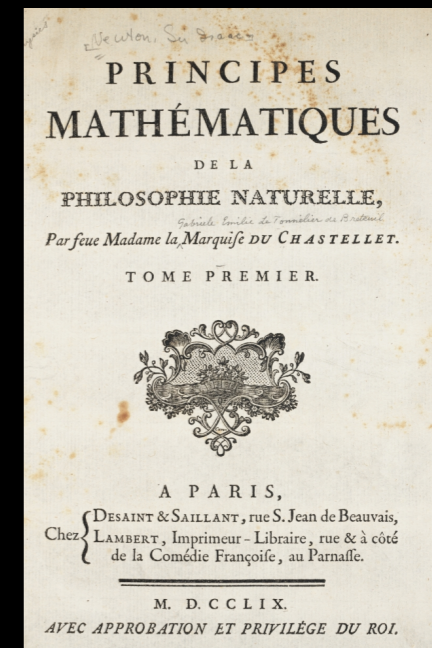
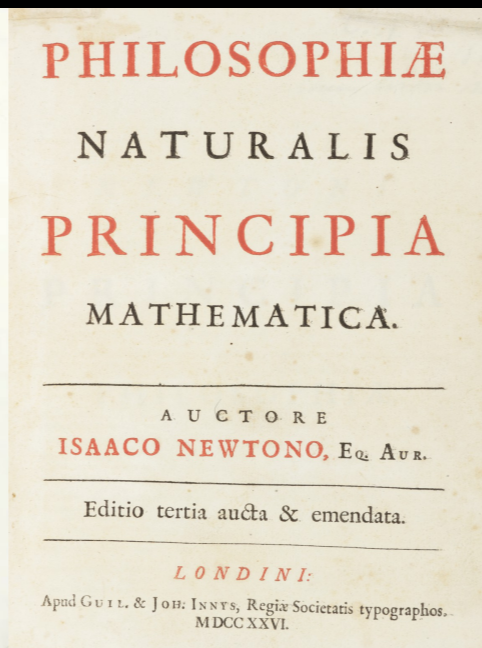
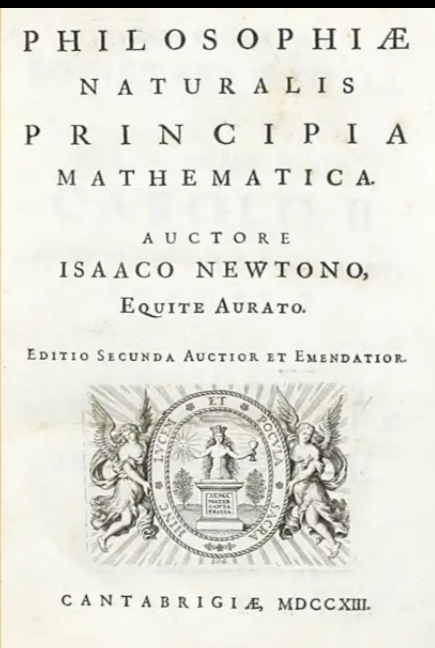
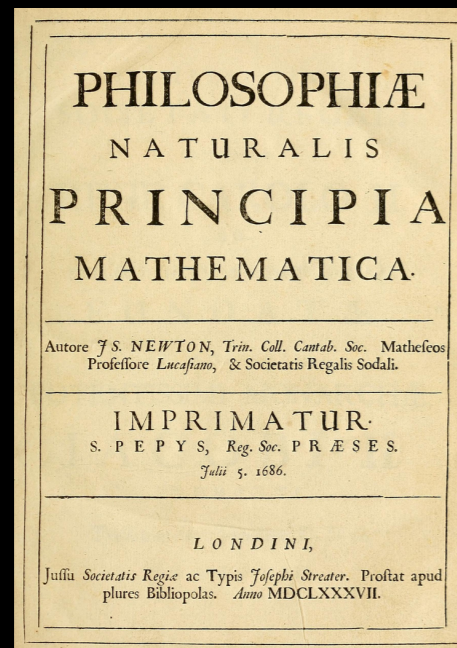
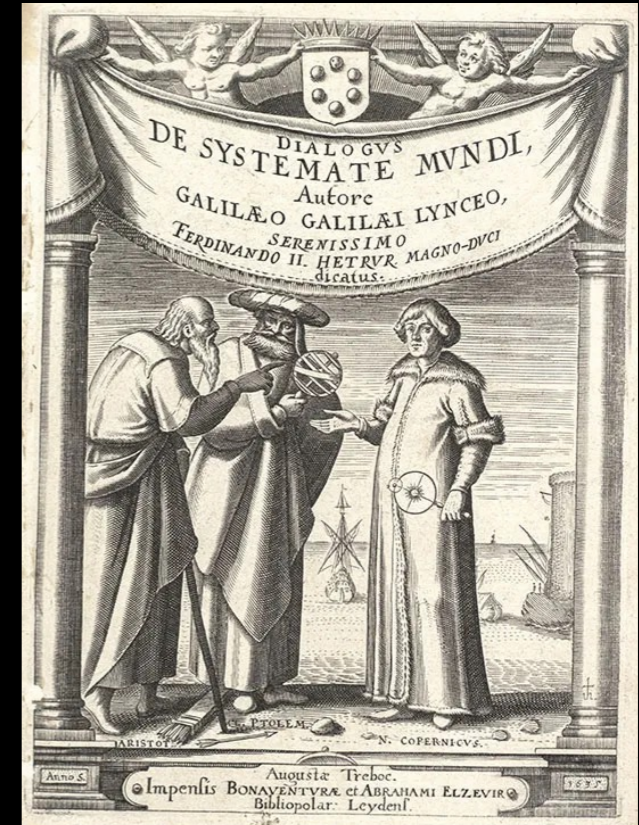
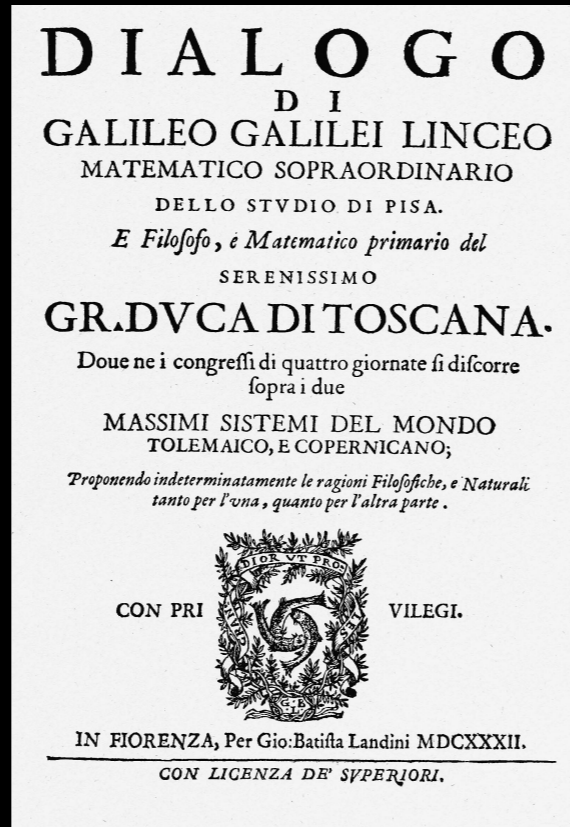
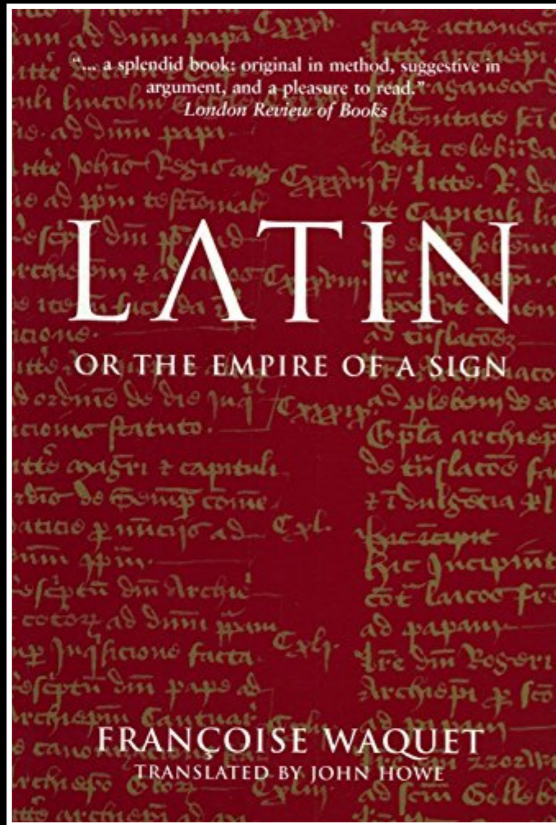
ارسطو

أرسطو

Aristotelēs



Translation “after Latin”



Ubiquitous Translation

СООТНОШЕНІЕ СВОЙСТВЪ СЪ АТОМНЫМЪ ВѢСОМЪ
ЭЛЕМЕНТОВЪ.
Д. Менделѣева.
Систематическое распределение элементовъ подвергалось въ исто-
риіи нашей науки многимъ разнообразнымъ превратностямъ. Наибо-
рѣе нашей науки многимъ разнообразнымъ превратностямъ. Наибо-


Ueber die Beziehungen der Eigenschaften zu den Atomgewichten der Elemente. Von D. Mendelejeff. — Ordnet man Elemente nach zunehmenden Atomgewichten in verticale Reihen so, dass die Horizontalreihen analoge Elemente enthalten, wieder nach zunehmendem Atomgewicht geordnet, so erhält man folgende Zusammenstellung, aus der sich einige allgemeinere Folgerungen ableiten lassen.

Jahres-Bericht
über
die Fortschritte
der
physischen Wissenschaften
von
Jacob Berzelius.
Eingereicht an die schwedische Akademie der Wissenschaften,
den 31. März 1830.

Aus dem Schwedischen übersetzt
von
F. Wöhler.

Zehnter Jahrgang

Tübingen,
bei Heinrich Laupp.
1831.



JOURNAL
OF
THE CHEMICAL SOCIETY.
ABSTRACTS OF CHEMICAL PAPERS PUBLISHED IN
BRITISH AND FOREIGN JOURNALS.
PART I.
Organic Chemistry.


The Asymmetric Carbon Atom. ERNST MOHR (*J. pr. Chem.*, 1903, [ii], 68, 369-384. Compare Rabe, *Abstr.*, 1901, i, 33; Aschan, *Abstr.*, 1903, ii, 2).—A theoretical paper. G. Y.

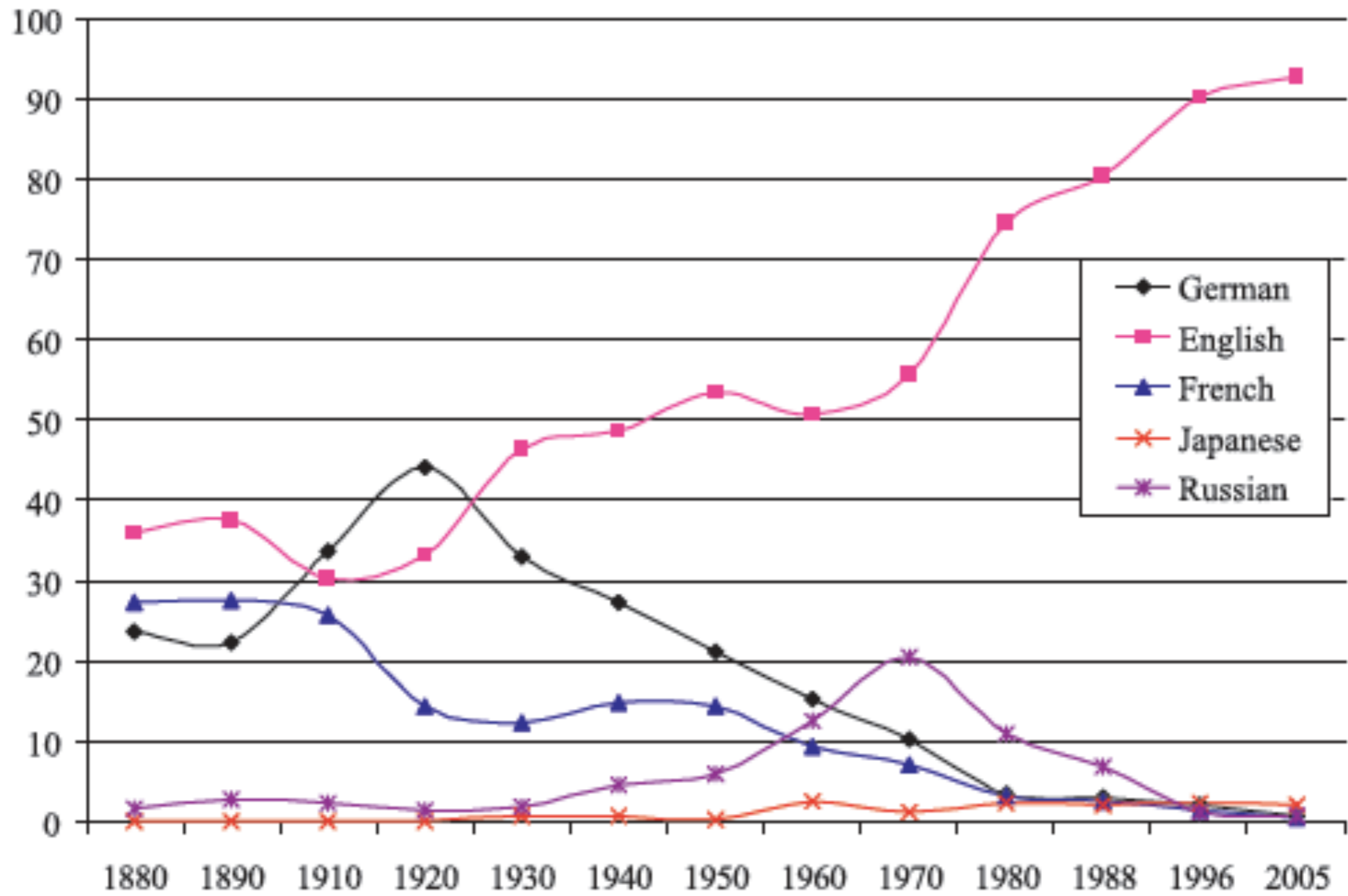
Action of Fuming Sulphuric Acid on isoAmyl Chloride. ROBERT A. WORSTALL (*J. Amer. Chem. Soc.*, 1903, 25, 932-935).—isoAmyl chloride was sulphonated by fuming sulphuric acid, and acicular crystals of the barium salt, $(\text{OH}\cdot\text{C}_5\text{H}_{11}\cdot\text{SO}_3)_2\text{Ba}\cdot 2\text{H}_2\text{O}$, were isolated. A concentrated aqueous solution of the salt, when boiled with dilute hydrochloric acid, did not develop a pink colour; no precipitate formed, and no odour of fusel oil was perceptible. The free acid, obtained from the lead salt by hydrogen sulphide, contained only a trace of sulphuric acid after being boiled with water. isoAmyl sulphate is possibly the initial product of the sulphonation, and, by further action, is converted into the hydroxysulphonic acid. A. McK.

Action of Water on Methylene Dibromide. KARL KLÖSS (*Monatsh.*, 1903, 24, 783-789. Compare Jeltokow, *Ber.*, 1873, 6, 558).—When heated with water at 150°, methylene dibromide is hydrolysed with formation of formaldehyde. After heating for 30 hours, the yield of formaldehyde is 89.1 per cent. of the theoretical; a 93.8 per cent. yield of formaldehyde is obtained on heating methylene dibromide with lead oxide and water for 26 hours at 150°. The author discusses the methods of estimating formaldehyde (see Legler, *Abstr.*, 1883, 1035; Lisekann, *Abstr.*, 1889, 1036; Eschweiler *Abstr.*, 1889, 1250; Blank and Finkenbeiner, *Abstr.*, 1899, ii, 188 820). G. Y.

VOL. LXXXVI. i.

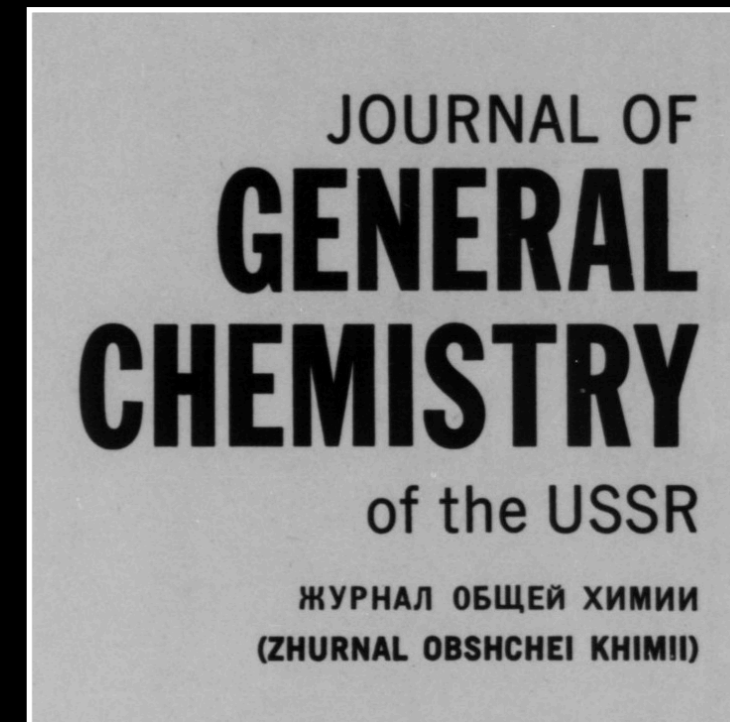
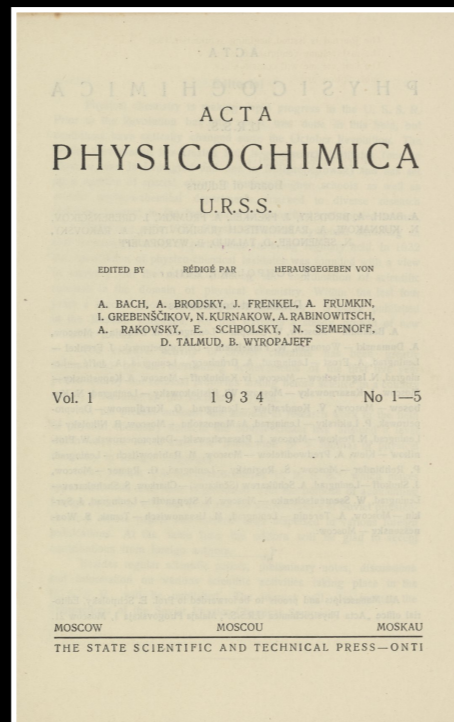
CHEMISCHES
CENTRAL-BLATT.
REPERTORIUM
REINE, PHARMACEUTISCHE, PHYSIOLOGISCHE UND TECHNISCHE CHEMIE.
DRITTE FOLGE. X. JAHRGANG.
LEIPZIG,
VERLAG VON LEOPOLD VOSS.
1879.



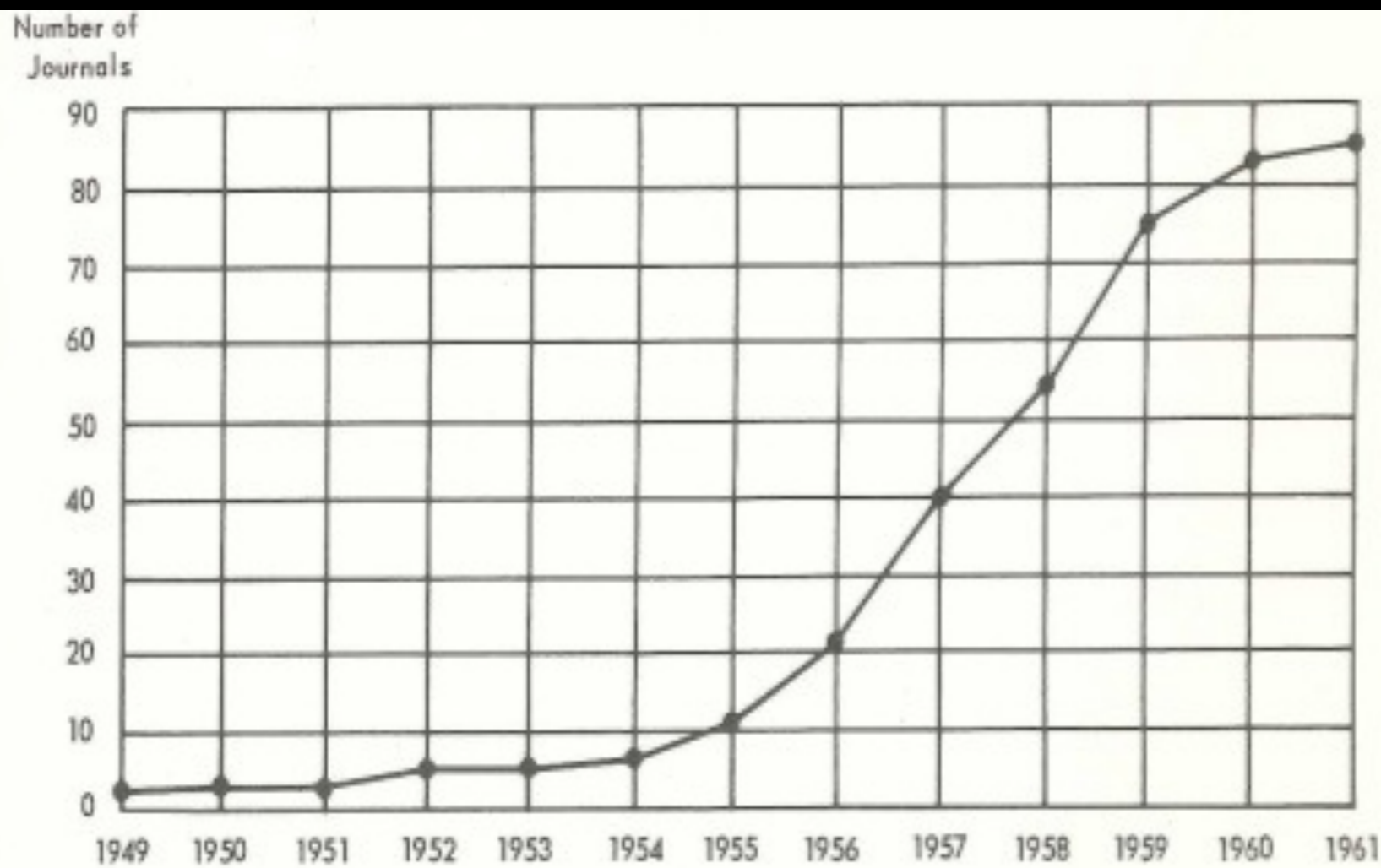


(Ulrich Ammon, 2012)

Cover -to- Cover



Earl Coleman (1916-2009)



Growth of Cover-to-Cover Translations of Soviet Journals

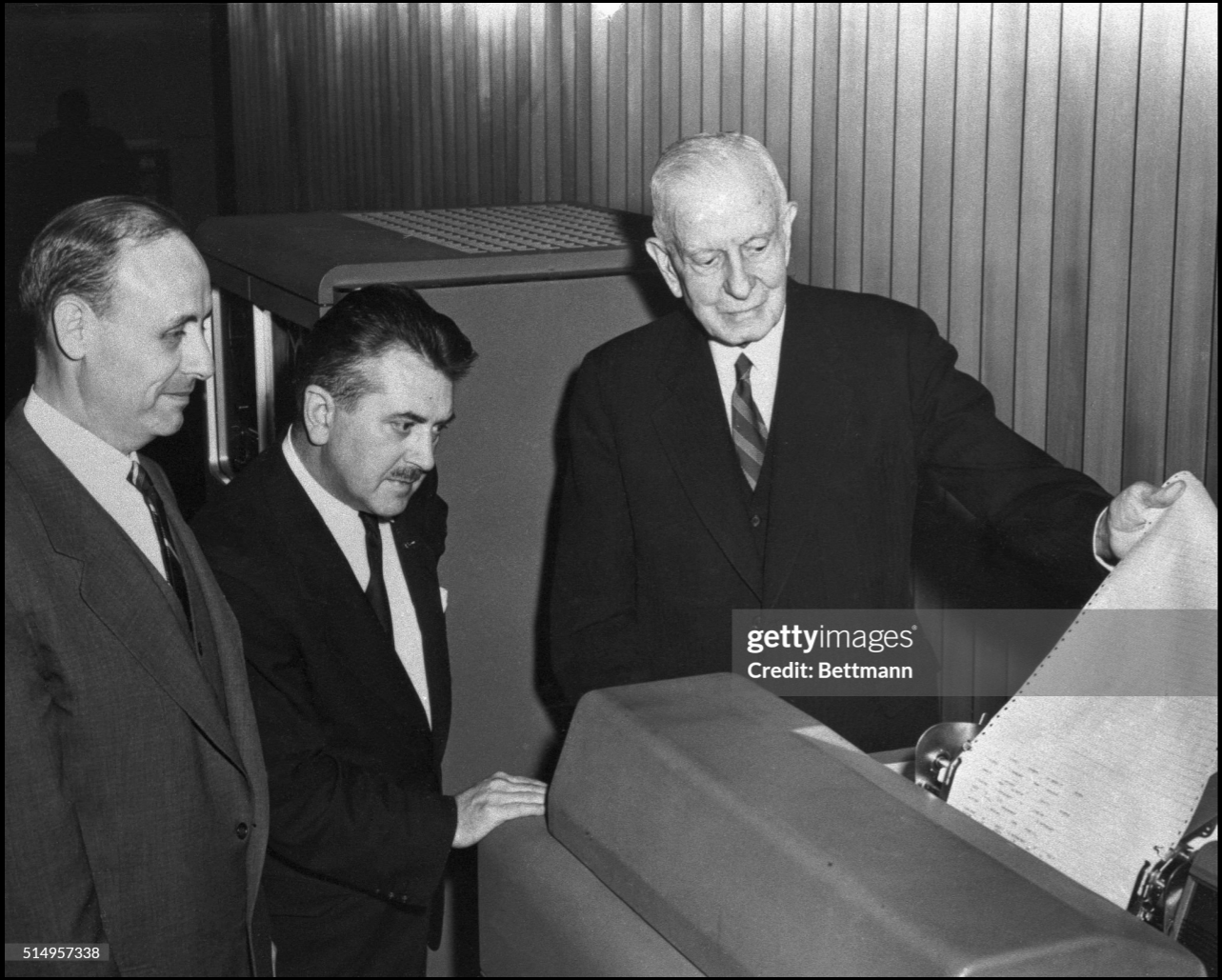
Machine Translation

“Recognizing fully, even though necessarily vaguely, the semantic difficulties because of multiple meanings, etc., I have wondered if it were unthinkable to design a computer which would translate. Even if it would translate only scientific material (where the semantic difficulties are very notably less), and even if it did produce an inelegant (but intelligible) result, it would seem to me worth while.

Also knowing nothing official about, but having guessed and inferred considerable about, powerful new mechanized methods in cryptography — methods which I believe succeed even when one does not know what language has been coded — one naturally wonders if the problem of translation could conceivably be treated as a problem in cryptography. When I look at an article in Russian, I say: “This is really written in English, but it has been coded in some strange symbols. I will now proceed to decode.”

— Warren Weaver, “Translation,” July 1949

Machine Translation



gettyimages
Credit: Bettmann

514957338

OBRABOTKA										POVISHAYET										KACHY ESTYO										NYEFTYI																																																	
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1										
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9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9										

IBM SERVICE BUREAU
IBM 733727

Research in Language Translation by Machine

kyislorodn—

kyislorod— oxygen	— 222	— 23	— 242	— 242	— 242	— 242
lyshyeni— optical	— 222	— 23	— 242	— 242	— 242	— 242
materyal— material	— 222	— 23	— 242	— 242	— 242	— 242
— mi	— 222	— 23	— 242	— 242	— 242	— 242
— moyi	— 222	— 23	— 242	— 242	— 242	— 242
— moog—	— 222	— 23	— 242	— 242	— 242	— 242
— myedj	— 222	— 23	— 242	— 242	— 242	— 242
— myest—	— 222	— 23	— 242	— 242	— 242	— 242
— myekamychesk—	— 222	— 23	— 242	— 242	— 242	— 242
— myezhnanarod—	— 222	— 23	— 242	— 242	— 242	— 242
— na	— 222	— 23	— 242	— 242	— 242	— 242
— rapadyeni—	— 222	— 23	— 242	— 242	— 242	— 242
— nauka	— 222	— 23	— 242	— 242	— 242	— 242

oxygen

A 250 word sample Russian-English dictionary and 6 basic rules of syntax and grammar are stored in the IBM 701.

Sentences in the Russian language are punched into standard IBM cards and read.

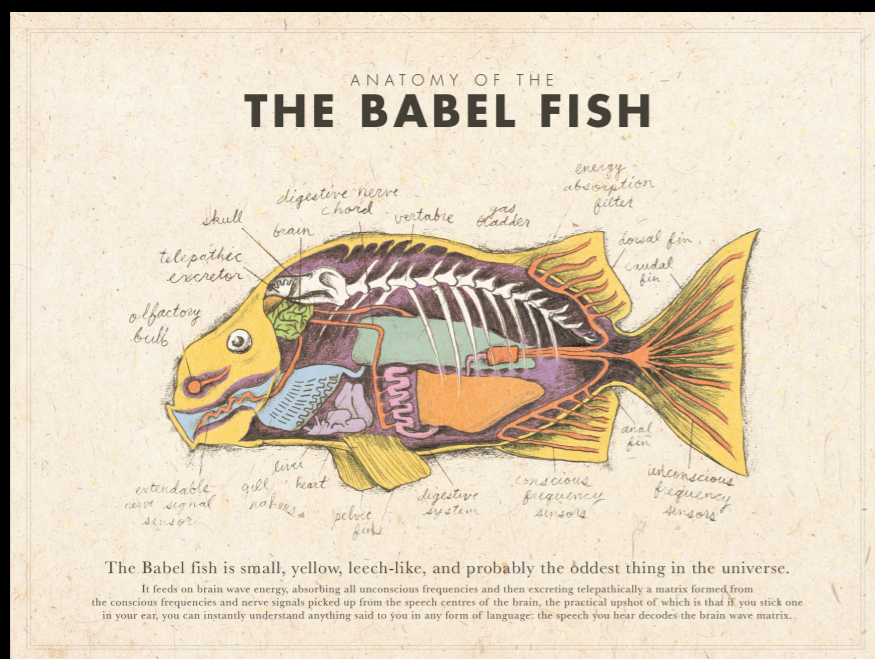
In a few seconds the English translation of the Russian sentence is printed.

A Joint Project of the
Institute of Languages and Linguistics
of Georgetown University
and International Business Machines Corporation

DeepL and AI?



1. Degeneration without constant renewal of training texts.
2. Science as a form of knowledge production generates novel concepts and terminology.
3. Oral communication in collaboration.
4. Pedagogy and the training of future scientists.



MICHAEL D. GORDIN

SCIENTIFIC BABEL

How Science Was Done
Before and After Global English

The Inevitability of Translation in Scientific Communication

Michael D. Gordin
Princeton University

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