Contents

A NOTE ON THE INDEX xiii
INDEX 1
CONTRIBUTORS 441
SOCIEDIES INDEXED 471
PERIODICALS INDEXED 475
LISTS OF SCIENTISTS BY FIELD 479
ERRATA 504
Lists of Scientists By Field

MATHEMATICS

Abel, N. H.
Abraham Bar Hiyya
Abū Kāmil
Abū-'Wafā'
Adams, J. C.
Adelard of Bath
Adrain
Aepinus
Agnesi
Agullon
Ahmad ibn Yūsuf
Aida Yasuaki
Aigina
Aigina
Al-Battani
Al-Biruni
Albert of Saxony
Alberti, L. B.
Albertus Magnus
Alembert
Alzate y Ramírez
Amperé
Amsler
Anatolius of Alexandria
Anderson, O. J. V.
Andoyer
Angeli
Anthemius of Tralles
Antiphon
Apollonius of Perga
Apollonius
Arbogast
Arbuthnot
Archimedes
Archytas of Tarentum
Argand, J. R.

Babbage
Bachelier
Bachet de Mézières
Bachmann, P. G. H.
Bacon, R.
Al-Baghdādī
Baire
Balbus
Balmer
Banach
Ibn Al-Banna'
Banā Mūsā
Barber
Barlow, P.
Baroccius
Barrow

Aristaeus
Aristarchus of Samos
Aristotle
Aristoxenus
Arnold
Arnow
Artin
Āryabhaṭa I
Āryabhaṭa II
Atwood
Autaicus of Pitane
Auzout
Azara

Bartholin, E.
Bateman
Al-Battānī
Bayes
Beaupre
Bell, E. T.
Belleville
Beltrami
Benedetti, G. B.
Bernoulli, D.
Bernoulli, Jakob I
Bernoulli, Jakob II
Bernoulli, Johann I
Bernoulli, Johann II
Bernoulli, Johann III
Bernoulli, Nikolaus I
Bernoulli, Nikolaus II
Bernstein F.
Bernstein, S. N.
Bertini
Bertrand, J. L. F.
Berwick
Bessel
Betti
Biezout
Bhāskara II
Bianchi
Bennaymè
Bily
Birkhoff
Al-Birūnī
Bjerknes, C. A.
Blaesche

Blasius of Parma
Blichfeldt
Bliss
Bobillier
Böcher
Boethius
Bohl
Bohr, H.
Bolyai, F.
Bolyai, J.
Boîza
Boîzan
Bombelli
Bonnet, P. O.
Boole
Borchardt
Borda
Borel, E.
Borelli
Bortkiewicz
Bortolotti
Bošković
Bosse
Bosсut
Bouguainville
Bouilhau
Bouquet
Bour
Bourbaki
Boussinesq
Boutroux
Bouvelles
Bradwardine
Solutions, geometrical
Archimedean, 4:97b
development of, 4:260a
coclea, 1:164b
generation of, 7:1a
of least resistance, 3:459a; 10:68a
in nature, 3:596b
non-Platonic, 3:169a
Platonic
see Solids, geometrical, regular
regular, 1:341b, 245b, 518b-b; 3:181a,
396b; 4:97b, 424a, 609b, 5:113a;
7: 290b-292a, 398a; 9:191b; 10:271a;
11:533a-b; 15-671a
angle of inclination, 7:29b
construction of, 4:423a-b; 11:28a,
222b; 13:303b-304a
development of, 4:260a
inscribed, 6:415a, 616b; 10:294b
surface vs. volume, 10:295b
rotational, 1:228b; 3:183a; 5:527a;
10:296b; 12:460a
classification of, 13:435b
surface areas, 6:600a
volumes, 1:164b; 3:152a; 4:517b; 5:
588b; 7:536b; 18:435a-436a
semiregular, 10:295b
space-filling, 8:617a
see also Polyhedra; specific solids
Solids, physical
atomic theory of, 5:160b
chemical reactions of, 8.373b; 13:247a
compressibility, 11:530a
clasticity, 1:123b; 303b; 6:342a;
7:601b; 9:160b
electrolytic conduction, 15:449b
Kelvin-Kirchoff-Neumann bodies, 4:
230a, 230b-231a
kinetic theory of, 2:466a
pressure effects, 12:593b
stability, 4:230b
structures of, 8:597b
theory of, 2:431b
mechanical properties, 5:161a
thermal motion in, 5:161a; 15:363a
Sollandis, 1:147b
Solitons, Gauß zu, 7:27b; 9:140b
Sollas, William Johnson (1849-1936), 12:
519b-520b, 2283b; 12:545b*
Solliod, Barthélemy de, 15:15a
Solms-Laubach, Heinrich zu (Count), 3:31a
Solomon, king of Israel, 15:63b
temple, 14:29b-a
Solomon ben Abraham ben David, 12:7bB
Solomon ben Judah bcn Joseph, 12:7bB
Solomon Islands, 2:342b
Solstices
and calendar, 5:533a
observation of, 1:246b; 2:148a, 150b; 9:
337a; 338b; 11:188a, 189b; 240a;
12:403a; 15:218b, 270b
position of, 3:101a, 108a; 13:320a, 440b;
15:219b, 677a, 680b
summer, 4:390a, 459b; 15:673a
Solutebility, 2:499a, 3:334a; 4:229a; 7:162a
and chemical structure, 12:418b
of gases, 2:170a; 12:271a
of glass, 4:214b
of oils, 8:618b
of salts, 1:616b; 4:229a, 238b-239a, 352b;
5:324a; 7:206a; 8:618b
effects of gas, 5:254a
Solutions, 8:373b
absorption spectra, 7:162a
analogy to gases, 12:299a-b; 13:579a-b
boiling point, 11:298b
colligative properties, 11:279a; 14:182b;
15:460a
concentrated
boiling points, 3:176b
cooperative critical points, 5:103b
critical points, 3:620b
density, 3:211b; 13:547b
distribution in, 12:404b; 15:434a
electrical conduction in, 3:334a; 6:439a,b;
7:203b, 449a-b, 462a
electrified systems, 4:229a
electrolytic, 7:162a
fractional solution, 3:242b
freezing point, 11:298a-299b; 15:459a
and concentration, 14:191a
heat of solution, 4:228b, 554b
ionic coefficients, 12:495b
ionic strength
and activity coefficients, 2:499a; 8:290b
isohydric, 1:300a
nonaqueous, 3:176b; 14:125a
optical properties, 9:376b
and concentration, 2:139a-b
critical opalescence, 3:620b
partial molal properties, 4:229a
partition coefficient, 2:69b-70a; 11:426a;
12:404b; 15:434a
physiological
Cushing's solution, 3:518a
in wound treatment, 5:29b
pressure effects, 13:244b
pseudo-solutions, 11:279a
solid, 1:416a; 5:187a; 7:412a; 8:119a;
12:593b; 13:580a; 14:241a, 588a
and atomic size, 1:462a; 6:561a
heterogeneity of, 3:239a
theory of, 6:561a; 11:550a; 13:617b
solvent-solute relations, 7:162a; 13:244b
specific gravity, 9:291a-b
specific heats
and concentration, 9:110a
standard, 5:325b-326a
strength of, 13:547b
supercooling, 8:520a
supersaturation, 2:254b; 8:546a
thermal surface tension, 14:67a
temperature effects, 13:244b
theories of
seventeenth-century, 12:312b
nineteenth-century, 2:186b; 4:203a;
7:203b, 462a; 8:510b; 10:577b; 11:8b;
13:244a-b
twentieth-century, 7:162a, 208b, 387a;
14:125a
chemical, 9:287b, 291b
turbidity
and molecular weight, 3:620b
vapor pressures, 5:324a; 11:298a-299b;
13:243a
viscosity, 7:518b
volume changes, 4:554b; 14:191a
see also Concentration, Chemical; Electrolytes; Saturation
Solvation, 14:125a
Solvay, Ernest (1838-1922), 12:520b-521;
9:467a
Solvay Congresses, 4:248b; 4:318b, 326a,
579b; 5:272a; 7:154a; 8:11a, 489b,
9:104b, 452b, 525b; 12:521a, 528b;
15:442b, 449b
Solvents
ionization, 14:125a
universal, 7:523a; 10:309b, 11:40b
Solvolyasis, 14:125a
Somailand, 13:552a
Somassidhânta, 15:612a
Somailia, 2:208a
Somerset Coal Canal, 12:487a
Somersetshire
geology, 4:11a; 12:487a-b, 490a-b
Alfred, Solvay established (1861) a small works in the Schaerbeek district of Brussels. Following some small success, and supported financially by the family, the Solvay brothers built, in 1863, a factory at Couillet, near Charleroi; production started in 1865. Solvay patented every stage of the process but granted licenses to soda manufacturers in other countries. In 1872 a license was acquired by Mond, who introduced the Solvay process in England and later achieved great success with it. Solvay’s key contribution to the soda trade was his invention of a carbonating tower in which ammonical brine could be mixed thoroughly with carbon dioxide. By 1890 Solvay had established plants in most European countries, in Russia, and in the United States.

Solvay was a member of the Belgian senate and a minister of state. He founded the Solvay International Institutes of Chemistry, of Physics, and of Sociology. By the terms of Solvay’s gift, the institutes held periodical international conferences at which such broad areas of science as electrons and photons (1928), the solid state (1951), and the origin and structure of the universe were discussed. The names of the participants testify to the quality of the contributions. The 1928 physics congress, for example, was addressed by Bragg, de Broglie, Bohr, Born, Heisenberg, and Schrödinger.

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W. A. CAMPBELL

**SOMERVILLE, MARY FAIRFAX GREIG** (b. Jedburgh, Roxburghshire, Scotland, 26 December 1780; d. Naples, Italy, 29 November 1872), *scientific and mathematical exposition, experimentation on the effects of solar radiation.*

One of the foremost women of science of the nineteenth century, Mrs. Somerville was through her writings and example influential in gaining wider acceptance among a literate public for various nineteenth-century scientific ideas and practices and in opening new opportunities to women. Her notable career, spanning more than half a century, brought her in contact with many of the foremost scientific, literary, and political personages of Europe and America. Public recognition accorded her had profound and beneficial effects in advancing the cause of science and of women’s education and emancipation.

Through her father, Vice-Admiral Sir William George Fairfax, R.N., a hero of the Battle of Camperdown, she was connected with the distinguished Fairfax family of England that produced the great Cromwellian general Sir Thomas Fairfax and the Fairfaxes of the Virginia Colony. Through her mother, Margaret Charters, his second wife, daughter of Samuel Charters, solicitor of customs for Scotland, she was related to several ancient Scottish houses, among them the Murrays of Philiphaugh, the Douglasses of Friarshaw, the Douglasses of Springwood Park, the Charterises of Wemyss, and John Knox.

Fifth of their seven children (only three of whom survived to majority), Mary Fairfax was born in the manse at Jedburgh, the home of an aunt, Martha Charters Somerville, who later became her mother-in-law. Her childhood was spent in Burntisland, a small seaport on the Firth of Forth opposite Edinburgh. In a house sold to the Fairfaxes by Samuel Charters and still standing, her easygoing, indulgent mother thriftily reared four children—the eldest surviving son Samuel, Mary, and two younger ones, Margaret and Henry—on slim navy pay. Customarily in the Charters, as in many well-connected Scottish families, sons received excellent educations, attending university and entering the kirk, the legal profession, or service in the East India Company. For daughters, mastery of social and domestic arts and a minimum of formal book learning was considered sufficient. Mary’s father, returning from a long period of sea duty, was “shocked to find . . . [his daughter] such a savage,” hardly able to read, unable to write, and with no knowledge of language or numbers. He dispatched her, at the age of ten, to a fashionable, expensive boarding school at Musselburgh—a drastic step for a man of such strong Tory convic-
as in the Connection of the Physical Sciences, Mrs. Somerville strongly endorsed the new geology of Lyell, Murchison, Buckland, and their school—a stand that brought her some public criticism.

Twenty-one years later, when she was eighty-nine, her final work, On Molecular and Microscopic Science, appeared in two volumes. It deals with the constitution of matter and the structure of microscopic plants. At this date its science was considered old-fashioned, but young John Murray published it out of loyalty to and affection for its author, on the recommendation of Sir John Herschel, who had also been instrumental in persuading Mrs. Somerville to bring out her Physical Geography. The public received it with kindly interest and deference to its venerable creator. In the same year she was made a member of the American Philosophical Society (she had warm regard for Americans) and completed her autobiography—a vivid and spritely account of her life in Scotland, England, and Italy; of her visits to Switzerland, France, and Germany; and of the many interesting personages she had known. After her death her elder surviving daughter, Martha, published parts of this manuscript as Personal Recollections From Early Life to Old Age of Mary Somerville (1873).

In her later years Mrs. Somerville gave powerful but always temperate support to the cause of the education and emancipation of women. Hers was the first signature on John Stuart Mill’s great petition to Parliament for women’s suffrage, solicited by Mill himself. An early advocate of higher education for women, many of her books were given after her death to the new Ladies College at Hitchin (now Girton College, Cambridge). Somerville College (1879), one of the first two colleges for women at Oxford, is named after her. Although frail and deaf in her last years, Mary Somerville’s spirit and intelligence, her interest in friends, in the cause of women, and in science never faltered. At the time of her death, at ninety-two, she was revising a paper on quaternions.

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ELIZABETH C. PATTERSON

SOMMERFELD, ARNOLD (JOHANNES WILHELM) (b. Königsberg, Prussia [now Kaliningrad, U.S.S.R.], 5 December 1868; d. Munich, Germany, 26 April 1951), theoretical physics.

Sommerfeld’s father, Franz Sommerfeld (1820–1906), had been married to Cácile Matthias (1839–1902) six years when his son Arnold Johannes Wilhelm was born. Franz Sommerfeld had himself been born and raised in Königsberg, where his father, Friedrich Wilhelm Sommerfeld (1782–1862), had been Hof-Post-Sekretär. The family was Protestant; and although Sommerfeld was not religious, he never renounced his faith. “My father, the practicing physician . . . , was a passionate collector of natural objects (amber, shells, minerals, beetles, etc.) and a great friend of the natural sciences”; he was also a member of the semipopular Physikalisch-Ökonomische Gesellschaft in Königsberg. “To my energetic and intellectually vigorous mother I owe an infinite debt,” Sommerfeld also acknowledged in 1917 in his autobiographical sketch. At the humanistic Altstädisches Gymnasium (Collegium Fridericianum) in 1875–
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical Essays</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PREFACE</td>
<td></td>
<td>531</td>
</tr>
<tr>
<td>HISTORY OF MATHEMATICAL ASTRONOMY IN INDIA</td>
<td>David Pingree</td>
<td>533</td>
</tr>
<tr>
<td>MAN AND NATURE IN MESOPOTAMIAN CIVILIZATION</td>
<td>A. Leo Oppenheim</td>
<td>634</td>
</tr>
<tr>
<td>MATHEMATICS AND ASTRONOMY IN MESOPOTAMIA</td>
<td>B. L. van der Waerden</td>
<td>667</td>
</tr>
<tr>
<td>THE MATHEMATICS OF ANCIENT EGYPT</td>
<td>R. J. Gillings</td>
<td>681</td>
</tr>
<tr>
<td>EGYPTIAN ASTRONOMY, ASTROLOGY, AND CALENDRICAL RECKONING</td>
<td>Richard A. Parker</td>
<td>706</td>
</tr>
<tr>
<td>JAPANESE SCIENTIFIC THOUGHT</td>
<td>Shigeru Nakayama</td>
<td>728</td>
</tr>
<tr>
<td>MAYA NUMERATION, COMPUTATION, AND CALENDRICAL ASTRONOMY</td>
<td>Floyd G. Lounsbury</td>
<td>759</td>
</tr>
</tbody>
</table>
Table of Contents

Contributors XI
List of Scientists by Field XXXVII
List of Nobel Prize Winners LIII
List of Articles LV
Index 1
<table>
<thead>
<tr>
<th>List of Scientists by Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abel, Niels Henrik</td>
</tr>
<tr>
<td>Adams, John Frank</td>
</tr>
<tr>
<td>Agnesi, Maria Gaetana</td>
</tr>
<tr>
<td>Ahlfors, Lars</td>
</tr>
<tr>
<td>Albert of Saxony</td>
</tr>
<tr>
<td>Apollonius of Perga</td>
</tr>
<tr>
<td>Archimedes</td>
</tr>
<tr>
<td>Arf, Cahit</td>
</tr>
<tr>
<td>Argyrus, Isaac</td>
</tr>
<tr>
<td>Babbage, Charles</td>
</tr>
<tr>
<td>Bacon, Roger</td>
</tr>
<tr>
<td>Baldi, Bernardino</td>
</tr>
<tr>
<td>Bernoulli, Jakob (Jacob, Jacques, James) I</td>
</tr>
<tr>
<td>Bers, Lipmann</td>
</tr>
<tr>
<td>Birkhoff, Garrett</td>
</tr>
<tr>
<td>Bogolubov, Nikolai Nikolaevich</td>
</tr>
<tr>
<td>Borel, Armand</td>
</tr>
<tr>
<td>Borrelli, Giovanni Alfonso</td>
</tr>
<tr>
<td>Bourbaki, Nicolas</td>
</tr>
<tr>
<td>Bradwardine, Thomas</td>
</tr>
<tr>
<td>Calderón, Alberto Pedro</td>
</tr>
<tr>
<td>Cantor, Georg Ferdinand Ludwig</td>
</tr>
<tr>
<td>Cardano, Girolamo</td>
</tr>
<tr>
<td>Cauchy, Augustin-Louis</td>
</tr>
<tr>
<td>Chandrasekhar, Subrahmanyan</td>
</tr>
<tr>
<td>Chern, Shing-Shen</td>
</tr>
<tr>
<td>Chevalley, Claude</td>
</tr>
<tr>
<td>Clavius, Christoph</td>
</tr>
<tr>
<td>Coignet, Michiel</td>
</tr>
</tbody>
</table>

**MATHEMATICS**

- d'Alembert (Dalembert, D'Alembert), Jean Le Rond
- de Finetti, Bruno
- De Giorgi, Ennio
- Descartes, René Du Perron
- Didymus
- Dieudonné, Jean
- Dijkstra, Wybe Edsger
- Dodgson, Charles Lutwidge
- Ehrenfest-Afanaseva, Tatiana A.
- Eilenberg, Samuel
- Erdős, Paul
- Euler, Leonhard
- Farey, John
- Feit, Walter
- Fisher, Ronald Aylmer
- Forsythe, George Elmer
- Frege, Friedrich Ludwig Gottlob
- Gödel, Kurt Friedrich
- Gorenstein, Daniel
- Grossmann, Marcel
- Hall, Philip
- Hamilton, William Rowan
- Harish-Chandra
- Harriot (or Harriot), Thomas
- Hartree, Douglas Rayner
- Hausdorff, Felix
- Hero of Alexandria
- Hilbert, David
- Hipparchus
- Hirst, Thomas Archer
- Hondius, Jodocus
- Hypatia
- Ibn al-Haytham, Abu 'Ali al-hasan
- Ibn al-hasan
- Ibrāhīm Ibn Sinān Ibn Thābit Ibn Qurra
- Ingemar, Vicente
- Jeffreys, Harold
- Jungius, Joachim
- Keldysh, Matrlslav Vsevolodovich
- Kepler, Johannes
- King, Ada Augusta, the Countess of Lovelace
- Kodaira, Kunihiko
- Kolmogorov, Andrei Nikolaevich
- Kovalevskaya, Sof'ya Vasilyevna (Sonya)
- Ladyzhenskaya, Olga Alexandrovna
- Lanz, José María de
- Leibniz, Gottfried Wilhelm
- Leray, Jean
- Lichtenrowicz, André
- Lie, Sophus
- Lions, Jacques-Louis
- Mac Lane, Saunders
- Mauchly, John William
- Maupertuis, Pierre Louis Moreau de
- McCrea, William Hunter
- McVittie, George Gunliffe
- Milanković, Milutin
Mataré, Herbert, 1:180–181
Matematicheskaiia teoriia optimalnykh protsessov (Pontryagin), 6:128
Materialism, 2:80
Materials for the Study of Variation (Bateson), 1:210–211
Materials science, 2:161–163
Maternal genes, 1:399–400
Mathematical analysis
celestial mechanics, 5:197–198
computer science, 3:350, 4:319–320
functions, 2:421–422, 5:198–199
integrals, 2:76
Lie groups, 2:119–120
perimeters, 2:258–259
rigor in, 1:6–7
scheme theory, 2:292
See also specific concepts and branches of Mathematics
Mathematical Analysis and Numerical Methods for Science and Technology (Lions), 4:320
The Mathematical Analysis of Logic (Frege), 3:70
Mathematical biology, 3:415
Mathematical geology, 4:164
Mathematical logic
arithmetic, 6:265–267
computer science, 7:82–84
development, 7:10–11
Mathematical modeling
catalysis, 1:354–355
oceanography, 6:256–257
Mathematical models
consciousness, 2:382
visual perception, 2:382
The Mathematical Papers of Isaac Newton (Whiteside), 5:268–269, 270
Mathematical Psychics (Edgeworth), 5:188
Mathematical psychology, 7:91–96
Mathematical Psychology of War (Richardson), 6:240
The Mathematical Theory of Black Holes (Chandrasekhar), 2:92
A Mathematical Theory of Communication (Shannon), 6:424, 426
A Mathematical Theory of Cryptography (Shannon), 6:426
The Mathematical Theory of Optimal Processes (Pontryagin), 6:128
Mathematical Theory of the Differential Analyzer (Shannon), 6:425
Mathematica-Deductive Theory of Rote Learning (Hull), 3:408
Mathematics
actuarial science, 6:564, 566
of aerodynamics, 5:335–336
analysis and synthesis, 3:285
Arabic, 1:46–47, 4:4–5, 6:185–186, 187
in Argentina, 4:202
atmospheric science, 6:469–472
calculators, 1:128
computer science and, 1:286–288, 3:356–357, 7:82–84
cosmology and, 5:81
cryptography, 6:426–427
discrete, 2:403–406
dynamic meteorology, 6:558–561
design and publishing, 1:348–349
education, 2:151–152, 5:1–2, 7:281
Galilean School, 1:349
Greek, 1:83–84, 3:283
history of, 1:166
homology, 2:360–363, 5:2–3
influential textbooks, 5:2
information theory, 6:424, 429
Institutiones mathematicae (Kircher), 4:131
instrumentation, 2:157–158
introductory textbooks, 1:19–21
intuitionistic, 4:150–152
Islamic, 7:87–89
Jesuits, 2:148–149
Judaism, 6:564–565
limits of, 3:278–279
linear programming, 7:80–82
logic and, 1:144–145, 3:130–132, 5:3–4
magic squares, 5:196
meteorology, 6:238–239
Newtonian theory of gravity and, 5:56–57
Paris Problems, 3:308–310
philosophy, 3:435–437, 7:278
physics and, 4:249, 6:489–490, 491
in Portugal, 5:178
professionalization of, 2:34
pure, 2:272
research, 3:326–327
Rudolphine Tables (Kepler), 4:106–107
science and, 5:269
statistical mechanics, 2:356–357
symbolic logic, 2:310–311
theoretical physics, 1:316–318
vision, 1:145–146
See also specific concepts and branches of Mathematics
Mathematische Analyse des Raumproblems (Weyl), 7:277
Mathematische Begriffsbildungen zur Gravitationstheorie (Grossmann and Einstein), 3:192
Mather, Kenneth, 4:276
Mather, Stephen, 2:189
Matijasević, Yuri Vladimirovich, 6:267
Matilda effect, 7:1–2
NEW DICTIONARY OF SCIENTIFIC BIOGRAPHY
115