CHAPTER 9

The anatomy of Catholic learning

For all the diversity of its territories and institutions the Habsburg Monarchy, by the later seventeenth century, basically supported a single culture. That was truer among educated than among uneducated people, and much could be found at all levels which resisted the unifying mould. Nor can the generalization be pressed to yield clear terminology—any more than the word 'Baroque' can be made to fit at all tightly round the mental structures of the age. Yet the common cultural bond was a crucial element in enhancing the cohesion of Central Europe under the dynastic aegis. In some measure this homogeneity was imposed by political developments and by the associated socio-economic trends which we have already examined. But the phenomenon has an intellectual dimension which demands analysis on its own terms.

In Counter-Reformation culture, as in Counter-Reformation politics and society, a narrow ruling stratum dominated the rest, and the gap between privileged and unprivileged grew ever wider: we have already seen how the new establishment tamed a rising generation of intellectuals in the earlier seventeenth century. Higher culture became divorced from lower, not so much in that they pursued different themes, but in that the former had scope for self-expression while the latter suffered increasing regimentation. Indeed, we shall see that the very factor which lent scope to the one was the chief means of regimenting the other: the world of occult science and superstition. Again, as with the political and social evolution, a condition of comparative equipoise emerged by 1700 through a mixture of controls and autonomous process. Catholic dogma was the *sine qua non*, but whereas the bulk of the population observed a code of Church discipline, the élite observed one of self-discipline. The educated Catholicism to be introduced in this chapter was both assertive and self-conscious, and also a distinctive Central European amalgam; it no more followed a Papal blueprint than did the rest of the Habsburg Counter-Reformation.

'Introduction' is certainly the *mot juste* for what follows: the subject has till now barely received any attention from historians. Reading standard accounts of the period, one might well wonder whether erudition existed at all.[1] Yet there was nothing particularly crude about the learned standards of seventeenth-century Austria: they were just very different from our own. We can distil a sophisticated set of views and discern surprising freedom of thought, given the constraints willingly imposed on themselves by contemporaries. The first, of course, was confessional orthodoxy in matters where the ecclesiastical authorities laid down unambiguous precepts. The second was deference to the constituted order, which provided the tools and organization of scholarship. The third was Latinity. We have seen how vernaculars had their place in the Counter-Reformation scheme, but it was a subordinate one. Even Pázmány laces his Hungarian-language works with Latin dedications to the magnates; Latin is the badge of a mind which can be trusted. While no longer the Latin of the Humanists—heavier, more discursive, more pedestrian—it still afforded refuge for a privileged, even liberal academia against philistine critics. Lambeck associated himself very much with the earlier traditions of the *Hofbibliothek*; Leopold I was anxious not to commit any solecism in the language of scholarship.[2] Behind its defences men had the chance to debate, and perhaps to publish with official backing. Much more was committed to paper in manuscript for private study and circulation—a mass of material which still awaits proper evaluation.

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Even in strife-torn Hungary nobles and religious orders had well-stocked libraries covering all aspects of traditional learning: theology in its many guises; law and medicine; history, sacred and profane; antiquities and coins; philosophy, mathematics, and the sciences of nature; ethics, politics, and philology. The beleaguered Benedictines of Pannonhalma, scarcely returned to their devastated monastic buildings, registered over 2,000 books in 1658, especially recent devotional literature. The Jesuits developed holdings from slender beginnings, as at Tyrnau and Kassa. The Observant Franciscans in

[1] For example, Denis–Vančura, op. cit. i, 1, 258 ('All moral life, all intellectual questioning, went into exile . . .').

[2] Lambeck, *Commentarii*, i, cols. 63 ff. ÖNB, MS. 12757, fols. 61, 78. Cf. above, pp. 114 f.

Szakolca, hardly one of the country's larger municipalities, possessed more than a thousand volumes in Latin and a variety of modern languages when the first catalogue was drawn up in 1662.[3] Magnates' libraries covered the same terrain with more of a secular emphasis. While some owners clearly limited their vision, like Simon Forgách, who seems to have collected mainly improving Catholic literature and Hungarian history, others had greater intellectual ambitions. Pál Esterházy displayed a wide range of interests, particularly medical; Miklós Zrinyi specialized in Italian political writers and possessed such multi-volumed sets as the *Magnum Theatrum Vitae* of Laurentius Beyerlinck; Ferenc Nádasdy's library was so rich that Emperor Leopold requisitioned some two hundred titles to be added to the *Hofbibliothek* after his fall.[4]

Austria and Bohemia had a less troubled evolution. While major collections were being built up by families like Lobkovic, Liechtenstein, and Eggenberg (Hans Ulrich Eggenberg found time to annotate many of his new acquisitions), monasteries generated the need for extra space which was met by their fine Baroque interiors constructed towards the end of the period.[5] Not just the great names were involved: Josef Ignaz von Kirchberg, a representative member of Lower Austria's provincial nobility, left a library with

[3] *Catalogus Librorum Omnium Conventus S. Martini . . .*, ed. V. Récsey (Bp. 1902). The Tyrnau collection later became the core of the university library (Egy. Kt.) in Budapest; its resources were described by G. Pray, *Index rariorum librorum Bibliothecae Universitatis Regiae Budensis*, i–ii (Buda 1780–1). OSzK, MS. 23 fol. lat., is a catalogue of the Kassa collection from the 1660s; ibid. MS. 2119 quart. lat.: 'Cathalogus seu Inventarium perpetuum Librorum Conventus Szakolczensis . . .', continued into the 18th century.

[4] OL, Forgách cs. lt., P. 287, ser. II, fasc. FF, cs. 41: 'Registrum Librorum . . . Comitis Simonis Forgacs'. OSzK, MS. 2149 fol. hung.: 'Catalogus Librorum in Arce et Bibliotheca Fraknó repositorum' (Esterházy); *Bibliotheca Zrinyiana, die Bibliothek des Dichters Nicolaus Zrinyi* (V. 1893), esp. 51–84. A. Sitte, 'Gróf Nádasdi Ferenc művei és könyvtára', *MKSz* x (1902), 142–57; cf., for Nádasdy's works requisitioned by Vienna, ÖNB, MS. 9715, fol. 141; ibid. MS. 9716, fols. 106–15, 155 ff. There has been much miscellaneous information about Hungarian library holdings printed in *MKSz* since 1876.

[5] O. Brunner, 'Österreichische Adelsbibliotheken des 15. bis 18. Jahrhunderts', in *Neue Wege*, 155–67, is a brief sketch. No printed catalogue exists of the vast and important Lobkovic library (though the UK has a MS. one). H. Bohatta, *Katalog der in den Bibliotheken . . . des fst. Hauses von und zu Liechtenstein befindlichen Bücher*, i–iii (V. 1931). On Eggenberg: J. V. Polišenský, *Der Krieg und die Gesellschaft in Europa, 1618–48*, tr. A. Urbanová (Pr. 1971), 50 f.

over 3,800 books, strongest in Catholic theology, but well balanced overall; even the austere Capuchin house at Linz possessed more than 5,000 volumes by the early eighteenth century.[6] Sometimes the work of accumulation took generations, but we have plenty of evidence of individual initiative. Ignaz Karl Sternberg had a special catalogue drawn up for his extensive holdings in mathematics and astronomy. Gabriel von Selb, an ennobled jurist and member of the *Hofkammer*, brought together a large collection particularly strong in history, politics, and law. Johann Crane, a typical aulic councillor whose only memorable act was to sign the Peace of Westphalia as one of the Austrian plenipotentiaries, owned some thousand miscellaneous books, mostly in Latin.[7]

The largest repository of books belonged to the dynasty and occupied premises inside the Hofburg. The *Hofbibliothek* expanded continuously during the seventeenth century, acquiring the Fugger library from Germany, that of the Marquis of Cabrega from Spain, manuscripts and printed works from agents in Italy, France, and Frankfurt.[8] There is excellent information for the reign of Leopold about how its resources were actually used. Lambeck's *Commentarii* I have already mentioned: a vast project, supervised by the emperor, to advertise its treasures to the scholarly world. Only a fraction could be published (twenty-five volumes were planned), but this suffices to show the emperor's close concern for the legacy of Greek theological, legal, medical, philosophical, and historical manu-

[6] ÖNB, MS. 14878: the Kirchberg family collection, as inventoried in 1698. H. Paulhart and J. Voglsam (eds.), *Die Bibliothek des Linzer Kapuzinerklosters St. Matthias*, i–ii (Linz 1968–71).

[7] Sternberg: Str., MS. DH V 27, prepared 'Anno 168' (*sic*), and listing over 200 titles; cf. above, p. 208 and n. 27. Selb: ÖNB, MS. 14787, prepared in 1673, with over 3,000 titles in alphabetical order. Selb was at one time the friend and later the enemy of *Hofkammerpräsident* Sinzendorf (Wolf, 'Hofkammer', 479; Bérenger, *Finances*, 369–71), which may explain his evident wealth. Crane: ÖNB, MS. 14860, prepared (by the owner?) in 1658; cf. Gschliesser, op. cit. 230 f. Another example of the individual collector would be Windhag (above, p. 294).

[8] Stummvoll (ed.), op. cit., gives a general survey. For the library of Cabrega (Pedro de Navarra y de la Cueva), cf. *Privatbriefe*, ii, nos. 228, 235, 251, and pp. 65, 69, 91, 105; ÖNB, MS. 12757, fol. 22; there are catalogues of it ibid. MSS. 12601 and s.n. 4289. More on accessions policy ibid., MS. 12757, *passim*; HHStA, Obersthofmeisteramt, SR 46, esp. fol. 32; and esp. ÖNB, MSS. 9713–16, *passim*; cf. above, pp. 289 f., on the book commission. The dynasty maintained subordinate libraries at Ambras, near Innsbruck (Lambeck transferred some of its books to Vienna), and at Graz (ÖNB, MS. s.n. 3791, is a catalogue of works there which are lacking in the main *Hofbibliothek*).

scripts. Leopold consulted his librarian on a wide range of learned topics, especially antiquarian, and received precise reports about his expenditure.[9] Equally revealing are Lambeck's catalogues of the emperor's private library, a shifting collection of some thousand recent works which must have formed his daily reading. They include, of course, a goodly slice of Catholic apologetics and controversy; but also natural philosophy with a practical bent; much history, from the *acta* of favourite saints to contemporary polemic; classical, neo-Latin, and Italian literature; and a variety of manuscripts. And there is no doubt that some of them were thoroughly perused, even such tomes of pure erudition as the letters of the Bohemian Humanist, Bohuslav of Lobkovic.[10] We learn precisely what books lay to hand on 12 July 1674 in the emperor's oratory and closet: devotions and alchemy cheek-by-jowl; even what books were ready to accompany him when he travelled: Leopold's servants might have been less than enthusiastic about transporting the complete works of Lipsius in six volumes, or Bartholinus's *Historiae Anatomicae* in three.[11]

These titles give us a remarkable insight into the Habsburg intellectual world of the later seventeenth century. They also introduce us to some of its representative local authors, the writers who elaborate the serious core of Central Europe's *Weltanschauung*. Most are clerics, the majority in regular orders: Jesuits predominate, followed by Dominicans and Franciscans, Benedictines, Augustinian canons and Premonstratensians, and a goodly sprinkling of lawyers and physicians.[12] The same names reappear in all kinds of

[9] On Lambeck, cf. above, pp. 296 f., nn. 50–1. Leopold's relations with him are documented in ÖNB, MS. 12757 (18th-century copies of the emperor's letters); HHStA, loc. cit. (some letters from Lambeck, esp. fols. 16–20: precise accounts of expenditure in 1666); ÖNB, MS. 8011 (*aides-mémoire* for audiences). The latter in particular were well used by Th. G. von Karajan, 'Kaiser Leopold I und Peter Lambeck', *Almanach der k. Akademie der Wissenschaften*, xviii (1868), 103–56.

[10] ÖNB, MS. 12590, prepared in 1666, amended in 1674, lists mostly books published since 1648, a total of 1,086 vols. ÖNB, MS. 12592, is mainly a fair copy of the revised (i.e. 1674) catalogue, with an index and the additions cited in the next note. ÖNB, MS. 12757, fol. 18, for how Leopold devoured Lobkovic.

[11] ÖNB, MS. 12592, pp. 157–8: 'Bücher . . . in der Röm. Kays. Maj. Betzimmer'; ibid. 161–3: 'Bücher, welche in der . . . Retirade auff dem Tische gelegen'; ibid. 165–9: 'Bücher, welche in der Röm. Kayserl. Maj. Reisekasten sich befunden'. Lipsius, *Opera Omnia* is cited as a 1627 edn., presumably an error for 1637 (though that contained only 4 vols.).

[12] For the Jesuits see the bibliographical *chef d'œuvre* by Sommervogel (*et al.*), and

(continued)

disciplines, exhibiting the virtues and weaknesses of Baroque-Catholic polyhistory. In fact the most prominent polymaths often spent little time at Vienna itself. Caramuel, born in Madrid, worked in the Netherlands before moving to Austria, then soon concentrated his activities on Bohemia (where his father had once served Rudolf II) and ended his life in Lombardy. Magni, brought up at Prague, pursued a restless career with missionary and political assignments throughout the Empire. Marci was a provincial Czech who hardly set foot outside his native kingdom, though his intellectual heir, Dobrzensky, displayed slightly more *Wanderlust*. Self-effacing Jesuits passed their lives in periodic transfer from one remote college to another: Stansel, Kochański, Scheiner, Moretus, Lana-Terzi, Conrad, Menegatti . . .[13]

Two key figures never went to Vienna at all, though they became closely associated with it, and erected the nearest thing to a thoroughgoing philosophical rationale (or rather irrationale) for it. Athanasius Kircher (1601 or 1602–80), born near Fulda in Franconia, taught at various Jesuit houses of middle Germany during the testing years of war. Then he moved to Rome, where he received a permanent professorship at the Collegium Romanum in 1635 when on the point of accepting a post in the Habsburg capital, and where most of his thirty-eight books were first published. Kircher's colleague, Kaspar Schott (1608–66), likewise a native of Franconia who spent many years in Italy, later established himself at Würzburg, and his writings appeared there and in neighbouring Nuremberg (under the auspices of the Endters) during a single

a useful earlier compendium for the Habsburg lands: [J. N. Stoeger], *Scriptores Provinciae Austriae S. J.*, i (V. 1855). Some other orders are also well served; see especially J. Quétif and J. Echard, *Scriptores O.P.*, i–ii (Paris 1719–21); L. Wadding, *et al.*, *Scriptores O.F.M.* (Rome 1806); M. Ziegelbauer, *Historia rei literariae O.S.B.*, i–iv (Augsburg–Würzburg 1754); B. O. Černík, *Die Schriftsteller der noch bestehenden Augustiner Chorherrenstifte Österreichs von 1600 bis auf den heutigen Tag* (V. 1905); J. F. Ossinger, *Bibliotheca Augustiniana* (Ingolstadt–Augsburg 1768); Horányi, op. cit. (Piarists).

[13] On Caramuel: L. Ceyssens, 'Autour de Caramuel', *Bulletin de l'Institut Historique Belge de Rome*, xxxiii (1961), 329–410; R. Ceñal, 'Juan Caramuel; su epistolario con Atanasio Kircher', *Revista de Filosofía*, xii (1953), 101–47; *OSN* v, 138 f. For him and Magni see above, pp. 119, 217. On Marci: W. R. Weitenweber, 'Beiträge zur Literärgeschichte Böhmens', *Sb. d. k. Akad. d. Wiss ph.-h. Kl.* xix (1856), 120–56, at 122–44; and on Dobrzensky: ibid. 144–56. Brief biographies of Jesuits are appended to the entries in Sommervogel.

hectic decade from 1657.[14] The massive tomes of Kircher, Schott, and the rest, which must have been expensive even when printed with the financial backing of dynasty and Church, were purchased all over the Monarchy. Leopold's personal library contained thirteen of Kircher's and seven of Schott's; the Liechtensteins possessed thirty-one Kirchers; Sternberg had twenty-three works by Kircher and thirteen by Schott, Kirchberg over ten titles by each; even the more modest Crane owned eleven Kirchers by 1658. The monastery of Heiligenkreuz bought his huge *Oedipus Aegyptiacus* for thirty-five florins within a year of publication.[15]

The latest products of this scholarship would be discussed among educated circles in Vienna, Prague, and all the smaller centres of the Monarchy. Often they were interpreted and transmitted by lesser men who themselves wrote little: the Silesian, Godefrid Alois Kinner, provost of All Saints church on the Hradschin and tutor to Leopold's younger brother, Archduke Karl Josef; Philipp Müller, Leopold's secretive Jesuit preceptor and confessor, who smoothed the path of Lambeck to Vienna; Johann Maximilian Lamberg, Bernard Ignác Martinic, Pál Esterházy, and other aristocratic patrons; prominent members of the professions, like J. W. Mannagetta.[16] It is not too hard to imagine *conversazioni* amid the fine bindings of the *Hofbibliothek*, as described and illustrated by the English traveller, Edward Browne, or in the groves of Archbishop

[14] K. Brischar, *Athanasius Kircher, ein Lebensbild* (Würzburg 1877, separatum from *Katholische Studien*, iii); Sommervogel, iv, cols. 1046–77. Cf. UK, MS. XIV C 12: 'Vita Reverendi Patris Athanasii Kircheri à semetipso conscripta'. I have encountered several other copies of this brief life, and there exists a printed German translation; but it does not appear (*pace* Zedler and Sommervogel (iv, col. 1070)) to be included in the *Fasciculus Epistolarum . . . Athanasii Kircheri*, ed. H. A. Langenmantel (Augsburg 1684). Cf. below, pp. 433–5 and *passim*. On Schott: *Notice raisonné des ouvrages de Gaspar Schott, Jésuite . . . par M. l'Abbé M*[ercier] (Paris 1785); Sommervogel, vii, cols. 904–12.

[15] ÖNB, MS. 12590, *passim*. Bohatta, op. cit. ii, 1056–8; Str., MS. DH V 27; ÖNB, MS. 14878, *passim*; ÖNB, MS. 14860, fol. 53'. 'Die Handschriften-Verzeichnisse der Cistercienser-Stifte', *Xenia Bernardina*, ii (V. 1891), 119 (Heiligenkreuz).

[16] Very little information seems to be available about Kinner; see Zedler, s.v. (brief); Zibrt, *BČH* v, no. 16912; L. Thorndike, *History of Magic and Experimental Science*, vii–viii (New York 1958), viii, 310; and below, n. 61, and p. 361, n. 36. Cf. also his *Stella Matutina . . . sive Laudatio Funebris . . . in funere . . . Caroli Josephi Archiducis Austriae* (V. 1664). On Müller (or Miller): Stoeger and Sommervogel, s.v.; Krones, *Universität Graz*, 382; cf. ÖNB, MS. 9712, fol. 171; ibid. MS. 9713, fols. 7, 12, 15, 18, 33; OL, Eszterházy cs. lt., P. 125, cs. 658, nos. 3184–6. For Mannagetta see above, p. 109.

Lippay's celebrated garden at Pozsony, carefully tended by his horticulturalist Jesuit brother; in the courts and interminable corridors of Prague's Clementinum, or in cloistered walks at Klosterneuburg and St. Florian.[17] And the outcome of such discussions was a recognizable set of opinions and credences which, for all their inconsistencies, for all the lacunae in our understanding of them, we may call an intellectual system.

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Let us try briefly to analyse this system of ideas. Its foundation was firmly Aristotelian. From Aristotle derived the categories of its logic, the qualities of its physics, the substance of its metaphysics, the duality of matter and form, the unity of creation and the chain of being, the four kinds of causation, the teleological view of gravity, medicine, and so forth. A mass of surviving evidence bears witness to that, mainly university textbooks and manuscript notes by students. It is a genre of utterly predictable accounts of the physical world, of man's place in it and his duties, whether the writer be a Jesuit active in court service, like Philipp Müller, or a retiring Minim like Antonius Mandl. And a genre not restricted to clerics: one of the imperial *Leibärzte*, Johann Conrad Wechtler, laboured for many years on a colossal tome of the most amazing obscurantism and sterility.[18]

Such Aristotelianism had been refracted, of course, through the scholastics. It would be a difficult task to discover how far the great medieval *summae* were now actually read, though Martinic certainly prided himself on the ability to defend the heritage of Anselm and Aquinas.[19] More immediately relevant was the great revival in

[17] Browne, *Account*, 90–5; the illustration appears only in later edns. (e.g. *Durch Niederland, Teutschland, Hungarn, Serbien ... Reisen* (Nuremberg 1686), facing p. 242). János Lippay's *Posoni kert*, describing the archiepiscopal pleasure-grounds, appeared at Tyrnau and Vienna in 1664–7. Cf. J. Ernyey, *Természettudományi mozgalmaink a 17.–18. században* (Bp. 1912, separatum from *Természettudományi Közlöny*); R. Rapaics, *A pozsonyi kert* (Bp. 1938, separatum from ibid.); E. Gombocz, *A magyar botanika története* (Bp. 1936), 135 ff. An Italian polyhistor called Giovanni Bonanus (Bonanni?) seems to have been the leading light of the Lippay-circle; see also Mayer, op. cit. i, no. 1302; and the confused observations by E. Browne, *A Brief Account of some Travels in Hungaria* ... (London 1673), 95 f.

[18] ÖNB, MSS. 10503–5, compilations by Müller; A. Mandl, *Templum Sophiae L Columnis constructum* (V. 1662), though he does mention Mersenne, Kepler, Galileo, and Kircher. J. C. Wechtler, *Homo Oriens et Occidens* (Frankfurt 1659—though the frontispiece is dated '1660' (and the imperial privilege '1648'!)).

[19] ÖNB, MS. 9713, fols. 91 f., 97 f.; ibid. MS. 9715, fol. 155. Cf. Kalista (ed.), *Korespondence*, no. 27.

study of Aristotle during the later sixteenth century, which—as we have already seen—spilled over into Protestant Germany and Hungary. The neoscholastic movement of Suarez, Fonseca, Soto, Toletus, showed that traditional Catholic philosophy had regained its nerve. It represented also an accommodation with some of the large challenges which had threatened the Church since the age of Aquinas: nominalism, Humanist critique, Protestant redefinition of theological verities. Thus the doctrine was not pure, even in its inception. Consider the conceptual influences on the young Pázmány, as a persuasive new lecturer at the University of Graz about the year 1600. He knew the Thomist school of Salamanca, the Jesuit philosophers at Coimbra and Rome, the Averroists of Padua, especially Zabarella and Piccolomini, and a wide range of other Humanist writers. They were all combined by the strongly practical and decisive personality of Pázmány in a distinct effort of synthesis.[20]

Structural modifications are still clearer with Arriaga in the next generation. Rodrigo Arriaga (1592–1667) was a Spanish Jesuit who settled at Prague from the 1620s until his death, and not only played a major part, as rector of the Carolinum for many years, in rebuilding Bohemian education, but also gained recognition as one of the leading Catholic thinkers of the period. A fully international figure, standing close to the dynasty (he taught the young Ferdinand III the Spanish he must have needed during the Nördlingen campaign), Arriaga's *Cursus Philosophicus* first appeared on the Plantin presses at Antwerp in 1632 and went into numerous editions.[21] There is no doubt that this formidable folio of 900 pages was designed to uphold established Catholic wisdom under the aegis of benign Habsburg rulers. Its elegant frontispiece illustrates a 'hortus philosophiae' which, as the dedication explains, is entrusted to the king of the Romans and his wife, and where the true logic, physics, and metaphysics of Aristotle can flourish anew.

[20] I. Gerencsér, *A filozófus Pázmány* (Bp. 1937); Őry, op. cit. *passim*. Pázmány's Latin works (mostly lecture-courses) are printed in *Opera Omnia, series latina*, i–vi (Bp. 1894–1904). On neoscholasticism in general: L. Giacon, *La seconda scolastica*, i– (Milan 1944–).

[21] K. Eschweiler, 'Roderigo de Arriaga SJ', *Spanische Forschungen der Görres-gesellschaft*, iii (Münster 1931), 253–85; cf. H. Bosmans, 'Théodore Moretus SJ, mathématicien', *De Gulden Passer*, N.R. vi (1928), 57–163, *passim* (Moretus was the cousin of Arriaga's printer). There were further edns. of the *Cursus* at Paris 1637, 1639, 1647, 1669; and at Lyons 1644, 1651, 1653, 1669.

But the text reveals a less rigid adherence to authority, while a preface to the reader explicitly requests him to be prepared for novelty, since the ancients must be 'non domini, sed duces', and the experience of our senses may enable us to improve on them. At several important points Arriaga shows himself more of an Occamist than a Thomist.[22]

For such thinkers as Arriaga Aristotelianism became a practical vehicle, so much so, indeed, that its old metaphysical dimension—where that was felt problematical—tended to be separated out as a distinct study of ontology, leaving the rest of the edifice to find new supports.[23] One aspect of this was the revival of other medieval scholastic systems, particularly the doctrines associated with Duns Scotus. Scotism was championed by the Franciscans and established one of its main seventeenth-century homes at Prague, helped by the Irish friars who, as one admirer claimed, dissolved the pitch-black clouds of ignorance and heresy much as St. Patrick had once cleared their fatherland of serpents. It found weighty and verbose expositors in Bernhard Sannig and Amandus Hermann, whose approach, less advanced than Arriaga's, shows no gleam of modernity; how could it when two-thirds of Hermann's metaphysics are devoted to angels![24] Nevertheless it cast fresh light on Aristotle, as did a continuing preoccupation with certain notions drawn from the classical Renaissance, especially the doctrines of neo-stoicism.

The idea of man's dignity, so central to Humanism, was not, as people frequently imagine, some idle paean to the human spirit, but a precise evaluation of the place of man, being microcosm, in the macrocosm of nature. That theme—expounded before 1600 by such Central Europeans as Lascovius—dominates a curious compendium published by Antonio Zara, Bishop of Pedena in Istria and protégé

[22] Cf. S. Sousedík, 'Teorie zhušt'ování a zředování v díle Rodriga Arriagy', *Filosofický Časopis*, xvi (1968), 673–98; Thorndike, op. cit. vii, 399–402.

[23] The theme of a difficult but rewarding book by P. di Vona, *Studi sulla scolastica della Controriforma* (Florence 1968), esp. 184–95 on Arriaga; cf. Wundt, op. cit.

[24] B. Jansen, 'Zur Philosophie der Scotisten des 17. Jahrhunderts', *Franziskanische Studien*, xxxii (1936), 28–58, 150–75 (152–4 on Sannig); Thorndike, op. cit. vii, 465–476; C. M. Balic, 'Wadding the Scotist', *F. Luke Wadding Commemoration volume* (Dublin 1957), 463–507. On Prague Hibernian Scotists: Millett, op. cit. 468–73, 479 f., 482–5, and esp. 152 n. Hermann, *Sol Triplex*, 828–967; cf. above, p. 128. Other orders too had their Scotists; see, for a trivial example, OL, Eszterházy cs. lt., P. 125, cs. 705, no. 11960, a thesis printed on silk.

of Ferdinand II.[25] Zara surveys the gamut of human activity: body, imagination, intellect, memory, in a way which must strike us as rather learned than logical, since we have lost the key to his theoretical organization of the material. But it is the same kind of schema which natural philosophers from the Habsburg lands adopted later in the century: Johann Ferdinand Hertodt, for example, the town physician of Brno, in his poem, *Opus Mirificum sextae diei*; even the uncompromising (not to say unpromising) Aristotelian, Wechtler. It is a view of nature still close to Aristotle and Pliny and wide-eyed medieval attitudes towards the wonders of creation (not by accident was the very last edition of Bartholomaeus Anglicus, that rag-bag of credulity, prepared at St. Vitus's in Prague on the threshold of the seventeenth century), married with some prime insights of Renaissance speculation: the work of Telesio, Cardano, Porta.[26]

Thus orthodox philosophy, the overall philosophy of classroom and seminary, exhibits several strata. At the level of the university arts curriculum, a crude Aristotelianism survives until the end of the century and beyond. When J. J. Scharz and his Jesuit master sought to demonstrate the twin provinces of intellect and will in a Linz dissertation of 1676, they simply hitched Aristotelian assertions about logic, universal physics, particular physics, and metaphysics to the four cardinal virtues and left it at that. When F. S. Schott defended some theses with the good Renaissance title, *Cosmus in Micro-Cosmo*, under the Viennese Jesuits twenty-five years later, he based his text overwhelmingly on Aristotle, Pliny, the Fathers, and early medieval writers. And we should not necessarily be persuaded by any claim to eclecticism or reappraisal. The Austrian Cistercian, Georg Neupauer, for example, reveals in his treatises some familiarity with recent authors: Arriaga, Kircher, Caramuel, and

[25] On Lascovius: above, pp. 32, 34. A. Zara, *Anatomia Ingeniorum et Scientiarum* (Venice 1615), with some autobiographical information at 16 ff. That Zara was no aulic hanger-on, but a proper Tridentine bishop who resided in his humble and distant diocese, is proved by the book's colophon.

[26] J. F. Hertodt, *Opus Mirificum sextae diei, id est Homo physicè, anatomicè, et moraliter . . . dissectus* (Jena 1670); Wechtler, op. cit. (whose frontispiece depicts, *inter alia*, Hermes Trismegistus). Bartholomaeus Anglicus, *De Genuinis Rerum Coelestium, Terrestrium et Inferarum Proprietatibus*, ed. G. B. Pontanus of Breitenberg (Frankfurt 1601), with no suggestion that the work might be antiquated. For Pontanus, provost of Prague cathedral, see *Rudolf II*, 158–61 (where I have wrongly made him a Jesuit).

Marci among them, and he makes some play with his own opinion; but the outcome is only a conventional *réchauffé*.[27]

On a somewhat more elevated plane, we are faced with a deep-rooted polymathic habit which simply adds new knowledge more or less mindlessly to received views. Part of Caramuel's *œuvre* falls into this category: his *Trismegistus Theologicus*, or the quaintly-titled *Mathesis Biceps*, which Leopold I studied. So do such popular textbooks as Pexenfelder's *Apparatus Eruditionis*, a catch-all of traditional wisdom.[28] The genre was pursued long into the eighteenth century in Hungary, where the Catholic religion, being most vulnerable, proved least adventurous. Martin Szentiványi, a leading professor at Tyrnau, produced three volumes, neatly divided into nine parts and ninety chapters, which he called *Curiosiora et Selectiora Miscellanea*, though they are really a classic instance of the inability to select, a sort of *reductio ad absurdum* of the Baroque striving for completeness.[29] The reader is made to skip alarmingly from cosmography to chronology by way of doggerel verses on the state of the harvest; from geography to ecclesiastical history via the works of Thomas à Kempis. A section on 'discoveries and inventions' passes rapidly from sunspots to the uses of rhubarb; the next one, about 'things lost', embraces both Paradise and genuine cinnamon; the next describes things which have never existed at all, like Copernican motion.

Yet Szentiványi has some merits, even if they are not those of

[27] J. J. Scharz, *Gemella Philosophia intellectus et voluntatis* (Linz 1676); F. S. de Schott, *Cosmus in Micro-Cosmo, hoc est: Mundus Opere Sex Dierum Creatus* (V. 1701). These are two examples taken at random from the large dissertation literature; Schott quotes a few 17th-century authors, even Robert Fludd, but they are quite marginal. Neupauer: Schlierbach, MS. 65 (81): 'Metaphysica Eclectica'; ibid. MS. 69 (86): 'Logica Eclectica'; ibid. MS. 76 (93): 'Physiologia Eclectica'; all dated in the 1690s.

[28] J. Caramuel Lobkovic, *Trismegistus Theologicus latine Ter-Maximus*, i–iii (Vigevano 1679); id., *Mathesis Biceps vetus et nova*, i–ii (Campagna 1670). ÖNB, MS. 12757, fol. 19 (Ebersdorf, 8 Oct. 1670), acknowledges imperial receipt of the latter, or perhaps only of vol. 1, since in 1672 one of Lambeck's agents still seems to be trying to secure the second part, which is 'molto bizarra' (ÖNB, MS. 9714, fol. 150); cf. Karajan, op. cit. 127. Pexenfelder, op. cit.

[29] M. Szentiványi, *Curiosiora et Selectiora variarum scientiarum Miscellanea*, i–iii (Tyrnau 1689–1709), all the parts have separate pagination. Full list of his writings in Sommervogel, s.v. (they include the anti-Lutheran tracts collected together as *Opuscula Polemica*, i–ii (2nd edn. Tyrnau 1718–30). On Szentiványi's life see Serfőző, op. cit. esp. 17 ff.

organization. He is definitely not a 'simple' Aristotelian: only the most mediocre writers of the day could be called that. All the better ones—the Pázmánys, the Arriagas—show flexibility and some willingness to disagree. Others again were by no means concerned just to add: they were equally eager to subtract.

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The most obvious alternative to Aristotle was Plato. Again it is not easy to assemble evidence as to how far the classic texts were actually read, though they are well represented in libraries. Lambeck purchased Platonic manuscripts for Leopold from Venice and Rome in 1671, and Lamberg had a high regard for Marsilio Ficino.[30] We stand on firmer ground with three curious and significant thinkers who were much influenced by the Platonic tradition: Marci, Magni, and Caramuel.

Jan Marcus Marci (1595–1662), from Landskron in Bohemia, had one foot firmly in the post-1620 establishment: he was a professor at the Carolinum from 1626 and a friend of the Jesuits, whose order he joined on his deathbed; a successful doctor, *Leibarzt* to the Habsburgs, and ennobled by Ferdinand III with a special salary; a respected scholar, whose works appeared with priestly approbations and dedications to the emperor. But he was also controversial: his first book, *Idearum Operatricium Idea*, left incomplete, contains highly speculative discussion of the principles of biological propagation, drawing on the animistic armoury of Neoplatonism. Marci felt bound to defend himself against the charge of believing in eternal ideas, independent of the Creator. Some thirty years later, having conducted novel research in mechanics and optics, he returned to the issue of substantial generation and to the criticism of Aristotle, or at least of his interpreters.[31]

[30] ÖNB, MS. 9714, fols. 108 f., 116, 120, 127, 129, 153, 163; ibid. MS. 9713, fol. 83 (Lamberg).

[31] Weitenweber, art. cit.; B. Ryba, 'Originál posledního pořízení Jana Marka Marci v diplomatáři strahovském', *Str. Kn.* iv (1969), 95–108; Zíbrt, *BČH* v, 15915–62. The *Acta historiae rerum naturalium necnon technicarum*, special issue 3, ed. J. Smolka (Pr. 1967), are given over to Marci, and add a few new insights (cf. also the (incomplete) bibliography ibid. 39–50). J. M. Marci, *Idearum Operatricium Idea sive Hypotoposis et detectio illius occultae Virtutis, quae Semina faecundat . . .* (Pr. 1635), esp. pref. to reader, sig. (+ + +)^{r} – A2^{v}; a second volume was announced, but never

(continued)

Valerian Magni (1585–1661) was still more contentious. We have seen something of his role as a politician. He proved no less original and intransigent as a theorist, and there has probably been more recent discussion of him than of anyone else who appears in this chapter (though it amounts to no more than a few articles). Proceeding from the belief that the human understanding is a kind of divine illumination (not for nothing had he lived in Prague at the same time as Johannes Kepler), Magni moved to attack both Aristotelian physics, especially on the subject of the vacuum, and the moral validity of the whole Aristotelian philosophy. From his publication, at Warsaw in 1647, of a brief tract, *De Atheismo Aristotelis*, he fought running battles with the Jesuit censorship.[32]

Both Marci and Magni made enemies; yet both remained an integral part of the intellectual scene. By the end of his life Marci's reputation was secure throughout Central Europe, from Kircher in Rome to Morhof in Kiel. And although Magni, at the end of his, suffered brief imprisonment at the hands of the Papal nuncio, he was soon delivered from his arrest in an imperial carriage.[33] Neither destroyed the framework of knowledge: Marci, in the end, still identified light with the Aristotelian quintessence; Magni's highly personal Christian philosophy could create no new school. It is the same with the extraordinary Caramuel Lobkovic (1606–80), more famous than either in his own day. Child prodigy, master of twenty-

published. Id., *Philosophia Vetus Restituta, omnia in omnibus* (Pr. 1662, reissued Frankfurt 1676), with another interesting preface (sig. *3' ff.). Cf. below, pp. 330 f., 337 (mechanics and optics).

[32] Above, pp. 119, 133 n. 43, 139 n. 59, 217; below, p. 426. General appreciations of his thought in A. de Corniero, 'Capuchinos precursores del P. Bartolomé Barberis en el estudio de S. Buenaventura: P. Valeriano Magni de Milán', *Coll. Franc.* iii (1933), 67–80, 209–28, 347–83, 518–70; and A. Boehm, 'L'augustinisme de Valeriano Magni', *Revue des sciences religieuses*, xxxix (1965), 230–67. Cf., more briefly, *Dictionnaire de théologie catholique*, ix (1926), cols. 1553–65 (good); Winter, *Frühaufklärung*, 164–7; Blekastad, op. cit., index, s.v., who repeatedly compares him with Comenius. Complete bibliography of Magni's works by G. Cygan in *Coll. Franc.* xlii (1972), 119–78, 309–52. See below, p. 337, on his physics.

[33] Marci, *Philosophia Vetus Restituta*, sig. *4' (letter from Kircher); D. G. Morhof, *Polyhistor*, i–iii (Lübeck 1695–1708), ii, bk. 2, pt. 2, 39 f., 259 f., 298 f., 308, 313, 331, 335, 367, etc. *Dictionnaire de théologie catholique*, ix, col. 1556. It has regularly been stated that only one copy survives (in Prague's UK) of Magni's last philosophical work, *Opus Philosophicum* (Litomyšl 1660), which was confiscated by the censors; but that does not appear to be true: one is listed in Paulhart–Voglsam (eds.), op. cit. litt. O, no. 148.

four languages, author of over one hundred books, 'prince of the casuists', Caramuel's Cistercian contemporary, Sartorius, described him as 'a Name worthy to be spelled out in letters of gold, a very Sun among intellects'.[34] There is no doubting his encyclopaedic learning and his eclectic method: it is just difficult to penetrate the bombast of the one and reach any clear statement of the other. Best, perhaps, are the preface to the *Rationalis et realis Philosophia*, where Plato is explicitly preferred to Aristotle, and some letters to Kircher, Marci, Bernard Ignác Martinic, and other friends.[35] Caramuel possessed a highly diffuse and discursive mind: the *Trismegistus Theologicus*, his penultimate book, represents an amazing jumble of erudition, a kind of *Finnegans Wake* of Baroque philosophy. For all his innovatory forays he was certainly no radical, seeking instead to refurbish and rehouse the existing principles of Christian thought.

Marci, Magni, and Caramuel all display, besides their Platonism, some awareness of the contemporary Western debates which we have learned to call the 'scientific revolution'. Those debates penetrated Central Europe in two further ways. Protestant intellectuals in Hungary—and to a lesser extent in Silesia, among pupils of Daniel Sennert (1572–1637)—opened their minds to influences from the Dutch universities and from modernists in Germany; eager readers could be found at Debrecen or Kolozsvár for Bacon and Descartes, Gassendi and the atomists. I mention (but this is not the place to dwell on them) Johannes Bayer (1630–74), who showed empiricist leanings; his Upper Hungarian compatriot and fellow-student at Wittenberg Isaac Zabanius (1632–1707), who wrote on the existence of atoms; and the Transylvanian scholar, János Pósaházi (*c.* 1630–86), who brought back Cartesian ideas from

[34] Cf. above, n. 13 (Ceyssens, Ceñal); and earlier H. Hurter, *Nomenclator Literarius*, i–iii (Innsbruck 1871–86), ii, 529–34. Sartorius, op. cit. 547–50; cf. Morhof, op. cit. i, bk. 1, 209. Caramuel was one of the most redoubtable polyscriptors on record. Ferdinand III once spent the day at his monastery, examining the *œuvre*. The emperor said he could not be the judge of its quality, but he would never have believed, had he not seen it, that one pair of hands and one pen could write so much about so many things. That, adds Caramuel, was twenty years ago, and he only saw the first bookcase full! (*Mathesis Biceps*, i, sig. *3').

[35] J. Caramuel Lobkovic, *Rationalis et realis Philosophia* (Louvain 1642), esp. sig. aiii–aiv ('negare non potero eius [Plato's] doctrinam propriùs ad Christianam accedere, quam Peripateticam'). A series of these letters is published in *Mathesis Biceps*, i, 415–86, 711–14; cf. Ceñal, art. cit. 122–47.

Utrecht. Puritan authors, like János Apáczai (1625–59), naturally sought to widen such breaches in the traditional firmament.[36]

Meanwhile an independent spirit made itself evident within certain immigrant Catholic circles. There were elements of full-scale libertinism around Prince Eugene and his library, housed in Vienna by 1712, with its rich collection of free-thinking literature. Something similar grew up in the entourage of the prickly but gifted second-generation Bohemian, Count Sporck, that peculiar blend of penitent Baroque *seigneur* and enlightened dilettante.[37] More important was an atmosphere of fairly down-to-earth criticism associated especially with the numerous Irish settlers in the Monarchy. Some of it came from men of religion: the Prague Franciscans and their robust instruction, which so offended local Jesuits; the learned Nicholas Donellan, vicar-general of the Augustinian hermits and professor of canon law at Vienna University, travelling companion with Edward Browne on the latter's Royal Society visit to Austria; or the argumentative military chaplain, Thomas Carve.[38] Others were lay intellectuals, like the splendid William O'Kelly, a successful doctor. O'Kelly is the author of a forthright guide to practical philosophy 'methodo parisiensi

[36] On Sennert: Thorndike, op. cit. vii, ch. 7. S. Felber, *Ján Bayer, slovenský baconista XVII storočia* (Bratislava 1953), is demolished by D. Tschižewskij, 'Johannes Bayer, ein deutscher Philosoph in der Slowakei', *Südostforschungen*, xv (1956), 471–7. J. Mikleš, *Izák Caban, slovenský atomista XVII storočia* (Bratislava 1948), is again rather misconceived, though Zabanius's *Existentia Atomorum* (Wittenberg 1667), is a significant little work; cf. above, p. 267 (Sachs). On Pósaházi: E. Makkai, *Pósaházi János élete és filozófiája* (Kolozsvár 1942). J. Apáczai Csere, *Magyar Encyclopaedia* (Utrecht 1653); cf. I. Bán, *Apáczai Csere János* (Bp. 1958).

[37] Braubach, op. cit. v, 92–115, 169–95; Winter, op. cit. 118 ff. Cf. Montesquieu, *Voyages*, i–ii (Bordeaux 1894–6), i, 5 ff., 281–4. It is quaint that the two most stimulating companions Montesquieu found at Vienna were both generals (Eugene and Guido Starhemberg); then he moved on to Venice to enjoy the company of a third: the renegade Austrian commander Bonneval. On Sporck, cf. above, p. 216.

[38] Above, pp. 221, 320. For other Hibernians in Central Europe, cf. Millett, op. cit. 356, 366–8, 372 f., 479 f. It was an Irishman, Antonius Donillius (Donnelly?) who reissued Marci's *Philosophia Vetus Restituta* in Germany in 1676 (cf. 1662 edn., sig. **3'). On Donellan (died in 1679): Ossinger, op. cit. 297 f.; Janetschek, op. cit. 292 ff.; J. J. Gavigan, 'A letter from Nicolas Donellan', *Aug.* xix (1969), 291–320; K. Hörmann, 'Nikolaus Donellan, ein Ire auf dem moraltheologischen Lehrstuhl der Universität Wien', *Festschrift F. Loidl*, i, 65–95. Donellan apparently converted Ferenc Nádasdy (Fallenbüchl, op. cit. 67; Gavigan, *Austro-Hungarian Province*, i, 99), though their later relationship is unclear (cf. Pauler, op. cit. i, 281 ff.). He corresponded with Lambeck from Eperjes in Hungary (ÖNB, MS. 9714, fols. 43,

pertractata', aimed as an antidote to dryasdust scholastic primers and an introduction to the useful discoveries of recent Western scientists: Galileo, Gassendi, Descartes. He proudly acknowledges a line of distinguished Irish (or honorary Irish) iconoclasts stretching from Scotus through Occam to Robert Boyle.[39]

Yet none of this goes very far to alter the general picture. Hungarian Protestants were isolated and basically conservative, heavily indebted to Aristotle and less radical than some admirers have claimed. Eugene and Sporck were also isolated, an élite of the élite, only toying with erudite sedition. Though the *libertins* received at Vienna represent an interesting chapter in the prehistory of the Enlightenment and the troubled story of Habsburg–Papal relations (the Italian anticlerical fugitive, Pietro Giannone, actually became a pensionary of Emperor Charles VI), their impact on the country at large was extremely slight. The letters of Eugene's protégé, J. B. Rousseau, show how distant that French salon poet remained from the Austrian milieu.[40] Much of the Catholic criticism was linked to power struggles within the ecclesiastical establishment, usually campaigns against the Jesuits. Even O'Kelly is more striking for irreverence than for novelty. No new framework of analysis was constructed; indeed, the elaboration of new logical systems, one aspect of an anti-Aristotelian approach, proved largely a Jesuit preserve. Caramuel—needless to say—had views on that, as on everything else, but the main debate was pursued by Kircher and Schott, Caspar Knittel in Prague and Szentiványi at Tyrnau, and

71 f.; ibid. MS. 9715, fols. 40, 48), and seems to have accompanied Count Leslie's regiment thither. For other Irish Augustinians in Central Europe, cf. Ossinger, op. cit. 363 f., 735; Gavigan, *Austro-Hungarian Province*, 10–14. Carve (died after 1672), from Tipperary, wrote a lively travel-diary: *Itinerarium*, ed. M. Kerney (London 1859, 1st edn. 1639–46); as well as books on Irish history which involved him in a marvellous slanging-match with a Hibernian friar called Bruodin (T. Wall, 'Bards and Bruodins', in *Wadding Commemorative volume*, 438–62).

[39] O'Kelly, op. cit.; cf., for some details of his life, Schmid, op. cit. 21 ff.

[40] On the Viennese exile of Giannone (1676–1748), who was a friend of Eugene and the court librarian Garelli, see most recently G. Ricuperati, 'Libertinismo e deismo a Vienna: Spinoza, Toland e il Triregno', *Rivista Storica Italiana*, lxxix (1967), 628–95. Jean-Baptiste Rousseau, *Lettres sur differens sujets*, 2 vols. in 3 (Geneva 1749); he began by feeling at home ('Tous les Princes et tous les Seigneurs parlent notre langue, et la pluspart en connoissent les agréments mieux que nous-mêmes'—a palpable exaggeration, though cf. above, p. 214, n. 45), but soon grew disillusioned.

involved a thoroughly backward-looking rediscovery of the *Ars Magna* of Ramon Lull.[41]

The most fundamental opponents of orthodox learning belonged to a tradition almost as old as Christianity itself: Augustinianism, a thorn for complacent scholastics in Counter-Reformation no less than in Reformation. Again the doctrine was espoused by a clear faction within the body of the Church: canons regular, Premonstratensians, Augustinian friars. Partly they taught a timeless scepticism. Nebridius of Mündelheim, from the abbey of Klosterneuburg, made no bones about it in the preface to his *Philosophia ... S. Augustini*: "Aristotle", he tells us, "was a man heathen and false, profane and arrogant, obscure and slippery, who neither knew nor worshipped the one God or true wisdom; for that reason he now resides with the inhabitants of the nether regions, quibuscum desperatè Deum summè bonum blasphemat et execratur." Then the good canon proceeds to a Baroque *tour-de-force* of quotations drawn entirely from St. Augustine.[42] Similar sentiments can be found on occasion in Caramuel, while the vehemence of Magni betrays the influence of Augustine and Bonaventura, as do the mystical leanings of some Franciscans and the odd mild flirtation with Cornelius Jansen.[43] At the same time there exists a particular debt to Renaissance sceptics, most evident in the writings of Hieronymus Hirnhaim (1637–79), the Premonstratensian abbot of Strahov. Hirnhaim was the author of some fairly unremarkable devotional literature, but his *De Typho Generis Humani* is one of the

[41] S. Sousedík, 'Diskrétní logika Jana Caramuela z Lobkovic', *Filosofický Časopis*, xvii (1969), 216–28; cf. below, pp. 353–5.

[42] Nebridius à Mündelheim, *Philosophia ... S. Augustini ... Christiana* ([V.] 1654); cf. his *De vita et virtutibus ... S. Augustini* (V. 1648), with reflections on ethics. It would be helpful to know more about the intellectual life of the Augustinian canons in this period. The general level of study among Augustinian friars does not appear to have been very high (Gavigan, *Austro-Hungarian Province*, ii, 98–161, 213–26, 313–33).

[43] J. Caramuel Lobkovic, *Thanatosophia nempe Mortis Museum in quo demonstratur esse tota Vita ... vanitas vanitatum ...* (Brussels 1637). For Magni: Corniero, art. cit.; Boehm, art. cit. Amandus Hermann, *Desertum Pharan mystice explicatum ...* (Pr. 1687), sermons for passiontide. On Central European readers of Jansen: L. Ceyssens, 'Florence Conry, Hugh de Burgo, Luke Wadding, and Jansenism', in *Wadding Commemorative volume*, 295–404, at 331–55; S. Dolezel, 'Frühe Einflüsse des Jansenismus in Böhmen', in Seibt (ed.), op. cit. 145–53; cf. Rezek (ed.), 'Idea gubernationis ecclesiasticae'.

most provocative books to have come out of seventeenth-century Central Europe. Learning is evil, it insists, conducive only to vanity; no real knowledge is possible and scholars never agree; the works of the Creator are inscrutable. The message can be summed up in a simple—albeit rather paradoxical—chapter-heading: 'de vano libros conscribendi studio'.[44]

Once more, however, the picture is not completely negative. Nebridius and Hirnhaim, like Magni and Caramuel, are seeking a genuine Catholic philosophy. Hirnhaim especially was a man of real erudition, besides being a considerable public figure; despite his reflections on the vanity of books, he showed much concern for the well-being of his monastery's library and the archbishop of Prague's seminary. His *De Typho* represents more than just a paean to *docta ignorantia*—as the Emperor Leopold perhaps perceived when he recorded qualified approval of it. Rather Hirnhaim takes up a similar position to his spiritual ancestor, Agrippa of Nettesheim, in the *De Incertitudine et Vanitate Scientiarum*: both would dearly embrace pansophy, but they are baffled by the complexities of the world and human opinion. And Hirnhaim leaves no doubt of a residual sympathy for the pious, even mystical Neoplatonism of his teacher, Marci.[45] A very interesting postscript to this appears in a manuscript compiled for private use by an Augustinian friar down the Petřín hill in the Old Town of Prague. The anonymous writer stresses the weaknesses of Aristotle—he has little time for Peripatetic qualities, humours, or elements. Instead, he tries to build up a new doctrine based on recent philosophers of nature: Kircher, Schott, Caramuel, above all Marci. His very title launches a manifesto of both critique and reconciliation: *Nova, vel potius Antiqua, Philosophia, Naturalis,*

[44] H. Hirnhaim, *De Typho Generis Humani sive Scientiarum Humanarum inani ac ventoso tumore ...* (Pr. 1676); the title-word 'typhus', as he explains, is derived from Augustine: 'Huic inflanti et evertenti vento, Divi Augustini vestigiis insistens, exitiosam hujus mundi scientiam comparo'. Hirnhaim also says that this work presents a view of science parallel to that of religion expressed in his *Sermo S. Norberti* (Pr. 1676). C. S. Barach, *Hieronymus Hirnhaim* (V. 1864), is an interesting study, though it makes excessive claims for its subject's modernity.

[45] Str. MS. DJ III 3 is an autobiographical account of Hirnhaim's public activities; cf. above, p. 221. Hirnhaim drew up the first *Leges Bibliothecae Strahoviensis* (1671), ed. P. Kneidl (Pr. 1971). For Leopold: ÖNB, MS. 12757, fol. 57 (4 Feb. 1676), where the emperor says that *De Typho* is 'not bad'. In the Kirchberg library catalogue (ÖNB, MS. 14878, fols. 10ᵛ, 22ᵛ) there is an inspired miscopying of Agrippa's title: 'De incertitudine et *varie*tate omnium *Senten*tiarum'.

Fundamentalis, Realis, Christiana, Catholica, Selecta, Anti-Aristotelica.[46]

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Thus we have a thread of dissent. But, in intention at least, it was usually a creative dissent. The larger instinct was a desire for the synthesis of old and new. Let us follow it now into two areas of crucial contemporary intellectual concern. The first is astronomy. As everyone knows, cosmological speculation in much of Europe was seriously affected by successive Roman condemnations of Galileo and the Copernican system in 1616 and 1633; but we need to keep the impact of these judgments in perspective[47] Besides its own highly mythopoeic contribution, the Galileo-affair has fostered two widespread legends about seventeenth-century astronomy: firstly, that Catholic countries were forced to suspend cosmological investigations; secondly, that everywhere a straight contest took place henceforth between Ptolemaic reactionaries and Copernican progressives. The truth is more subtle.

In Central Europe both practical and theoretical work continued. Galileo even retained some unrepentant admirers: the truculent Magni, not altogether surprisingly, still backed his views, while the military architect Pieroni had plans for a German translation of the *Dialogo dei due massimi sistemi del mondo* and actually enlisted the help of Cardinal Dietrichstein.[48] But that is not the real point: Magni thought the earth's rotation only probable; Pieroni was a shadowy figure, not a true radical mind. More important, the new discoveries engendered much Catholic analysis of celestial problems which was unexceptionable and unexceptioned. In the 1640s Caramuel and the Tyrolean Capuchin, Antonius Schyrl de Rheita, debated the number of Jupiter's satellites, Caramuel and Marci the

[46] UK, MS. XIV G 21, written in 1661, with later additions evidently influenced by the publication of Marci's *Philosophia Vetus Restituta* (cf. UK, loc. cit. fols. 8^{v}–11^{r}).

[47] T. S. Kuhn, *The Copernican Revolution* (Cambridge, Mass. 1957) is an intelligent and intelligible general survey of a complex issue. It should be remembered that the condemnations were specifically and crudely directed at a few crucial (and anyway well-known) passages. Cf. Reusch, op. cit. ii, 394–400.

[48] J. Cygan, 'Das Verhältnis Valerian Magnis zu Galileo Galilei und seinen wissenschaftlichen Ansichten', *Coll. Franc.* xxxviii (1968), 135–66, a somewhat inconclusive article. On Pieroni: Galileo, *Opere*, i–xx (Florence 1890–1909), xvi, 188–90, 300 ff., 358–60, 393 f., 397 f., 419 f.; xviii, 268; cf. *Rudolf II*, 194 n. 3; and above, p. 202.

relation between the motion of a pendulum and the earth's centre of gravity. Of course, it was easier to discuss some things than others: the incorruptibility of the heavens formed a far more dispensable piece of the Aristotelian scheme than the immobility of the earth. Yet little evidence exists that those who tended to criticize the former rather than the latter were anything but free agents; and we have every sign of genuine intellectual enthusiasm for the inquiry.[49]

The Jesuit order was especially active, its practical astronomy already a lively tradition in Central Europe by 1600, with Christoph Clavius from Bamberg, who settled at Rome and attracted the Tyrolean Grienberger (1564–1636) to join him. A series of important instrument-makers and observers followed, like Scheiner, known for his work on sunspots; Behm, Stansel, and Hartmann, who wrote on comets and planets; and others more concerned with ancillary questions of mathematics and mechanics, horology and optics. The quality of their technical competence is illustrated by a Prague manuscript based entirely on Jesuit authorities, as well as in more modest compilations, and the interest lasted into the eighteenth century, as the researches of Maximilian Hell (1720–92) demonstrate.[50] Moreover, it was never divorced from theories of the world-systems: J. B. Riccioli's massive *Almagest*, quite the largest cosmological treatise of the period, contains a long section on the Copernican hypothesis and Galileo's opinions. Standard courses of lectures, such as Hirnhaim's, seem also to have embraced this issue, albeit in much briefer compass.[51]

[49] J. Caramuel Lobkovic, *Novem Stellae circa Iovem, circa Saturnum sex, circa Martem non-nullae* (Louvain ?1643); id., *Perpendiculorum Inconstantia ... examinata et falsa reperta* (Louvain 1643), with a dedication to Bernard Ignác Martinic. J. M. Marci, *Otho-Sophia seu Philosophia Impulsûs Universalis*, op. posth. ed. J. J. W. Dobrzensky (Pr. 1683), 127 ff., with further reference to Martinic as intermediary and the opinions of Kinner *et al.* One instance of constraint may be Théodore Moretus, who seems to have argued for the immobility of the earth without complete conviction (Bosmans, art. cit. 98 f.).

[50] On these Jesuits, all born in the Habsburg lands except for Scheiner, who came from Mindelheim in Bavaria, see Sommervogel, s. vv. UK, MS. XII G 3: 'Gnomonice sive Horologiographia ex diversis ... Scriptoribus ... Operâ F. F. S.', a careful piece of work and well illustrated. Heiligenkreuz, MS. 470, is a typical monastic MS. Good 18th-century observatories were constructed by the Benedictines at Kremsmünster and the archbishop of Eger.

[51] J. B. Riccioli, *Almagestum Novum*, 1–11 (Bologna 1651) i, pt. 2, 290–500, including Galileo's recantation. Str., MS. DB VI 37, based on Hirnhaim's lectures, esp. pp. 35–7 (on Copernicus) and 147 ff. (appendix on instrument-making).

Perhaps the best-known textbook in the Habsburg lands was Kircher's *Itinerarium Exstaticum*, an epitome of Riccioli commissioned by Ferdinand III and first published at Rome in 1656, then reissued with commentaries from Kaspar Schott at Würzburg in 1660. While offering an orthodox general account of planetary science, Kircher and Schott stress its experimental base and the great body of recent discoveries about the heavens which have radically altered older notions.[52]

There was, then, an evident need to steer between the Scylla of an outmoded Ptolemy and the Charybdis of Copernicus (viewed as fact, rather than as idle hypothesis). Riccioli, Kircher, and the rest thought they had found a perfectly satisfactory compromise candidate: Tycho Brahe, who in the years around 1600 evolved a mixed system where sun and moon circle a stationary earth and the other planets circle the sun. Jesuits readily espoused the Tychonic system, with certain modifications (often they preferred one or two more planets to revolve around the earth); so did Caramuel, who while promising, as usual, 'multa contra veterem Philosophiam', really offered 'multa *Caramuelaeam* verae doctrinae *restitutionem* propugnantia' (my italics), and even sought to cling to the solidity of the heavenly spheres; so did thinkers throughout the *Reich*. From the Capuchin Schyrl came a thorough exposition, modelled on Tycho but including distinctly generous references to Copernicus too, all backed by his own observations and prefaced with an elaborate illustrated dedication to Ferdinand III.[53]

Schyrl's association of his book with the Habsburgs is no mere genuflection; the dynasty had long shown interest in astronomy. Of

[52] I have used the 2nd edn., entitled *Iter Extaticum Coeleste* (Würzburg 1660); see esp. 1–10 (Schott's dedication to the abbot of Fulda), 11–18 (Kircher's preface to the reader), 485 ff. (Schott's defence against certain critics). There was a 3rd edn. (Würzburg 1671), and two more followed in 18th-century Hungary.

[53] Ibid., esp. 36–9. Caramuel, *Novem Stellae*, ded. (quoted); id., *Mathesis Biceps*, 271–83, 415–86, 1389 ff.; cf. Hermann, *Sol Triplex*, 565 ff., for another defender of the spheres. See also, in general, D. Stimson, *The Gradual Acceptance of the Copernican Theory of the Universe* (2nd edn. New York 1971), 77 ff. (sketchy). Antonius Maria Schyrl de Rheita, *Oculus Enoch et Eliae sive Radius Sidereomysticus* (Antwerp 1645), esp. the interesting preface, which emphasizes how the Index has suppressed only a few passages of Copernicus, *donec corrigantur*; cf. G. Schott, *Technica Curiosa sive Mirabilia Artis*, i–ii (Würzburg 1664), i, 397 ff. Schyrl (also known as 'Rheita') is said (by Heimbucher, op. cit. i, 741) to have converted Christian August of Sulzbach.

course, its greatest protégé was Kepler, but that is to judge by the standards of a more distant posterity. Tycho had also been patronized by Rudolf II at Prague, where he died in 1601, and he was the right kind of figure for court consumption: an aristocratic cavalier, exiled from the Protestant north. His descendants remained in Central Europe during the seventeenth century, as did his instruments and manuscripts; it is not too important for our purposes that the former were largely engaged in securing a profitable sale of the latter.[54] From the 1640s Ferdinand III and Leopold supported a Jesuit, Albrecht Kurz, or Curtius, in his project to publish the great series of Tycho's observations of the heavens recorded between 1582 and 1601. Kurz was well suited to the task, being not only the brother of an imperial vice-chancellor and a Bavarian major-domo, but also a relative of the Rudolfine courtier who had done most to attract Brahe to Prague. His edition of the *Historia Coelestis* eventually appeared on a thousand folio pages at Augsburg in 1666, with full recognition of the stimulus given by the Habsburgs and Georg Martinic and reflections on the continuity of the Tychonic tradition. This work duly found its way into Leopold's private library; and we know that Ferdinand III sponsored other publications of a similar hue.[55] Some aspects of the case are not clear to me—why did Kurz always hide behind the pseudonym 'Lucius Barrettus' (a transparent anagram of 'Albertus Curtius')? On the other hand we possess one piece of information which very few contemporaries can have known: by a piquant turn of fate the original manuscript of Copernicus's *De Revolutionibus* lay all the time in the library of one of Bohemia's magnates.[56]

[54] On Tycho Brahe's life see, most recently, W. Norlind, *Tycho Brahe, en levnadsteckning* (Lund 1970), who offers no real reinterpretations. His heirs were the offspring of a somewhat devious son-in-law and bore the family name Gansneb Tengnagel vom Kamp.

[55] Tycho de Brahe, *Historia Coelestis* (Augsburg 1666, apparently reissued at Regensburg in 1672). This Georg Martinic (ibid., p. cxxiii) is presumably the elder brother of Bernard Ignác, acting chancellor of Bohemia during the 1640s, who died in 1651. Kurz seems to have published a trial run of his work at Vienna in 1657 (Mayer, op. cit. no. 1804, not in Sommervogel). On Kurz (1600–71) see the scattered information in Balbin, *Bohemia Docta*, i, bk. 2, 408 f.; Riccioli, op. cit. i, pt. 1, pp. xxix, xlv f.; Sommervogel, ii, cols. 1742–4; Norlind, op. cit. 320–2; Schmidt, *Pfalz-Neuburg*, 39 f., 42. Cf., on Jakob Kurz von Senftenau, *Rudolf II*, 71, 136. ÖNB, MS. 12590, p. 38, lists the *Historia Coelestis*; cf. HHStA, RHR, Misc., Bücherkommission im Reich, fasc. 2, 'konv. 5', fols. 70–3, 78 f.

[56] On the pseudonym, cf. below, n. 84. N. Copernicus, *Complete Works*, i (London–

(continued)

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Thus astronomical views in the Habsburg lands were not merely benighted; they show how the Central European environment could adapt and accommodate novel ideas. It is worth pursuing this theme further, into the field of terrestrial science. Concern for measurement meant an interest in mathematics. Among members of the dynasty it is most pronounced with Ferdinand III. Having been forced into the unwelcome career of soldiering, which he abandoned at the earliest opportunity, Ferdinand began by studying military geometry—a popular subject at the Habsburg court—then turned to more general problems and drew up a set of exercises, even preparing an instrument (a kind of prototype slide-rule) to help solve them. The emperor's brain-child was edited for publication, first (pseudonymously) by Kurz, then by Schott.[57] Mathematical enquiry reached wider circles via imperial favourites such as Kinner and its partisans among the Jesuits, one of whom, the Belgian Grégoire de St. Vincent, proved the most gifted local exponent of the art. St. Vincent, like the emperor, was drawn into the theatre of war: during the Saxon invasion of Prague many of his manuscripts were destroyed. Fortunately enough could be rescued by his colleague Arriaga to allow publication of his huge *Opus Geometricum*, which included important theorems about circles and conic sections as well as a suitably intricate dedication to the dynasty.[58]

Undoubtedly mathematics became the serious pursuit of a learned élite which operated in an international framework. Links were provided with the Low Countries by such men as St. Vincent and the mobile Belgian Jesuit, Théodore Moretus; with Germany by Caspar Ens, Schott, and the equally mobile Polish Jesuit, Adam

Warsaw–Cracow 1972) is a facsimile of this MS., which once belonged to Comenius, then passed to the younger Otto von Nostitz, and remained the *pièce de résistance* of the Nostitz Library in Prague for nearly 300 years.

[57] G. Schott, *Mathesis Caesarea sive Amussis Ferdinandea* (Würzburg 1662), esp. the preface; Kurz's edn. appeared at Munich in 1651. The Viennese interest in military architecture is evidenced by copies of MSS. by Joseph Furtenbach (1591–1667): ÖNB, MSS. 10834, 10842, 10847–8, 10884–5, 10918, 10960, 11026; cf. MS. 11015.

[58] G. de St. Vincent, *Opus Geometricum Quadraturae Circuli* (Antwerp 1647). On the author see H. Bosmans in *Biographie Nationale ... de Belgique*, xxi (1911), cols. 141–71. Sommervogel and others perpetuate the myth that St. Vincent (1584–1667) was seriously wounded in Prague during the *Swedish* siege: by that time he had long returned to Belgium.

Kochański. Becher looked still further afield and presented his work on exact timekeeping to the Royal Society of London in 1680. Even standard monastic treatises refer to French textbooks.[59] But no decisive move ensued to enthrone quantity in the place of existing qualitative assumptions. The most debated part of St. Vincent's tome was its culminating section, a vain claim to have finally solved the age-old riddle of how to square the circle. Moreover, this riddle is actually described as *the* 'problema Austriacum', both by St. Vincent and by his friend Kinner, who (with the approval of Caramuel, Marci, and others) issued a simplified version of one of his proofs at Prague in the 1650s.[60] Now it was still perfectly reasonable for contemporaries to discuss the possibility of quadrature—like the philosophers' stone, no one could yet demonstrate it to be a phantasm. But the Austrian obsession with it begins to look old-fashioned; more important, it goes with an attachment to mathematics as a learned amusement, a game of fancy rather than an iron discipline. Kircher, Schott, and Kinner devised for the dynasty a species of calculating machine with keyboard (or tabulator) to simplify the operations of arithmetic and geometry, fortification and astronomy, and much else besides. Though no doubt an ingenious project, it owed more to an environment of courtly diversion, backed by a belief in some pristine harmony of knowledge, than to the spirit of Barrow and Newton, or even of Leibniz.[61]

Another fascinating issue, even more central, where we can

[59] On Moretus (1602–67): Bosmans, 'Moretus'; G. Schott, *Cursus Mathematicus* (Würzburg 1661), with ded. to Leopold. Adam Kochański (1631–1700) was born in Poland, taught at Bamberg, Würzburg, and Mainz, and also in Bohemia, where he died. J. J. Becher, *Theoria et Experientia de nova Temporis Dimetiendi Ratione ...* (London 1680). Heiligenkreuz, MS. 470, pp. 175 f. and *passim*, using the *Cursus seu Mundus Mathematicus* of Claude François Milliet de Chales (Lyons 1674).

[60] G. A. Kinner, *Elucidatio Geometrica Problematis Austriaci sive Quadraturae Circuli* (Pr. 1653, colophon says '1654'). Cf. J. M. Marci, *Labyrinthus in quo via ad circuli quadraturam plurimis modis exhibetur* (Pr. 1654); and other Central European examples in Schott, *Technica Curiosa*, ii, bk. 8.

[61] G. Schott, *Organum Mathematicum libris IX explicatum* (Würzburg 1668), esp. the dedication (to Johann Kaspar Ampringen) and preface; cf. A. Kircher, *Specula Melitensis encyclica* (Naples 1638), reprinted in Schott, *Technica Curiosa*, i, 427–77. Western Europeans interested in quadrature included Henry Oldenburg, who sought a copy of Kinner's book in 1668 (R. M. and M. B. Hall (eds.), op. cit. iv, no. 891); but St. Vincent's claims were disputed by Descartes and Mersenne, Huygens and Leibniz.

observe Central Europeans wavering between old and new, trying to espouse the latter in order to confirm the former, is the empirical approach to knowledge. As with astronomy, so with natural philosophy as a whole, thinkers from the Habsburg lands were not behindhand in asserting the authority of the senses. Observation of the heavens could be paralleled by close study of nature. Kircher's *Itinerarium Exstaticum* formed the prelude to a much larger book called *Mundus Subterraneus*, very celebrated in his lifetime, an account of geology which possesses some genuine originality and claims to be founded on experience, both the author's own and that of his helpers. These range from fellow-Jesuits to emperors, through the elector of Mainz and Friedrich of Hesse-Darmstadt, Archbishop Lippay and Bernard Ignác Martinic. When Becher took up the same subject, he claimed to be more practical still, incorporating schemes to derive useful minerals from the mud of the Danube, and so forth.[62] Similar concerns exercised local physicians and clergy who went around collecting evidence of natural phenomena. Some of it was published in the proceedings of the *Academia Naturae Curiosorum*; some provided scope for disputes at home, like that between two Moravian doctors, J. F. Hertodt and Wenceslaus Ardensbach, who argued heatedly about the properties of the flora and minerals in their province.[63]

At the same time both astronomy and physics called for the testing of hypotheses and the construction of new instruments with which to conduct experiments. Two particular areas of investigation found favour in Central Europe. The first was optics, continuing the work of Kepler and of Scheiner, whose *Oculus*, printed at Innsbruck in 1619 with a dedication to Ferdinand II, discusses both theoretical and practical aspects of vision. The properties of light

[62] A. Kircher, *Mundus Subterraneus*, i–ii (Amsterdam 1665), esp. the two prefaces. J. J. Becher, *Physica Subterranea* (2nd edn. Frankfurt 1681, first published ibid. 1669); id., *Experimentum novum ac curiosum de Minera Arenaria Perpetua* (Frankfurt 1680); cf. H. von Srbik, 'Abenteurer am Hofe Kaiser Leopold I', *Archiv für Kulturgeschichte*, viii (1910), 52–72, at 67 f. See also the evaluation of these works by Thorndike, op. cit. vii, 567–83.

[63] J. F. Hertodt, *Tartaro-Mastix Moraviae* (V. 1669); id., *Opus Mirificum*; id., *Crocologia seu curiosa croci regis vegetabilium enucleatio* (Jena 1671); W. M. Ardensbach von Ardensdorff, *Tartaro Clypeus, excipiens Tartaro Mastigem* (etc.) *Hertodianum* (Pr. 1671). The latter—a pupil of Marci and assiduous reader of Kircher—appears to prevail, especially since he makes some use of Western sources (Harvey, Boyle, Willis, Nathaniel Highmore, Swammerdam, etc.).

fascinated Marci, and his *Thaumantias* of 1648 contains notable new observations on the spectrum; after Marci's death a Styrian Jesuit took up similar themes.[64] In optics too the largest compendium came from the pen of Kircher—once again at the instigation of Ferdinand III. Kircher's *Ars Magna Lucis et Umbrae* tells us much about colour, lenses and mirrors, the construction and application of telescopes and magic lanterns (of which he has some right to be called the inventor). Its decidedly practical flavour is confirmed elsewhere in Kircher's *œuvre*: witness the beautiful illustrations of what a microscope reveals, reproduced in the posthumous guide to his museum; it was passed on to students like Jan Rakolupský of Szakolca, whose careful manuscript handbook of optics draws on Kircher, Schott, Scheiner, and other Jesuit writers.[65]

One of the classic seventeenth-century problems, atmospheric pressure, was likewise widely debated in Central Europe. During the 1640s Magni became a leading demonstrator of the possibility of a vacuum, and he revelled in the resultant controversy; his novel experiments, along with those of Guericke, Boyle, Torricelli, and Maignan, were fully reported there. Schott wholly gave over the early books of his *Technica Curiosa* to an approving discussion of their conclusions.[66] Similar ingenuity was devoted to hydraulics, especially by Dobrzensky, who wrote a treatise on the properties of water, illustrating the kinds of machine which could be used to harness them. Further elaborate mechanisms employing water-

[64] J. M. Marci, *Thaumantias Liber de Arcu coelesti* (Pr. 1648, reissued, ed. J. Marek, ibid. 1968); Zacharias Traber, *Nervus Opticus* (V. 1675). Cf. also S. Hartmann, *Catoptrica illustrata propositionibus Physico-mathematicis* (Pr. 1668).

[65] A. Kircher, *Ars Magna Lucis et Umbrae* (Rome 1646), with a dedication to the 'rising sun' of Archduke Ferdinand (IV), and a preface describing the emperor's part in the project. Excerpts from this work in J. S. Kestler, *Physiologia Kircheriana Experimentalis* (Amsterdam 1680), bk. 3. For the microscope: Philip Bonanni, *Musaeum Kircherianum* (Rome 1709), sect. 11. Rakolupský: Str., MS. DS V 19, written in the 1660s, with careful drawings, and based on a range of printed sources. Cf., for more optical constructions, Schott, *Technica Curiosa*, ii, bk. 11.

[66] V. Magni, *Admiranda de vacuo et Aristotelis philosophia* (Warsaw 1647); id., *Philosophiae pars prima* (Warsaw 1648); id., *Vacuum pleno suppletum* (V. 1650). Schott, *Technica Curiosa*, i, bks. 1–4; cf. id., *Mechanica Hydraulico-Pneumatica* (Würzburg 1657); Caramuel, *Rationalis et realis Philosophia*, 442–9; J. J. W. Dobrzensky, *Nova et Amaenior de admirando fontium genio ... Philosophia* (Ferrara 1659), 26 ff. Even Hermann (*Sol Triplex*, 504–7) was ready to be persuaded; cf. Marci, *Philosophia Vetus Restituta*, 208–22; UK, MS. XIV G 21, pp. 192–5; F. S. Schott, op. cit. 31.

power adorn the pages of Kircher, Schott, and other Jesuit investigators of nature, and some of them were no doubt actually constructed in order to probe the secrets of the visible world. The magnificent contrivances described by the German inventor, Georg Andreas Böckler, enjoyed widespread fame throughout the Empire, and one of them was consulted in manuscript by Leopold I.[67]

How far were these scientists genuinely scientific? How far, in other words, were they aware of the conditions necessary for controlled physical experiment? Kircher's protestation at the beginning of his *Magnes* may stand for the attitude of many of his contemporaries: "I have introduced nothing, however small, into this book which could not be, so far as lies within my power, personally tested and established (propriis experimentis comprobatum, stabilitumque)". The *Magnes* indeed offers (as its author also claims) a marriage of theory with practice, and—despite criticizing Gilbert and Kepler—it has serious insights into the working of magnetism.[68] One of Kircher's fellow-Jesuits went further: Francesco Lana-Terzi, from Brescia in northern Italy, compiled a massive three-volume survey of physical demonstrations and machines, some invented by himself, among them a visionary project for an airship as well as more standard thermometers and microscopes. He also published an introductory *Prodromo*, dedicated—like the main work—to Leopold, whose preface issues a real manifesto of the new philosophy, the more forcible for being written in Italian, not Latin. It is always wrong (Lana-Terzi assures his readers) to build on speculation and universal axioms instead of 'isperienze certe, ed accuratamente fatte', to follow authority or

[67] Dobrzensky, op. cit.; his book first appeared at Ferrara in 1657. Bonanni, op. cit. sect. 9; G. Schott, *Technica Curiosa*, i, bk. 5; cf. id., *Anatomia Physico-Hydrostatica Fontium* (Würzburg 1663). G. A. Böckler, *Theatrum Machinarum Novum* (Cologne 1662, and Ger. trans. Nuremberg 1673), takes much from his Renaissance predecessors Ramelli and Rudolf II's antiquary Strada. His 'Machina Universalis', listed as belonging to the emperor in ÖNB, MS. 12590, p. 87, is presumably the present ÖNB, MS. 10993: 'Machina universalis, Das ist eine neu erfundene ... anrichtung eines mechanischen Wercks, das man ... zu unzehlig vielen ... Sachen ... gebrauchen kan'.

[68] A. Kircher, *Magnes sive De Arte Magnetica* (3rd edn. Rome 1654), esp. reverse of title-page and preface to reader: 'Ego Artem trado Magneticam, eamque ita quidem pertracto, ut in ea tamen nec praxin Theoria, nec Theoriam praxis unquam destituat...'; ibid. 383 ff. on Gilbert and Kepler. Cf., for a positive view of this work, E. Benz, 'Theologie der Elektrizität', *Mainz, Akademie der Wissenschaft und der Literatur, Geistes- und Sozialwissenschaftliche Klasse*, 1970, no. 12.

popular appeal instead of induction; learning must be reformed so that it serves common human needs.[69]

Here again, however, the overall mood of Habsburg intellectuals, even of Lana-Terzi himself, was much less radical than these sentiments might suggest. The mood is well mirrored in the rag-bag writings of Schott, with their boundless curiosity and lack of discrimination, their privileged and comfortable world of garrulous clerical erudition. A practical bent certainly existed—Caramuel, amid all his other activites, managed to practise as an architect[70]—but it grew less, rather than more pronounced as time went on, and it does not appear to have involved contact with any true artisanate; a courtly, not an urban milieu defined it: the isolated and playful circles of imperial patronage. Just as mathematics could be put to work in arithmetical toys for Ferdinand III and his sons, so the highest purpose of mechanics might be found in stagecraft for the Hofburg theatre, of hydraulics in water-machines for the palace gardens. Significantly physics provided its own equivalent to quadrature of the circle, its own (as it were) archduke's head: the quest for perpetual motion, a pursuit not so much disreputable as definitely unprofitable. *Perpetuum mobiles* were continually discussed and described by Kircher, Schott, Dobrzensky, Becher, and their fellows, their causative principle related sometimes to magnetism, sometimes to atmospheric variation, sometimes to water-power. Lana-Terzi also devoted his best energies to demonstrating them.[71]

Thus empiricism had its proper, but subordinate place in the philosophical priorities of Central Europe. Experiment served ultimately to prove old assumptions; it was part of a preconceived harmony of knowledge. That may help us understand why music, the embodiment of practical and theoretical harmony, played such

[69] F. Lana [-Terzi], *Prodromo overo saggio di alcune inventioni nuove* ... (Brescia 1670), 1–17, stressing how few there are who 's'impieghino nelle lettere per esercitar il lume dell'intelletto ottenuto da Dio a fine di giovare al genere humano'. The main work, *Magisterium Naturae et Artis*, i–iii (Brescia—Parma 1684–92), received long and flattering reviews in Germany (*Acta Eruditorum*, 1685, 31–7; 1688, 35–9; 1693, 145–50). Lana-Terzi's other writings are listed in Sommervogel, s.v.

[70] D. de B. Ferrero, 'Il Conte Ivan Caramuel di Lobkowitz..., architetto e teorico dell'architettura', *Palladio* N.S. xv (1965), 91–110.

[71] Kircher, *Magnes*, 238 ff.; Schott, *Technica Curiosa*, i, bk. 6; ii, bk. 10; Dobrzensky, op. cit. 113–20; Becher, *De nova Temporis Dimetiendi Ratione, passim*; cf. R. M. and M. B. Hall (eds.), op. cit. i, nos. 87, 97, 108–9, 112, 119, 223. Lana-Terzi, *Prodromo*, chs. 9–14, and much more in his *Magisterium*.

a great role in the seventeenth-century Austrian Baroque. The achievements of composers and performers were underpinned with deeper reflections on the purpose of the art. The first full musical lexicon appeared at Prague in 1701. Kircher devoted perhaps the best of all his monumental treatises to the science of music, and he counted as an international expert both on its actual techniques and on its metaphysical foundations.[72] It is hardly an accident that Habsburg scholars were so interested in constructing an 'organum', which might be just the king of musical instruments—Dobrzensky devised one for Leopold at Prague in 1668—and might also carry the connotation, familiar to generations of schoolmen, of a logical or mathematical key to the universe. Not for nothing does the peroration to Kircher's *Musurgia* describe the entire world as an organ played by the Creator.[73]

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Although the instruments might be new, the tunes were old. New, potentially disruptive forces were held within a traditional intellectual matrix: a mental stance by no means entirely inflexible, but embattled. Having established that, we are in a position to address the crucial problem of this Baroque world-view: its occultism. While natural philosophy clearly represented the most exposed flank of existing Catholic orthodoxy, contemporaries could turn to a defence already elaborated during the later Renaissance. As I have tried to explain elsewhere, tension between received authorities and advancing knowledge is an important root of sixteenth-century magic, and the combination of realism and irrationality formed an essential element in Mannerism.[74] Now the terms were reformulated

[72] T. B. Janovka, *Clavis ad Thesaurum magnae artis musicae* (Pr. 1701). A. Kircher, *Musurgia Universalis sive Ars Magna Consoni et Dissoni*, i–ii (Rome 1650), with dedication to Archduke Leopold Wilhelm. An epitome of this work, by one Andreas Hirsch, was published as *Kircherus ... Germaniae redonatus ... Das ist Philosophischer Extract und Auszug ...* (Schwäbisch Hall 1662); and extracts from it appeared in German and English translation. U. Scharlau, *Athanasius Kircher als Musikschriftsteller* (Marburg 1969), is detailed and technical. Cf. briefly above, p. 153 for practising musicians; but that subject lies outside the purview of this book.

[73] Dobrzensky: ÖNB, MS. 10051: 'Philomela Veris Quaerens non iam rivulos, sed mare Gratiarum Desideransq. suaviter sub umbra Vel alarum, vel Aquilarum suarum Augustissime Caesar Leopolde sedere: seu Vocale Organum ...' Cf. Schott, *Organum Mathematicum*; Kircher, *Musurgia*, bk. 10, repeated in Hirsch, op. cit., bk. 6.

[74] *Rudolf II*, ch. 7; cf. above, pp. 33–6.

for the Counter-Reformation context: intellectually more vulnerable, emotionally and spiritually more stable; Mannerism heightened into the paradox and mystery of Baroque. Against such a background learning could actually be designed to demonstrate wonders, the occult invoked as a form of quasi-scientific explanation.

This process was not always conscious, but Kircher lets slip the premise when he tells us that his treatise on astronomy will show "how the fabric of the world is constituted according to principles far more recondite than either the simple minds of former ages or the vulgar philosophers of our own time have persuaded themselves". Schott is equally explicit in his first major work, *Magia Universalis Naturae et Artis*, which treats 'universal magic' as a dimension of all other branches of knowledge, as man's contact with the underlying divine wisdom. Indeed, Schott's whole *œuvre* offers the best introduction to this literature of secrets and mysteries, whose title-pages and chapter-headings throb with the promise of hidden intellectual treasure: of *mirabilia, curiosa, abdita, arcana, rara, recondita, prodigiosa, exotica* ...[75] The same enthusiasms appear in the proceedings of the *Academia Naturae Curiosorum*; in the work of Bohemians like Hertodt and above all Balbín, ever on the look-out for curiosities of nature with a patriotic flavour; in Hungarian compendia of wonders surviving through Szentiványi and beyond: a typical late product is Antonius Gabon's *Physica Exotica* of 1717 which, setting its face against the sceptic, appeals to the 'ardens ad arcanissima quaeque ingenium'.[76] The mood was easily coloured with mysticism: Schyrl's astronomy aimed to help our minds rise to contemplation of God; Caramuel developed analogies between Mother Church and the order of the heavens, nature, and the elements; visionary inspirations guided some of the

[75] Kircher, *Iter Extaticum*, 15. G. Schott, *Magia Universalis* ..., i–iv (Würzburg 1657–9), with a 2nd edn. at Bamberg 1674–7; id., *Physica Curiosa sive Mirabilia Naturae et Artis* (Würzburg 1662), with an expanded edn. ibid. 1667, reissued in 1697. These works were designed, with the *Technica Curiosa*, to form a trilogy; cf. Mercier, *Notice raisonné*, 6–34, 36–49, 51–63.

[76] A. Gabon, *Physica Exotica sive Secreta naturae et artis* (Tyrnau 1717), intro.: a text based on Kircher, with mentions of Schott, Porta, Paracelsus, Cardano, Agrippa, Mizauld, and others. Cf., for a further example, A. Felker, *Arcana naturae et artis* (Kassa 1734–5). On the genre in general see Thorndike, op. cit. vii, ch. 21; viii, ch. 31.

work of Kircher and Magni; Hirnhaim laid sceptical stress on the ineffability of natural mysteries.[77]

All this amounted to renewed apostrophe of a vitalist universe with its hidden correspondences and sympathies. Of course, many Europeans took symbols seriously in the seventeenth century (though their great age was drawing to its close); educated men everywhere were frequently credulous. Spain, in particular, was not markedly different from the *Reich*, as the career there of the German Jesuit Nieremberg indicates.[78] But Catholic Central European philosophy presents us with a pervasive habit of mind which invested even commonplace phenomena with 'magical' workings: a mentality standard enough among Aristotelians, still more standard among the Platonists and syncretists who went beyond Aristotle. It is almost as though its proponents were making a plea (reasoned enough, in its anti-rational way) for *nebulous* and *indistinct* ideas, by contrast with the revolutionary slogan of Cartesianism—a contrast the more pointed if we recall that Descartes claimed to have discovered his new method while a mercenary wandering through the Habsburg lands in the precise years around 1620 when they were made safe for Catholicism.[79]

Thus far, occult philosophy yielded an admirable establishment creed, for it seemed to confirm both Catholic truth and social order. Learning must not conflict with dogma, but room existed for interplay between the two. While natural magic demonstrated grounds for the miraculous and mysterious aspects of belief, Catholic doctrine offered scope for the activities of the natural magicians. How different was the rigid disapproval by official

[77] Schyrl, op. cit., pt. 2; J. Caramuel Lobkovic, *De Ecclesiae Romanae Hierarchia* (Pr. 1653), pref. and 17–35; Kircher, *Iter Extaticum*, 4 f.; Hirnhaim, *De Typho*, *passim*.

[78] Nieremberg (1595–1658) was born in Madrid of south-German parents. Sommervogel, v, cols. 1725–66, lists over fifty books by him; some appeared in several languages, including Czech (*Knihopis*, nos. 6188–91), and they were republished as far afield as Hungary (*RMK* ii, no. 1020). Among the best known were his *Curiosa y occulta philosophia*; and the *Historia Naturae* (Antwerp 1635), which was read by Leopold (ÖNB, MS. 8011, fol. 101'). Austro-Spanish cultural relations in this period are—so far as I know—largely untrodden terrain. Another interesting case would be Caramuel, some of whose works, even late in his life, were written in Spanish.

[79] Descartes, *Discours de la méthode*, esp. pt. 2. The episode when he fell into a trance while seated by the stove of an overheated room seems to have taken place in 1619 at Neuburg, home of the newly-converted palsgraves.

Calvinism of all meddling with the supernatural! How evidently do the German Lutherans, here as elsewhere, occupy a middle position, with their vogue for *mirabilia* and sympathetic cures.[80] Undoubtedly Catholic advocates of the occult thought themselves to combine unconstrained curiosity with total orthodoxy. Kircher interprets some crosses found on people's clothes after an eruption of Vesuvius as prodigies of the Almighty, the fall of the walls of Jericho as an instance of 'musical magic'; Balbín recounts many stories of beneficial supernatural agencies—uncorrupted corpses and the like; the *Academia Naturae Curiosorum* prints descriptions of 'rarities of nature': the name of Christ incised in a stone or an image of the Virgin in a mineral, and thanks Emperor Leopold for sending them[81] Both Schott and Szentiványi edified their fascination with letter-mysticism by compiling long sets of bizarre anagrams on the *Ave Maria*; Szentiványi (characteristically) managed to cobble together one for each day of the year.[82]

At the same time this was erudition which sought to conform as well as confirm. That lay in the nature of its patronage; but it went deeper. There is a mystic strain in the symbolic forms of Habsburg culture, displayed in repeated dedications and frontispieces which liken the imperial dynasty—from a sense, not of idle simile, but of some real correspondence—to the sun, the magnet, the fount of harmony, the prime mover.[83] Moreover, the whole endeavour played itself out in a closed fraternity, esoteric and exclusive, studying things 'a vulgi captu aliena', an admiring coterie of

[80] Cf. below, esp. pp. 373, 385, 389 f.

[81] A. Kircher, *Diatribe de prodigiosis Crucibus* (Rome 1661), with dedication to Archduke Leopold Wilhelm, reprinted in Schott, *Joco-Seria* (below, n. 84), 313–63; Kircher, *Musurgia*, ii, 231 f; Balbín, *Miscellanea Historica*, i, bk. 3, 168 ff. *passim*; *Miscellanea Curiosa Medico-Physica Academiae Naturae Curiosorum*, i (1670), 261 ff. and *passim*.

[82] Schott, *Mathesis Caesarea*, filling up the last pages; Szentiványi, *Curiosiora ... Miscellanea*, i, pt. 2, 27–37. In both cases the text used: 'Ave Maria, gratia plena, Dominus tecum', yields such pearls as 'Te puram sine macula genitam adoravi'. Examples of similar anagrams, chronosticha, and so on, are legion. Cf. below, p. 351 and n. 15.

[83] Kircher, *Magnes*, dedication: 'Quicquid demum in abditis politici mundi arcanis, solis Regibus notis, conditum est: id totum magnes in se, veluti in divinae cuiusdam ideae architypo, uti ex totius huius praesentis Operis decursu patet, implicitum tenet; Regiae prorsus mentis symbolum, virtutum heroicarum in magnis hominibus elucescentium norma vera, amussis omnis fallaciae expers ...' Cf. Kircher, *Ars Magna Lucis et Umbrae*, ded.; Lana-Terzi, *Prodromo*, ded.; J. M. Marci, *De Proportione Motus* (Pr. 1639), ded.; ÖNB, MS. 10051, fol. 1.

initiates, protected by courts and aristocrats. Emphasis lay always on the passive, contemplative side of life, the philosophy of acceptance. Even when concerned with 'operative magic', practitioners tended to remain playful and allusive, as in the *Jocoseria Naturae et Artis*, a collection of tricks and improbable effects issued by Schott under another of those punning Jesuit pseudonyms whose significance (though an open secret to contemporaries) seems lost on us.[84]

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Yet not all magic was either Christian or licit. The occult also posed an immense threat both to Catholic truth and to the Catholic social order. As everyone recognized, there existed another sort of magic: the black magic of superstition, drawing on the hidden powers, not of God, but of the devil. The whole system was potentially steeped in demonology. Equally evidently there existed a vast mass of the common population, easily attracted into active pursuit of the supernatural. The operative magic of the unprivileged had immediate practical implications: wizardry and divination, witchcraft and sorcery. The ordinary man's need to satisfy his physical wants by occult means was a far cry from the reflective arcana of the well-to-do.

The enormous challenge from this paganism was felt by all Churches: at a local level it absorbed a large part of their energies during the sixteenth and seventeenth centuries. Recent literature emphasizes the similarity of response on the part of Catholic and Protestant reformers alike to deep-rooted survivals of pre-Christian attitudes, and their parallel attempts to impose a new morality and culture, especially in the countryside.[85] Yet there were also major

[84] Schott, *Magia Universalis*, i, sig. †††† 1–4; cf. his statement (ibid. i, 57) that the magical part of optics is that 'quae ... quidquid in scientia illa universa rarum, reconditum, prodigiosum, ac paradoxum est, atque à communi Opticorum sensu ac usu remotum, rimatur, atque ad aliorum utilitatem, liquidissimamque voluptatem, Principum praesertim et Magnatum, producit in medium, non sine intuentium admiratione ac stupore'. *Joco-Seriorum Naturae et Artis sive Magiae Naturalis centuriae tres*, issued, without place or date of publication (in fact Würzburg or Nuremberg 1666), under the name of 'Aspasius Caramuelius'. It is transparently a work of Schott's (cf. Mercier, *Notice raisonné*, 70–5), and even features in a list (at the end of *Mathesis Caesarea*) of his books soon to be printed. Leopold had a MS. copy of it (ÖNB, MS. 12590, p. 87). But the reason for the pseudonym—as for Kurz's (above, p. 333)—escapes me, unless it be some parody of Caramuel Lobkovic.

[85] Cf. above, p. 140 and n. 62.

differences between faiths, quite apart from the distinctive features of a Central European evolution where Catholicism reasserted itself slowly and belatedly against particularized religious communities and amid constant pressure from local heresy. At a profounder level the Catholic Church was different precisely because it built on the miraculous and the sacramental, and laid such weight on the supernatural. Having harnessed white magic in the cause of holiness, the Counter-Reformation required a clear definition of black magic and a fierce campaign against it.

That definition was, in the nature of things, impossible—since the phenomena which it sought to define existed merely as mental constructs, blended of learned and popular credulity; but the quest for it was vital to the success of seventeenth-century Catholicism. And not only of Catholicism, for the definition had social as well as spiritual reference: most magic was permitted to the educated, proscribed for the uneducated. Thus the outcome was fruitful to state as well as Church: while the compromise with white magic allowed an élite to maintain its integral Catholic *Weltanschauung*, the attack on superstition enforced hierarchy and subordination. One face of Janus was the servant of the political nation, the other dictated to society at large. As the next two chapters will seek to show, the intellectual synthesis of Central Europe's Counter-Reformation needed to approve magic; its social actualization needed to condemn it.