

CONTENTS

PARTS I AND II

	PAGES
PREFACE	X-XV
LIST OF ILLUSTRATIONS.	xxxiv-xxxv
INTRODUCTORY CHAPTER	3-30
I. Reminiscences, 3	
II. Structure of This Work and How to Use It, 7	
III. Purpose and Spirit of This Work, 8	
IV. The Period Dealt With: the Fourteenth Century, 10	
V. The Subject Dealt With: Science and Learning, 15	
VI. Four Guiding Ideas, 19: 1. The idea of unity, 19. 2. The humanity of science, 20. 3. The great value of Eastern thought, 20. 4. The supreme need of toleration and charity, 22	
VII. The Practical Value of Historical Research, 25	
VIII. Principles of Selection, 26	
IX. Bibliographic Basis, 26	
X. Errors of This Work and Their Correction, 26	
XI. The Author Expresses His Gratitude, 28	
Appendix: Notes on the Transcription of Various Languages	31-33
1. Arabic, 31. 2. Chinese, 31. 3. Czech, 31. 4. Greek, 31. 5. Hebrew, 32. 6. Icelandic, 32. 7. Japanese, 32. 8. Korean, 32. 9. Persian, 32. 10. Polish, 32. 11. Russian, 32. 12. Sanskrit, 32. 13. Syriac, 32. 14. Turkish, 32.	

PART I

The Time of Abū-l-Fidā', Levi ben Gerson, and William of Occam (First half of the fourteenth century)

CHAPTER I

SURVEY OF SCIENCE AND INTELLECTUAL PROGRESS IN THE FIRST HALF OF THE FOURTEENTH CENTURY

37-390

I. General Background, 37	
II. Religious Background, 43: A. Western Christendom, 43: 1, The government of the church, 43; 2, The Crusades, 45; 3, Trial of the Templars, 46; 4, Religious orders, 47; 5, Regulars versus seculars, 47; 6, Biblical commentaries and homiletic writings, 48; 7, Apologetic writings, especially those written against heresies, 48; 8, Criticism of the church. Early reformers vs. conservatives, 50. B. The Byzantine church, 52: 9, Union of the churches, 52; 10, Defense of the Orthodox faith, 53. C. Other Eastern Christian churches, 53: 11, Missionary efforts, 53; 12, Nestorian church, 54; 13, Coptic church, 55. D. Israel, 55: 14, Biblical and Talmudic commentaries. Homiletics, 55; 15, Persecutions of the Jews, 56. E. Islām, 57: 16, Muslim brotherhoods, 57; 17, Explanation of the Qur'ān, 58; 18, Puritanism or fundamentalism in Islām, 58; 19, Muslim apologetics, 58. F. Buddhism, 59: 20, Buddhism in Ceylon and Burma, 59; 21, Chinese Buddhism, 59; 22, Japanese Buddhism, 59. G. Hinduism, 60: 23, Rāmānanda, 60	

CHAPTER I—Continued

PAGES

- III. The Translators, 60: 1. Arabic, 60: 1a, From Arabic into Latin, 60; 1b, From Arabic into Italian, 61; 1c, From Arabic into Spanish or Portuguese, 61; 1d, From Arabic into Hebrew, 61; 1e, From Arabic into Aethiopian, 62. 2. Persian, 62: 2a, From Persian into Greek, 63; 2b, From Persian into Armenian, 63; 2c, From Persian into Turkish, 64. 3. Greek, 64: 3a, From Greek into Latin, 64; 3b, From Greek into Hebrew, 64. 4. Latin, 64: 4a, From Latin into Hebrew, 64; 4b, From Latin into French, 65; 4c, From Latin into Italian, 66; 4d, From Latin into Dutch, 66; 4e, From Latin into German, 66; 4f, From Latin into Icelandic, 66; 4g, From Latin into Greek, 66; 4h, From Latin into Armenian, 66. 5. Hebrew, 67: 5a, From Hebrew into Latin, 67; 5b, From Hebrew into French, 67; 5c, From Hebrew into Arabic, 67. 6. French, 67: 6a, From French into English, 68; 6b, From French into Dutch, 68; 6c, From French into Italian, 68; 6d, From French into Latin, 68. 7. Spanish (Castilian) and Catalan, 68: 7a, From Spanish into Latin, 68; 7b, From Castilian into Italian, 68; 7c, From Castilian into Portuguese, 68. 8. Sanskrit, 68: 8a, From Sanskrit into Persian, 69; 8b, From Sanskrit into Telugu, 69; 8c, From Canarese into Telugu, 69; 8d, From Sanskrit into Chinese, 69. 9. Tibetan, 69: From Tibetan into Mongolian, 69. 10. Conclusions, 69. Appendix, 71
- IV. Education, 71: A. Christendom, 71: 1, Introductory remarks, 71; 2, Creation of new universities, 72; 3, English colleges, 72; 4, Parisian colleges, 72; 5, Educational reforms, 72. B. Israel, 73. C. İslām, 74. D. Far East, 74
- V. Philosophical and Cultural Background, 75: 1. Definition, 75. 2. The need of unity, encyclopaedic tendencies, classification of the sciences, 76. 3. Internationalism or universalism of mediaeval philosophy, 78. 4. The Book of sentences, 79. 5. Nominalism vs. logical realism, 81. 6. Rationalism in Jewish, Muslim, and Christian philosophies, 83. 7. Mystical reaction, 84
8. Philosophical and cultural background of various countries, 85: A. Western Christendom, 86: A1, Italy, 86; A2, Spain, 89; A3, France, 89; A4, England, 90; A5, Germany, 92; A6, Flanders, 93; A7, Iceland, 94; A8, Alia, 94. B. Eastern Christendom, 94: B1, The Latinizing party, 94; B2, The Hesychasts, 95; B3, Other Byzantine theologians or philosophers, 97; B4, Theologians of other Eastern churches, 97. C. Israel, 98: C1, Southern France, 98; C2, Spain, 99; C3, Italy, 101; C4, Eastern Jews, 101. D. İslām, 101: D1, Yaman, 102; D2, Mamlük, 102; D3, Anatolia, 104; D4, 'Irāq, 105; D5, Irān, 106; D6, Muslim India, 107. E. Hindu India, 107. F. China, 107. G. Japan, 109
- VI. Mathematics and Astronomy, 110: A. Western Christendom, 110: A1, Italy, 110; A2, France, 113; A3, England, 116; A4, Germany, 117; A5, Netherlands, 118; A6, Scandinavia, 119; A7, Catalonia, 119. B. Eastern Christendom, 119. Note on mediaeval accounting in Europe, 124: Italy, 124; Germany, 125; France, 125; England, 126; Flanders, 126; double-entry bookkeeping, 126; state accounting, 126; use of Hindu numerals, 127. C. Israel, 128: C1, Provence, 128; C2, Spain and Morocco, 130; C3, Eastern Jews, 131. D. İslām, 131: D1, Maghrib, 132; D2, Spain, 132; D3, Mamlük, 133; D4, Persia, 134; D5, 'Irāq, 136; D6, Tūrān, 136. E. India, 137. F. China, 137
- VII. Physics, Technology, and Music, 140: 1. Optics and optical meteorology, 141. 2. Weights and measures, 143. 3. Magnetism, 143. 4. Early mechanical clocks, 143. 5. Arms and armor, 144. 6. Development of printing in the East, 144. 7. Hydrostatics, 145. 8. Canals, 145. 8 bis. Metallurgy and mining, 145. 9. Mechanical theories, 145. 10. Discussions concerning the vacuum, 148. 11. Various technical improvements and their social impact, 150: Western guilds, 152: generalities for the Western guilds, 152, Italy, 152, France, 153, England, 153, Netherlands, 153, Germany, 153, Switzerland, 153, Spain, 153; Islamic guilds, 153;

CHAPTER I—Continued

PAGES

Guilds in India, 155; Chinese guilds, 155; Japanese guilds, 156; Particular inventions, 156.	12. Musical theories, 158: A, In the Latin West, 158;	B, Byzantine music, 160; C, Muslim music, 163																				
VIII. Chemistry, 165: 1. Alchemical traditions, 165.	2. Treatises on colors, 168.	3. Manufacture and use of glass, 170.	4. Manufacture and use of paper, 174.	5. Discovery of new chemical substances, 177.	6. Alchemists in the Latin West, 177: A, Italy, 177; B, England, 178; C, France, 178; D, Catalonia, 178.	7. Byzantine alchemy, 179.	8. Muslim alchemy, 179.	9. Alchemy in Buddhist Asia, 180														
IX. Geography, 181: A. Latin West, 182:	A1, Italy, 182: portolani, 182, expeditions to the Madeira, Canaries, and Azores islands, 183, travelers to the Near East, 185, East Africa, 186, Middle East, 186, China, 186, geographical thought, 187; A2, France, 189; A3, Spain, 190; A4, Western Isles, 190; A5, Germany, 191; A6, Knowledge of antipodal and polar regions, 192; Practical knowledge of the Arctic, 193.	B. Byzantine geography, 197.	C. Jewish geography, 198.	D. Muslim geography, 199: D1, Mamlük geography, 199; D2, Geography in 'Irāq, 201; D3, Geography in Persia and in Persian, 202; D4, Geography in the Maghrib, 202.	E. Geography in the Far East, 203: 1, Relations between the Far East and the West, 203; 2, The place of geography in Chinese learning. Topographical literature, 204; 3, Cartography, 204; 4, Descriptions of foreign countries, 205; 5, Relations between China and other parts of the East, 205																	
X. Natural History, 206: <i>Geographical survey</i> , 206:	A. Latin Christendom, 206: A1, Italy, 206; A2, Spain and Portugal, 207; A3, France, 207; A4, Germany, 207.	B. Byzantium, 208.	C. Armenia, 208.	D. Israel, 208.	E. İslām, 208: E1, Maghrib, 208; E2, Yaman, 209; E3, Mamlük, 209; E4, Persia, 210.	F. China, 210																
	<i>Special subjects</i> , 211: 1. General surveys. Theory of evolution, 211.	First Kingdom: Minerals, 213: 2. Geological theories, 213.	3. Lapidaries, 214.	4. Earthquakes and volcanoes, 214.	5. Mining and metallurgy, 217: England, 218; France, 219; German lands, 219; Scandinavia, 219; iron, 220; coal, 220.	Second Kingdom: Plants, 221: 6. Herbals, 221.	7. Botanic gardens, 224.	8. Plant iconography, 225.	9. Husbandry, 227.	10. Spices, 229.	Third Kingdom: Animals, 231: 11. Falconry, 231: Note on falconry in ancient China, contributed by Dr. A. W. Hummel, 233.	12. Fishing, 234.	13. Special animals, 238.	14. Translations of books on natural history, 240								
XI. Medicine, 240: <i>Geographical survey</i> , 241:	A. Latin Christendom, 241: A1, Italy, 241; A2, Hispanic peninsula, 245; A3, France, 246; A4, England, 249; A5, Belgium, 250; A6, Germany, 251.	B. Christian East, 252: B1, Byzantium, 252; B2, Armenia, 253.	C. Western Jews, 254: C1, Southern France, 254; C2, Hispanic peninsula, 255; C3, Italy, 256.	D. Eastern Jews, 256.	E. Western Muslims, 257.	F. Eastern Muslims, 257.	G. India and Tibet, 259.	H. China, 259.	J. Japan, 263													
	<i>Topical survey</i> , 263: 1. Medical astrology, 263.	2. Translations and commentaries, 264.	3. Literary and scholastic background, 264.	4. Anatomy, 265.	5. Physiology, 267.	6. Embryology and obstetrics, 268.	7. Anatomical (and medical) iconography, 269.	8. Physiognomy, 270.	9. Surgery, 271.	10. Eye diseases, 273.	11. Various diseases, 274.	12. Lepers and cagots, 275; Leprosy in Asia, 280.	13. Famines, 281.	14. Veterinary medicine, 284.	15. Regimina et consilia, 285.	16. Balneology, 286.	17. Pharmacy, 288.	18. Medical teaching and profession, 290.	19. Faith healing, 291.	20. Medical deontology, 292.	21. Hospitals, 293.	22. Erotics, 296
XII. Historiography, 296:	A. Western Christendom, 297: A1, Italy, 297: (a) chroniclers, 297, (b) missionaries and diplomats, 297, (c) historians, 298, (d) historians of science and culture, 298, (e) archaeologists and humanists, 298; A2, Hispanic peninsula, 299; A3, France, 300; A4, Germanic countries, 301; A5, Low Countries, 302; A6, Bohemia, 302; A7,																					

CONTENTS

CHAPTER I—Continued

PAGES

- | | |
|--|-----|
| England, 302; A8, Ireland, 303; A9, Scandinavia, 303. B. Eastern Christendom, 303: B1, Byzantine historiography, 303; B2, Armenian historiography, 304; B3, Georgian (or Iberian) historiography, 304; B4, Monophysite and Nestorian historiography, 306; B5, Abyssinian historiography, 306. C. Western Islām, 306. D. Eastern Islām, 307: D1, Arabia, 307; D2, Mamlūk, 307; D3, 'Irāq, 309; D4, Persians (writing in Persian), 309. E. Ceylon, 310. F. China and Korea, 310. G. Japan, 311
XIII. Law and Sociology, 312: A. Christian West, 313: A1, Italy, 313; A2, Spain and Catalonia, 315; A3, France, 316; A4, Germanic countries, 319; A5, England, 319; A6, Pays de Liège, 320. B. Christian East, 320: B1, Byzantine law, 320; B2, Abyssinian law, 320. C. Western Israel, 320. D. Eastern Islām, 321: D1, Mamlūk, 321; D2, 'Irāq and farther east in the Dār al-Islām, 321. E. India and Burma, 322. F. China, 322. G. Japan, 322
Additional notes, 322: 1. Internationalism of trade, 322. 2. Economic power of the church, 325 | 311 |
| XIV. Philology, 328: 1. The linguistic situation, 328. 2. Latin, 330. 3. Italian, 335. 4. Castilian (Spanish), 337. 5. Provençal, 338. 6. Catalan, 342. 7. Portuguese, 343. 8. French, 344; French in England, 347. 9. English, 349. 10. Dutch, 349. 11. German, 350. 12. Scandinavian, 351. 13. Greek, 352. 14. Slavonic languages, 355. 15. Armenian, 356. 16. Georgian, 356. 17. Syriac, 356; Syriac script, 359. 18. Coptic, 360. 19. Aethiopic, 362. 20. Hebrew, 363; Hebrew studies in the West, 369. 21. Arabic, 370; Arabic studies in the West, 374. 22. Persian, 375. 23. Turkish, 378. 24. Mongolian, 379. 25. Manchu, 381. 26. Sanskrit and Pāli, 382. 27. Dravidian languages, 383. 28. Tibetan, 384. 29. Chinese, 385. 30. Korean, 387. 31. Japanese, 389. Final remarks, 390 | 328 |

CHAPTER II

RELIGIOUS BACKGROUND (First Half of the Fourteenth Century)

391–425

- A. Western Christendom, 391: 2. Propaganda for the Crusades, 391: Pseudo Brocard, 391; Galvano de Levanto, 392. 3. The trial of the Templars, 393. 4. Religious orders, 395: The Olivetans, 395; the Spirituals, 396. 6. Biblical and homiletic writings, 397: Nicholas of Lyra, 397. 7. Apologetic writings, especially those directed against heresies, 400: Guiu Terrena, 400; Alvaro Pelayo, 401; Bernard Gui, 403; Witchcraft, 405. 8. Criticism of the church. Early reformers vs. conservatives, 406: Hugh of Newcastle, 406; Pierre Dubois, 407; Bernard Délicieux, 412; Guillaume Durant le Jeune, 413
- B. Byzantine Church, 414: 10. Defense of the Orthodox faith, 414: Andronicos of Constantinople, 414
- C. Other Eastern Christian Churches, 414: 11. Missionary efforts, 414: William Adam, 414
- D. Israel, 416: Bahya ben Asher, 416; Abudraham, 417; Abner of Burgos, 417; David ben Samuel Kokabi, 419; Israel ben Samuel Ma'arabi, 419
- E. Islām, 420: Muslim mystical brotherhoods, 420; Ibn Taimiya, 421
- F. Buddhism, 422: Vedeha, 422; Nien Ch'ang, 423; Shunjō Hōin, 424
- G. Hinduism, 425: Rāmānanda, 425

CHAPTER III

THE TRANSLATORS (First Half of the Fourteenth Century)

426–469

- 1a. Translations from Arabic into Latin, 426: Stephanus Arlandi, 426
- 1c. Translations from Arabic into Catalan, 427: Judah Bonsonyor, 427
- 1d. Translations from Arabic into Hebrew, 428: Moses ben Solomon of Beaucaire, 428; Samson ben Solomon, 428; Qalonymos ben David the Elder, 428;

CHAPTER III—Continued

PAGES

- Qalonymos ben Qalonymos, 429; Samuel ben Judah of Marseille, 433; Todros Todrosi, 435; Solomon Bonirac, 436; Solomon ben Pater, 436; Isaac ben Nathan of Cordova, 436; Samuel ben Solomon ha-Me'ati, 437
- 1e. Translation from Arabic into Aethiopian, 437: Salāmā, 437
 - 2a. Translations from Persian into Greek, 438: Gregorios Chioniades, 438; Georgios Choniates, 438
 - 3a. Translations from Greek into Latin, 439: Pietro d'Abano, 439; Niccold da Reggio, 446
 - 3b. Translations from Greek into Hebrew, 448: Shemariah ben Elijah ha-Iqrīṭi, 448
 - 4a. Translations from Latin into Hebrew, 449: Israel ben Joseph Caslari, 449; Judah ben Moses ben Daniel, 449; Hezekiah bar Ḥalafta, 450; Samuel Benveniste, 451; David ben Yom-tob ben Bila, 451
 - 4b. Translations from Latin into French, 452: Jean de Prouville, 452; Pierre de Paris, 452; Arnold of Quinempoix, 453; Pierre Bersuire, 454; Note on the *Gesta Romanorum*, 455; Nicolas de La Horbe, 456; Jean de Vignai, 457
 - 4g. Translations from Latin into Greek, 459: Guillaume Bernard, 459
 - 4h. Translations from Latin into Armenian, 459: Bartholomew of Bologna, 459; Jacob the Dragoman, 460; Nerses Balli, 460
 - 5a. Translation from Hebrew into Latin, 461: Johannes de Planis, 461
 - 6a. Translations from French into English, 461: Robert Mannyng, 461; Michael of Northgate, 462
 - 6c. Translations from French into Italian, 463: Zuccherio Bencivenni, 463
 - 7a. Translations from Spanish into Latin, 464: Raimond de Béziers, 464
 - 8a. Translations from Sanskrit into Persian, 464: Nakhshabi, 464
 - 8b. Translations from Sanskrit into Telugu, 465: Errāpragada, 465
 - 8d. Translations from Sanskrit into Chinese, 466: The Chinese Tripitaka, 466
 9. Translations from Tibetan (?) into Mongolian, 468: The Mongolian Tripitaka, 468

CHAPTER IV

EDUCATION (First Half of the Fourteenth Century)

470-478

- A. Christendom, 470: Creation of new universities, 470: Rome (1303), 470; Avignon (1303), 470; Perugia (1308), 470; Treviso (1318), 471; Cahors (1332), 471; Grenoble (1339), 471; Pisa (1343), 471; Prague (1347), 471; Florence (1349), 472; Perpignan (1350, 1379), 472. The colleges of Oxford and Cambridge, 473: Oxford colleges, 473: Exeter (1314-16), 474, Oriel (1324), 474, Queen's (1341), 474; Cambridge colleges, 475: King's Hall (before 1316), 475, Michaelhouse (1324), 475, University or Clare Hall (1326), 475, Pembroke (1347), 475, Gonville (1349), 475, Trinity Hall (1350), 475. Parisian colleges, 476: Collège du Cardinal Lemoine, 476, Collège de Navarre, 476, Collège de Montaigu, 476, Collège de Tréguier, 477. Grammar schools, 477
- D. Far East, 477: The Kanazawa-Bunko, 477; Soseki, 478

CHAPTER V

PHILOSOPHICAL AND CULTURAL BACKGROUND (First Half of the Fourteenth Century)

479-637

- A. Western Christendom, 479: A1. Italy, 479: Dante (1265-1321), 479; Jacopo Alighieri, 500; Francesco Petrarca (1304-74), 502; John of Naples, 518; Graziadei d'Ascoli, 517; Alexander of Alexandria, 517; Gerard of Bologna, 518; Gregorio da Rimini, 518; Urbano of Bologna, 519. A2. Spain, 519: Antonius Andreæ, 519; Bernat Oliver, 520; Alfonsus Vargas Toletanus, 520. A3. France, 521: Hervé Nédélec, 521; Durand of Saint Pourçain, 522; Durand d'Aurillac, 526; Palu, 526; Auriol, 528; Meyronnes, 529; Du Four, 531; Bonet, 532; Deguileville, 532; Mirecourt, 533; Raoul Le Breton, 534;

CONTENTS

CHAPTER V—Continued

PAGES

- | | |
|--|--|
| Jean de Pouilli, 534; John of Jandun, 535; Buridan, 540; Le Miesier, 546; Autrecourt, 546; Jean Bonnet, 547. A4. England, 549: Bassoles, 549; Occam, 549; John Rodington, 557; Adam Wodeham, 557; Jorz, 557; Sutton, 558; Holcot, 559; Bury, 560; Baconsthorpe, 561; Faversham, 562; Burley, 563; Dumbleton, 564; Heytesbury, 565; Rolle, 566. A5. Germany, 568: Berthold of Mosburg, 568; Eckhart, 568; Tauler, 571; <i>Theologia Deutsch</i> , 572; Suso, 573; Engelbert of Admont, 575; Thomas of Strassburg, 577; Eberhard von Wampen, 578; Boner, 579. A6. Flanders, 580: Ruysbroeck, 580. A8. Alia, 582: Popular encyclopaedias, 582 | |
| B. Eastern Christendom, 583: B1. Latinizing Byzantine theologians, 583: Barlaam, 583; Gregory Acindynos, 587. B2. Anti-Latin Hesychasts, 587: Nicephoros Chumnos, 587; Palamas, 588. B3. Other Byzantine philosophers, 589: Magentinos, 589 | |
| C. Israel, 589: C1. Jews in southern France, 589: Joseph Kaspi, 589; Jedaiah ben Abraham ha-Bedersi, 593; Levi ben Gerson (1288-1344), 594; Moses ben Joshua of Narbonne, 607; Judah ben Isaac Cohen, 609; Abba Mari ben Moses, 609. C2. Jews of Spain, 610: Vidal de Tolosa, 610; Mūsā ibn Tūbī, 611; Isaac ben Jacob ha-Kohen, 611; Shem-tob ben Abraham ibn Gaon, 612; Elhanan ben Abraham, 612; Joseph ben Abraham ibn Waqar, 613; Judah ben Asher, 613; Jacob ben Asher, 614. C3. Italian Jews, 615: Immanuel ben Solomon of Rome, 615. C4. Eastern Jews, 616: Isaac ben Samuel of 'Akkā, 616; 'Abd al-Dā'yim, 616; Aaron ben Elijah the Qaraite, 617 | |
| D. Islām, 619: D1. Yaman, 619: al-Mu'ayyad billāh, 619; al-Yāfi'I, 619. D2. Mamlūk kingdom, 620: al-Nuwairī, 620; 'Alī al-Subkī, 622; Ibn Rajab, 623; al-Khallāl, 623. D3. Anatolia, 623: 'Ashiq Pāshā, 623; Yūnus Emre, 625; Gūlshehřī, 625; al-Qaiṣarī, 626. D4. 'Irāq, 626: Ibn al-Muṭahhar al-Hillī, 626; 'Abd al-Razzāq, 627. D5. Īrān, 628: Ṣadr al-Shari'a al-Thāni, 628; al-Iji, 628; al-Tahtānī, 629; Ḥamḍallāh Mustawfī, 630; Muḥammad ibn Maḥmūd al-Āmīlī, 632. D6. Muslim India, 633: al-Multānī, 633 | |
| E. Hindu India, 634: Medhampkara, 634; Raṭṭa-kavi, 634 | |
| F. China, 634: Wu Ch'ēng, 634; Hsü Ch'ien, 635; Ch'én Hao, 635. Korea, 635: Li Ch'i-hsien, 635 | |
| G. Japan, 636: Gen-e, 636; Early printing in Japan, 637 | |

CHAPTER VI

MATHEMATICS AND ASTRONOMY (First Half of the Fourteenth Century) . . . 638-703

- | | |
|---|--|
| A. Western Christendom, 638: A1. Italy, 638: Jacob of Florence, 638; Paolo Dagomari, 639; Commercial arithmetic in Italy, 640; John of Genoa, 641; Hugh of Città di Castello, 641; Dominicus de Clavasio, 641; Cecco d'Ascoli, 643; Rubertis, 645; Paganica, 645; Andalò di Negro, 645; Augustine of Trent, 648; Thaddeus of Parma, 648. A2. France, 649: Jean de Linières, 649; Jean de Meurs, 652; Pierre Vidal, 657; Firmin de Beauval, 657; John of Bassigny, 659; Geoffroi of Meaux, 659. A3. England, 660: Mauduit, 660; Odington, 661; Wallingford, 662; Bradwardine, 668; Popular geometry in England, 671; Ashendon, 672; Bredon, 673; Merle, 674; Robert of York, 675. A4. Germany, 676: John of Saxony, 676. A5. Netherlands, 678: Henry of Bruxelles, 678; Note on civil calendars in Hainaut, 678. A6. Scandinavia, 678: Haukr Erlendsson, 678 | |
| B. Eastern Christendom, 679: Moschopulos, 679; Rhabdas, 681; Pediasimos, 682; Theodoros Metochites, 684; Chrysococces, 688; Catrarios, 690 | |
| C. Israel, 690: C1. Provençal Jews, 690: Abba Mari ben Eligdor, 690. C2. Spanish Jews, 691: Isaac Israeli the Younger, 691; Solomon ben Abraham Corcos, 692; Joseph ben Joseph Nahmias, 692; Isaac ben Pulqar, 693. C3. Eastern Jews, 693 | |
| D. Islām, 694: D1. Maghrib, 694: Muḥammad ibn Ibrāhīm al-Abullī, 694; 'Abd al-'Azīz ibn 'Alī al-Huwārī, 694; Muḥammad ibn al-Jazūlī, 695; Abū Muqrī', 695. D2. Spanish Muslims, 695: Ibn al-Raqqām, 695; Ibn Bāṣa, 696. D3. | |

CHAPTER VI—Continued

- Mamlük, 696; Muhammad ibn Sam'ún, 696; al-Mizzí, 696; al-Karakí, 697.
 D4. Persia, 697: al-Abhári, 697; al-Kāsháni, 698; Niżám al-A'rāj, 698;
 Shams al-dín Mírák, 699; al-Jaghmíni, 699. D5. Irāq, 700. D6. Túrān,
 700: al-Jūzjáni, 700
 E. India, 700
 F. China, 701: Chu Shih-chieh, 701; Chao Yu-ch'in, 703

CHAPTER VII**PHYSICS, TECHNOLOGY, AND MUSIC (First Half of the Fourteenth Century). 704-749**

1. Optics and Optical Meteorology, 704: Dietrich of Freiberg, 704; Kamál al-dín al-Fárisí, 707; Note on al-Qaráfi (XIII-2), 708; Early observations of aurora borealis, 709
2. Weights and Measures, 711: Metrology in the Far East, 713
3. Magnetism, 714: The discovery of the compass, 714
4. Early Mechanical Clocks, 716: Measurement of time in mediaeval Europe, 716; Early clocks, 717
5. Arms and Armor, 722: The invention of firearms, 722; Note on dinanderie, 727; monumental brasses, 728
6. Development of Printing in the East, 729: Block printing in the Far East and Central Asia, 729; Block printing in Egypt, 732; Development of typography in China, 733
7. Hydrostatics, 735: De incidentibus aquae, 735
8. Canals, 735
9. Mechanical Theories, 736: Ceffons, 736; Swineshead, 736; Francis of Marchia, 738; Giovanni da Casale, 739; John the Canon, 739
11. Various Technical Improvements and Their Social Import, 740
12. Musical Theories, 740: A. In the Latin West, 740: Marchettus, 740; Handlo, 741; Spechtshart, 741; Vitry, 742; Guillaume de Machaut, 744. B. Byzantine music, 745: Manuel Bryennios, 745. C. Muslim music, 746: al-Khaṭib al-Irbilī, 746; 'Abd al-'Azīz ibn Sarāyā al-Hillī, 749; Ibn Karī, 749

CHAPTER VIII**CHEMISTRY (First Half of the Fourteenth Century)**

750-761

6. Alchemists in the Latin West, 750: Buono, 750; Dastin, 752
7. Byzantine Alchemy, 753
8. Muslim Alchemy, 755: 'Abdalláh ibn 'Alí al-Kāsháni, 755; Additional notes on Mesopotamian and Chinese documents concerning the manufacture of glazes and ceramics, 757; al-Jildákí, 758
9. Alchemy in Buddhist Asia, 760: Lu Yu, 760; Ch'en Kuan-wu, 760; Ch'un Ch'un, 761

CHAPTER IX**GEOGRAPHY (First Half of the Fourteenth Century)**

762-810

- A. Latin West, 762: A1. Italy, 762: Vesconte, 762; Carignano, 764; Note on the so-called Tammar Luxoro atlas, 764; Dalorto and Dulcert, 765; Opicinus de Canistris, 766; Nicoloso da Recco, 768; James of Verona, 768; Marino Sanudo il Vecchio, 769; Pegolotti, 771; Note on Francesco Datini (d. 1410), 774; Niccolò da Poggibonsi, 774; John of Cora, 775; Peregrine of Castello, 776; Odoric of Pordenone, 777; Andrew of Perugia, 780; Savignone, 780; Mari-gnolli, 781. A2. France, 783: Jordan Catala de Séverac, 783. A3. Spain, 785: Pascal of Vitoria, 785; Jaime Ferrer, 785; Libro del conosçimiento, 786. A4. Western Isles, 787: Symon Simeonis, 787. A5. Germany, 787: William of Boldensele, 787; Ludolf of Sudheim, 788; Rudolf of Frameinsberg, 789

CONTENTS

CHAPTER IX—Continued

- | | PAGES |
|---|-------|
| B. Byzantine Geography, 790: Andreas Libadenos, 790; Stephen of Novgorod, 790 | 790 |
| C. Jewish Geography, 791: Estori Farhi, 791; Isaac Helo, 793 | |
| D. Muslim Geography, 793: D1. Mamlük, 793: Abū-l-Fidā', 793; Ahmad al-Tinī (?), 799; al-Dimashqī, 800; Ibn Fadlallah al-'Umari, 802; Ibn al-Firkāh, 804. D2. Irāq, 804: Ibn Shabib, 804; 'Abd al-Mu'min ibn 'Abd al-Haqq, 805. D4. Maghrib, 806: al-Tijānī, 806; al-Balawī, 807 | |
| E. Geography in the Far East, 807: Chu Ssū-pēn, 807; Chinese cartography, 808; Wang Hsi, 809; Huang Chin, 809; Wang Ta-yüan, 810 | |

CHAPTER X

- | | |
|--|---------|
| NATURAL HISTORY (First Half of the Fourteenth Century) | 811-833 |
|--|---------|

- | | |
|---|--|
| A. Latin West, 811: A1. Italy, 811: Pietro dei Crescenzi, 811; Matthaeus Sylvaticus, 816. A4. Germany, 817: Conrad of Megenberg, 817. A5. Flanders, 821: Beukels, 821 | |
| B. Byzantium, 823: The Pulologos, 823; Philes, 825; Neophytos Prodromenos, 826 | |
| C. Armenia, 826: Thomas of Cilicia, 826 | |
| E. Islām, 827: Ibn Luyūn, 827; al-Mujāhid 'Alī al-Rasūlī, 827; Ibn al-Mundhir, 828; Ibn Arqām, 830 | |
| F. China, 830: Wang Chēn, 830; Lu Ming-shan, 832; Huang Tao-p'o, 832 | |

CHAPTER XI

- | | |
|---|---------|
| MEDICINE (First Half of the Fourteenth Century) | 834-910 |
|---|---------|

- | | |
|---|--|
| A. Latin West, 834: A1. Italy, 834: Maino de Maineri, 834; Francesco di Piedimonte, 835; Dino del Garbo, 837; Guglielmo da Varignana, 838; Niccold da Santa Sofia, 839; Pietro Torrigiano de' Torrigiani, 839; Mondino Friulano, 840; Bartolommeo da Varignana, 841; Mondino de' Luzzi, 842; Guido da Vigevano, 846; Niccold Bertruccio, 847; Gentile da Foligno, 848; Alberto de' Zaneari, 852; Magnino of Milano, 854; Albino da Montecaliero, 855; Guido Aretino, 855; Johannes de Casso, 856; Barnabas of Reggio, 856; Castello, 857; Cortenova, 857; Rusio, 858; Maurus and Marcus, 858; Pipino, 859; Giovanni della Penna, 859. A2. Hispanic peninsula, 860: Alexander of Spain, 860; Figarola, 861; Alphonso of Cordova, 861; Jacme d'Agramont, 862; Giraldes, 862. A3. France, 863: Berenger, 863; Note on the College of Saint Cosmas, 863; Jean Pitart, 865; Henry of Mondeville, 865; Bernard of Gordon, 873; Gerald de Solo, 876; Jordanes de Turre, 877; Pierre de Saint Flour, 878; Raymond of Molieres, 878; Pierre Chauchat, 879; Damouzy, 879. A4. England, 880: John of Gaddesden, 880. A5. Belgium, 882: Jan Yperman, 882; Scellinck, 884; Bartholomew of Bruges, 885; Simon of Couvin, 886. A6. Germany, 887: John Hake of Göttingen, 887; Albert of Parma, 888 | |
| B. Christian East, 888: B1. Byzantium, 888: Joannes Chumnos, 888; Joannes Actuarios, 889 | |
| C. Western Jews, 892: C1. Southern France, 892: Jacob ben Joseph ha-Levi, 892; Hezekiah ha-Miliabi, 892; Isaac ben Judah Lattes, 893; Abraham ben David Caslari, 893. C2. Hispanic peninsula, 894: Samuel ben Waqar, 894; Solomon ibn Ya'ish, 894 | |
| E. Western Muslims, 895: Muhammad al-Shafra, 895; Ibn Khātimah, 896 | |
| F. Eastern Muslims, 897: 'Abdallāh ibn 'Abd al-'Aziz, 897; Muhammad ibn Muhammad al-Khujandi, 897; Ahmad ibn Muhammad al-Kilāni, 897; Ibn al-Kutubi, 897; Mahmūd ibn Ilyās al-Shirāzī, 898; Ibn al-Akfānī, 899; Ibn Qayyim al-Jawzīya, 901 | |
| H. China, 902: Wang Hao-ku, 902; Tsou Hsüan, 903; Wang Yü, 904; Wēn-jēn Kuei, 904; Hu-Ssū-hui, 905; Wei I-lin, 906; Ch'i Tē-chih, 907; Hua Shou, 907; Chu Tan-ch'i, 907 | |
| J. Japan, 909: Kajiwara Shōzen, 909; Aki Morisada, 910 | |

CHAPTER XII

HISTORIOGRAPHY (First Half of the Fourteenth Century)

PAGES

911-980

- A. Western Christendom, 911: A1. Italy, 911: Riccobaldo da Ferrara, 911; Dino Compagni, 912; Giovanni Villani, 913; Andrea Dandolo, 916; Mussato, 917; Ferreto de' Ferreti, 919; Giovanni de' Matociis, 920; Giovanni da San Gimignano, 920; Pastrengo, 921; Benzo d'Alessandria, 922; Cola di Rienzo, 922. A2. Hispanic peninsula, 924: Juan Manuel, 924; Muntaner, 925. A3. France, 927: Geoffroi of Paris, 927; Guiard, 927; Joinville, 928. A4. Germanic countries, 930: Ottokar of Styria, 930; Peter of Dusburg, 931; John of Victring, 933; Matthias of Neuenburg, 934; John of Winterthur, 935. A5. Low Countries, 936: Hocsem, 936; Melis Stoke, 937; Velthem, 938; Jan van Boendale, 939. A6. Bohemia, 940: Chronicle of Dalimil, 940. A7. England, 941: Langtoft, 941; Hemingburgh, 942; Tretvet, 942; Reading, 944; Murimuth, 945; Higden, 946. A8. Ireland, 947: Clyn, 947
- B. Eastern Christendom, 947: B1. Byzantine historiography, 947: Xanthopoulos, 947; Chronicle of Morea, 948; Nicephorus Gregoras, 949. B2. Armenian historiography, 953: Hayton the Monk, 953. B4. Nestorian historiography, 956: 'Amr ibn Mattā, 956. B5. Abyssinian historiography, 956: The chronicle of 'Amda Šion, 956
- C. Western Islam, 957: Ibn abi Zar', 957
- D. Eastern Islam, 958: D1. Arabia, 958: al-Janadī, 958. D2. Mamlūk historiography, 958: al-Birzālī, 958; al-Adfuwī, 959; al-Safadī, 959; Baibars al-Manṣūrī, 961; Ibn al-Wardī, 962; al-Dhahabī, 963. D3. 'Irāq, 967: Ibn al-Tiqṭaqā, 967; 'Abd al-Razzāq al-Shaibānī, 968. D4. Persia (histories in Persian), 969: Rashīd al-dīn, 969; al-Banākatī, 976; al-Waṣṣafī, 977
- E. Ceylon, 977: Sinhalese chronicle, 977
- F. China and Korea, 978: Li Tsē, 978; Ch'en Li, 979; Chang Chu, 979; T'ang Hou, 979
- G. Japan, 980: Japanese chronicles, 980

CHAPTER XIII

LAW AND SOCIOLOGY (First Half of the Fourteenth Century)

981-1002

- A. Christian West, 981: A1. Italy, 981: Oldrado da Ponte, 981; Cino of Pistoia, 982; Giovanni d'Andrea, 983; Alberico da Rosciate, 984; Trionfo, 985; Marsiglio of Padua, 986. A3. France, 989: Jean Faure, 989; Guillaume de Montlauzun, 990; John of Paris, 991. A4. Germanic countries, 993: Ruprecht von Freising, 993; Johann von Buch, 993
- B. Christian East, 994: B1. Byzantine law, 994: Blastares, 994; Armenopoulos, 995; Thomas Magister, 996
- D. Eastern Islam, 997: D1. Mamlūk, 997: Ibn Jamā'a, 997; Ibn al-Ukhūwwa, 998. D2. 'Irāq and farther east, 999: Ibn Nubātā, 999
- E. India and Burma, 1000: Caṇḍeśvara, 1000
- F. China, 1001: Su T'ien-chio, 1001
- G. Japan, 1001: Japanese law, 1001: Kitabatake Chikafusa, 1001

CHAPTER XIV

PHILOLOGY (First Half of the Fourteenth Century)

1003-1018

- Latin, 1003: Yon, 1003; Siger of Courtrai, 1003; Conrad of Heinrichau, 1004
- Greek, 1005: Triclinios, 1005
- Coptic, 1005: Abū-l-Barakāt, 1005; Note on a Sa'idi scala of the same century, 1007
- Hebrew, 1008: Joseph ben David ha-Yewani, 1008; Solomon ben Samuel the Persian, 1008
- Arabic, 1009: Ibn Ājurruṁ, 1009; Ibn Hishām, 1010; al-Jārabardī, 1010; Khaṭib Dimashq, 1011
- Turkish, 1011: Abū Ḥaiyān, 1011; Codex Cumanicus, 1015
- Chinese, 1017: Chou Po-ch'i, 1017; Wu-ch'iu Yen, 1017
- Japanese, 1018: Yoshida Kenkō, 1018