

## Part One: Historical and Intellectual Background

### I. Religious Controversy and Political Strife, 1519 – 1648

[Readings, pp. 1 – 10.]

#### A. Martin Luther and The Reformation

1. 1517 – 30 Martin Luther leads a rebellion against what he perceived, and what many others at the time perceived to be doctrinal errors of the Catholic Church, and against the abuses of ecclesiastical authority and power in the secular and political order; 1521: Diet of Worms, the watershed year.
2. 1530: The Augsburg Confession: a formal statement of the beliefs of the Protestant Reformers.
3. 1555: The Peace of Augsburg: after a period of turmoil and violence based on sectarian differences (Lutherans v. Catholic; different factions of Protestant in opposition to one another) an accord is signed which grants German princes the right to declare which form of the Christian faith—Catholic or Protestant; which form of Protestantism—would be regnant within his domain
4. Key points of dispute:
  - a.) rejection of hierarchy: Lutherans reject the special power and authority of the Pope and the need for priests & bishops; exclusive reliance on Scripture—to facilitate which, Luther translates the Bible into the vernacular language, making it available to an increasingly literate laity;
  - b.) sacraments reduced to two: Baptism and Holy Communion, as the only two specifically mentioned in Scripture; their efficacy *presupposes*, and does not confer, Divine grace;
  - c.) salvation is won through faith alone—good works avail you nothing because God’s will can *not* be altered or influenced; strong tendency towards a doctrine of the Elect (predestination) a doctrine proclaimed canonical by John Calvin;

#### B. The Counter-Reformation: The Council of Trent (1545 – 63): The Catholic Church redefines itself in sharper contrast with the Protestant alternative.

1. reaffirmation of the authority of the Pope;
2. reaffirmation of the teaching authority of the Bishops and a strengthening of their power over their congregations;
3. Bible remains in Latin, so the laity is kept in dependence upon the clergy for instruction in the ways of salvation (Luther had translated the Bible into the vernacular, that is, into German);
4. the indispensable role of the sacraments for receiving God’s grace—grace and salvation are *not* attained by faith alone, contrary to a fundamental teaching of Luther;
5. emphasis on sacraments, good works and free will: “...nobody would be converted or reinforced in their faith if they were told that nothing they did would make any difference to what God had already decided.” [Steven Ozment, *The Age of Reform*]

#### C. Religious Wars in Europe, 1562 – 1648

1. French Wars of Religion
  - a.) St. Bartholomew’s Day Massacre 1572
  - b.) Edict of Nantes: 1598
2. The Thirty Years War: 1618 – 1648
  - a.) Henry IV assassinated, 1610
  - b.) The 30 Years War: a struggle for power among the main political entities in Europe waged behind the façade of religious claims to righteousness

## II. The World Transformed: from the Christian/Aristotelian Worldview to the Rise of Modern Natural Science:

### A. Christianity's encounter with Aristotle (384 – 322 BCE)

1. Aristotelian texts are translated into Arabic, 9<sup>th</sup> Century, Baghdad, “House of Wisdom” period
2. 12<sup>th</sup> Century, Spain: a period of intense intellectual creativity when the attempt is made to incorporate Aristotelian philosophy into the theological and legal traditions of Islam in the work of Averroës; Muslim, Judaic and Christian scholars interact freely; Aristotle translated into Latin
3. 13<sup>th</sup> Century, Paris: Albert the Great and Thomas Aquinas effect a synthesis of Christian theology with Aristotelian philosophy: logic, astronomy, rhetoric, some political theory

### B. Basic structure of the Universe according to Aristotle [Readings, pp. 13 – 18]

1. A “geocentric” universe
2. Four elements and four primary qualities
3. Two separate and utterly distinct domains of motion, each with its own explanatory principle:
  - a.) all terrestrial motion (motion on or near to the earth) was rectilinear—straight-line
  - b.) all celestial motion (the spheres above the earth) was circular
  - c.) in addition to these, Aristotle recognized “violent motion,” when the natural straight line motion of objects here on earth were forced—usually by human action—out of their normal course
4. Different kinds of life-forms were categorized according to a rigid classificatory system in which each species was distinct; different kinds of living things were arranged on a hierarchical scale, some creatures superior to others; some sub-species approaching closer to the essential form of the species than others.

### C. Key Features of the Christian/Aristotelian World View (CAWV)

1. The concept of a “World View”: a comprehensive, totalizing vision of the world, from its inception to its end; structured according to a logical framework in which everything has its place; natural phenomena and historical events are all subject to detailed explanation; mankind is assigned a specific place in the world, and human actions are regulated according to a moral code that applies universally.
2. The knowledge claims that constitute the CAWV rest upon the **authority of texts** whose validity and certitude are virtually beyond challenge. There are two categories of authoritative source:
  - a.) Theological
    - i. Holy Scripture—the Revealed Word of God
    - ii. Works of the Church Fathers: Jerome, Tertullian, Origen, et alia
    - iii. the Conciliar Decrees of the Church (Nicean, Lateran Councils, Trent, etc.)
    - iv. Papal Bulls, Encyclicals, Decrees
    - v. the Magisterium (teaching authority of the Bishops)
  - b.) Aristotle:
 

by the time that St. Thomas encountered the Aristotelian texts in Latin translation, there existed a long tradition of commentary and disputation centered on Aristotle's work. Aristotle himself had come to be regarded as a definitive authority on matters not directly bearing on theological issues—in areas such as logic and mathematics, astronomy, the life sciences, rhetoric, aesthetics, and political constitutions.

### C. Key Features of the CAWV (continued)

3. The concept of *law* under the CAWV is understood as the *command of God*
  - a.) at the level of mere stuff, the elements, the celestial bodies: all physical objects obeyed God's command automatically and without exception; the regularity of nature was understood as the obedience of all things to God's will; God controls absolutely everything that happens;
  - b.) planets, oceans, the weather, disease, all natural phenomena were understood in these terms too: everything obeyed God's command, and if God chose, He could make nature operate any way that He preferred; He could intervene, rescind His commands, could produce miracles;
  - c.) animals unfailingly obeyed God's command through instinct, because they had no free will; but again, God could command them to act otherwise—e.g., the lions did not attack Daniel when, in the Biblical story, he was thrown into their lair;
  - d.) Human beings were subject to God's command and called to obedience, though we could choose, in the perversity of our free will, to disobey Him.

### D. The Copernican Revolution and the Galileo Affair

1. Copernicus and the correction of the Julian Calendar
  - a.) by the beginning of 16<sup>th</sup> century, the Julian Calendar was off (behind) by 10 days;
  - b.) after painstaking inspection of all the available charts and surveys and data regarding the movements of the stars and planets, Copernicus found that he could calculate a more accurate basis for the calendar if he assumed the sun, not the earth, was at the center of the universe;
  - c.) making that assumption also simplified a great deal of the data itself, and produced more accurate predictions of various astronomical phenomena as well;
  - d.) his results are published in *De Revolutionibus orbium coelestium* in 1543.
2. The Galileo Affair
  - a.) by virtue of an improved telescope, Galileo “sees”, discovers that there are moons around Jupiter; he publishes his discovery in 1617;
  - b.) the very possibility of there being moons circling around Jupiter contravenes the central doctrines of the CAWV;
  - c.) Robert Cardinal Bellarmine refuses to look through Galileo's telescope; 1633: the Church silences Galileo, places him under house arrest for seven years.

**KEY POINT #1:** We mustn't think that Cardinal Bellarmine was simply being cruel or obtuse or dishonest when he prosecuted Galileo. There is a clear sense in which he was doing the right thing—doing the only *responsible* thing. He inherited and represented a tradition of thought, of intellectual inquiry going back a thousand years in which the source and guarantee of truth was found in the sacred writings and in the institutional authority of the Church. The methods of natural philosophy—while they may have turned up some interesting and useful results here and there—*had not yet established its credentials*, its authority; whatever claims to truth it may have made were not philosophically warranted. It is highly significant to note, in the article by Blackwell (14.b.6), that Galileo was never in his own lifetime able to *prove* that the sun was at the center of the solar system; this was a claim that *could not* be proven within the framework of the CAWV, *could not* be proven until the credentials of the new methods of scientific inquiry (as *we* would call them) had been philosophically demonstrated; until the scientific framework itself was strong enough to stand up against the centuries-old framework provided by the CAWV. The work of establishing the credentials of natural philosophy, of providing a philosophical foundation for the natural sciences was begun by René Descartes, extended by John Locke, and consolidated in the achievements of Isaac Newton.

### 3. Galileo's Defense

#### a.) Campanella's "Two Books" thesis:

- i. Campanella constructs his argument in defense of Galileo in the accepted mode of theological disputation: he appeals directly to the authority of Scripture and the Church Fathers. In effect, he was *playing by the accepted rules of the game at the time*.
- ii. The decree of the Council of Trent (1560- 64) asserts the Church's authority "in matters of faith and morals," leaving open the possibility that questions of empirical fact might be open to a more liberal interpretation.
- iii. Nothing in Galileo's work touched on questions of faith or morality;
- iv. his work in natural philosophy was built on observation, and his theories were constructed in rigorous mathematical terms; predictions based on his theory were borne out.
- v. So, Campanella argues: God wrote "two books", one in the language of man which concerns our moral instruction, and one in the language of mathematics which governs the behavior of natural objects.
- vi. God gave us reason. It is reason that enables us to puzzle out the mathematical structure of the universe for ourselves. There need be *no conflict* between the moral teachings of Scripture—concerning which the Catholic Church remained unquestionably authoritative—and the discoveries of natural philosophy because God was the author of both sets of teachings and there could be, therefore, no contradiction.
- vii. But still, implicit in what Campanella was arguing, *Scripture had been shown to contain error*.

#### b.) Galileo's Letter to Madama Christina (1615)

- i. Galileo contrasts—somewhat indelicately, and *imprudently!*—two methods of attaining the truth: his own method, direct empirical observation, and the traditional appeals to textual, that is, Scriptural authority; and he argues for the precedence of his method.
- ii. Equivocation on the expression "the Queen of the Sciences" as applied to Theology.
  - The discipline which encompasses all learning
  - The discipline devoted to (only) the most noble and "loftiest" of subject matters
- iii. reversing the burden of proof: it is not the scientist who must prove that his discoveries are congruent with the teachings of Scripture; rather, it falls to those who would affirm the teachings of Scripture to show that the scientific discoveries which are incongruent with Scripture "be not rigorously demonstrated."

### E. Thomas Kuhn and the Concept of "Paradigm Shift"

- a.) All scientific inquiry proceeds—can *only* proceed—under the regulatory guidance of a theoretical framework, a "disciplinary matrix", a *paradigm*. Students of science today, *you*, in your science classes here at SNC, must master this theoretical framework in order to take your place as a practitioner, or researcher, or teacher in the service of natural or social science. Proceeding under a settled and agreed-upon framework is called "normal science."
- b.) As research under this theoretical model proceeds and discoveries are made, it happens that researchers begin to turn up results that are difficult to fit into the logical structure of the theoretical matrix; these are usually small results, easily set aside, no great threat to the theory. But these small discrepant results—called "anomalies"—tend to accrete, they grow more numerous, more troublesome.
- c.) At some point, these anomalies become intolerable, and a threat to the theoretical matrix. Researchers begin to question the matrix; propose changes; challenge the authority of all that they have learned. This issues in a period of "revolutionary science."