I. Three Traditions

1. The Organic Tradition
   (a) Nature as *living organism*.
      
      *Characteristics*: change, growth and decay, final causation, substantial forms.
   
   (b) God as rational first-mover.

   (c) Rational, organic representations.

2. The Magical Tradition
   (a) Nature as a *work of art*.
      
      *Characteristics*: beauty, mystery, creativity, substantial forms and occult properties.
   
   (b) God as artist/magician.

   (c) Mathematical (numerological) complex, aesthetic representations.
3. The Mechanical Tradition

(a) Nature as *machine*.

*Characteristics*: regularity, permanence, predictability, rejection of final causation and occult properties.

(b) God as engineer.

(c) Mathematical (geometric) simple representations.

- 16th-17th cent: "Scientific revolution".

- **Popularized "Whig history" account**: Triumph of rational experiment-based world-view over irrational superstitious medieval views and out-dated ancient Greek metaphysics.

- **Kearney's account**:
  - *Magical*: 15th cent. recovery of Plato, Plotinus.
  - *Mechanical*: 16th cent. recovery of Greek atomists, Archimedes.
  - 16th-17th cent. world-view as synthesis of all three.
II. Galen (129 - ~210 A.D.)

- Roman physician.
- Combination of Hippocratic and Aristotelian doctrines.

**Four Humour Theory of Disease**

<table>
<thead>
<tr>
<th>humours</th>
<th>forms</th>
<th>seasons</th>
<th>elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>yellow bile</td>
<td>hot/dry</td>
<td>summer</td>
<td>fire</td>
</tr>
<tr>
<td>black bile</td>
<td>cold/dry</td>
<td>fall</td>
<td>earth</td>
</tr>
<tr>
<td>phlegm</td>
<td>cold/wet</td>
<td>winter</td>
<td>water</td>
</tr>
<tr>
<td>blood</td>
<td>hot/wet</td>
<td>spring</td>
<td>air</td>
</tr>
</tbody>
</table>
• **Choleric:** excess of yellow bile
  impetuous, deceitful, extravagant, bold.
• **Melancholic:** excess of black bile
  vigilant, jealous, sad.
• **Phlegmatic:** excess of phlegm
  lazy, sleepy, languid.
• **Sanguine:** excess of blood
  merry, sociable, studious, peaceful.

• In a healthy body, the humours are balanced and in harmony.
• Disease is due to an *imbalance* of humours.
• **Thus:**
  - Only one general type of disease: "distemper".
  - Disease is a global state of the body.

Treatment

- Restore balance by treatment of opposites.
  - Ex. Treat buildup of phlegm with yellow bile.
- Dietary restrictions, herbal remedies, purging (blood-letting, laxatives, etc.), some use of talismans.
- Some substances are effective by reason of their occult (hidden) properties. Galen calls these properties of the "whole substance" (later referred to as "substantial forms").

Contacts with magical tradition:

- Occult properties/substantial forms.
- Microcosm/macrocosm doctrine: the human body (4 humours) is representative of the cosmos (4 elements).

Note: Different correspondences in magical tradition: Aristotelian four elements are replaced by neo-Platonic three hierarchies.
Rationalists

- **Claim:** Experience does not provide explanations; just facts.
- From observations one may infer the existence of unobservable features of reality (atoms, pores, the void, essences, forces, hidden causes, *etc.*).
- **Thus:** General theories of disease that make reference to unobservable quantities are necessary.

**Ex.:** Asclipiades of Bithynia (c.124 - 40 B.C.)

- Disease is due to constriction or dilation of orderly flow of (invisible) atoms through (invisible) pores in body.
- Treatment takes the form of either dilation or constriction.

Empiricists

- **Claim:** Explanations of disease that make reference to unobservable quantities are illegitimate.
- General theories of disease based on unobservable things should be rejected.
- Medical knowledge should be based only on *practical, personal* case histories and direct observations; not on *theoretical* speculation.
(iii) Methodists

- **Claim:** Theoretical explanations of disease that refer to unobservable quantities are legitimate; but they should be restricted to particular observational contexts.

  *Ex:* Thessalus of Tralles (c. 70-90 A.D.)
  - Asclepiades' states of constriction and dilation are not unobservable; rather, one can be trained in the "Method" to detect them.
  - **Thus:** Disease is a manifest state detected through observation, as opposed to a hidden state inferred by reason.
  - **But:** Disease is explained through reference to theoretical things (atoms, pores).

**Characteristics of Debate**

- Origin of terms "rationalism" and "empiricism" used in philosophical debates over nature of knowledge.

- **Social dimension:** Accomplished, educated physicians (rationalists) vs. uneducated, village medical practitioners (empiricists).
III. Paracelsus (1493-1541)

- Phillipus Aureolis Theophrastus Bombastus von Hohenheim.
- German physician very much against institutionalized Galenic medicine.

"Let me tell you this: every little hair on my neck knows more than you and all your scribes, and my shoe-buckles are more learned than your Galen and Avicenna, and my beard has more experience than all your high colleges."

Metaphysics

- "Precipitation of astra" from God.
- *Astra* combine in the four "wombs" (fire, air, water, earth) with the *tria prima* (three principles).
- Physical objects are result:
  - womb = substratum in which object grows; astrum = seed; tria prima = nutrients.
1. *Astra (semina, archei)*
- *astrum* = life-giving virtue/principle that makes an individual object unique.
- Similar to Plotinus' seminal reasons (*astrum* as seed).
- Similar to neo-Platonic *astral body*: vehicle of the soul (intermediate between immaterial spirit and material body).

2. *Four wombs*
- *mysterium* ("matrix", "mother") = substrate in which an object is generated.
  
  **Example:** Milk is a mysterium of cheese and butter. Cheese is a mysterium of maggots and worms.

- *mysterium magnum* = the mother of all things; prime matter.
- Four wombs = the fundamental matrices created from the *mysterium magnum* through a process of differentiation and separation.
- **firey womb**: activates growth; generates stars, planets, meteorological phenomena.

- **airey womb**: nourishes; generates living, breathing creatures; primary source of "invisibles" like spirits, fates, witchcraft, dreams, visions.

- **watery womb**: consumes; generates metals, minerals, salts; primary source of watery things like fishes, coral, nymphs.

- **earthy womb**: fixes, solidifies; generates plants, vegetation; primary source of earthy things like trees, animals, stones.

**Note**: The wombs are not the same as the Greek elements:

(a) An object is not a composite of the 4 elements; rather, it is associated with just a single element.

(b) The wombs are dynamic principles and not material substances.
3. The tria prima

- Three principles constitutive of all things:
  
  **Mercury:** transformative agent, fluidity, volatility.
  
  **Sulphur:** binding agent, combustibility.
  
  **Salt:** solidifying/sustaining agent.

**Example:** When a piece of wood is burnt, the products reflect its constitution:

- smoke: mercury (chaotic quality)
- flame: sulphur (binding agent mediating between salt and mercury)
- ash: salt (coagulant)

4. Microcosm/Macrocosm

- Neo-Platonic tripartate scheme of being reflects the Trinity: God has a single essence with three parts:

- Humans consist of three essences:
- The Trinity, and hence the human being, is reflected again in the *Tria Prima*:
Ontological Theory of Disease

• Diseases are due to "rogue" astra: foreign agents invading the body.
• Thus: Different types of disease, one for every different type of rogue astrum.
• And: Disease is a local state of the body: disease "grows" around foreign astrum in same way fruit grows on a tree and minerals grow in a mine.

Treatment

• Erradicate foreign body (astrum) by treatment of like with like.
• Determine the tria prima principle that governs the growth of the disease and treat with substances that employ the same principle.
• Chemical treatments ("iatrochemistry"): mercury, arsenic, antimony, etc. The poison that causes a disease should be used in proper dosage as its cure.
IV. The Chemical Philosophy

- Late 16th century: profusion of texts and translations by followers of Paracelsus.

- **Goal:** To overturn the traditional Aristotelian-Galenic bias of the universites and replace it with a Christian neo-Platonic and Hermetic philosophy.

**The chemical interpretation of Genesis**

- "Halchymie should have concurrence and antiquitie with Theologie... [Moses] tells us that the *Spirit of God mounted upon the water:* which was an indigested Chaos or masse created before by God, with confused Earth in mixture; yet by his Halchymicall Extraction, Separation, Sublimation, and Coniunction, so ordered and conoiyned againe, as they are manifestly seene a part and sundered; in Earth, Fyer included, (which is a third Element) and Ayre, [and] (a fourth) in Water, howbeit inuisibly."

- The creation as a chemical process in which the three principles and four elements are produced.

---

*Thomas Tymme (d. 1620) in the dedication to Joseph Duchesne's 1605 *The Practise of Chymicall, and Hermetical Physicke, for the preservation of health.*
The chemical geocosm

- Michael Sendivogius (1566-1636).
  - Posits a central sun in the earth corresponding to the celestial sun.
  - Four elements in the earth distill a radical moisture that sublimes to the surface.
  - Combines with rays of central and celestial suns to produce living things.

"Therefore when there is Rain made, it receives from the Air that power of life, and joyns it with the Salt-nitre of the Earth... and by how much the more abundantly the Beams of the Sun beat upon it, the greater quantity of Saltnitre is made, and by consequence the greater plenty of Corn grows, and is increased, and this is done daily."

- Volcanism as attributed to central fire.
- Mountain streams as products of distilling processes in the earth.
- Chemical analyses of mineral waters found at spas.
Parcelsian vs Galenic Practices

- **Uroscopy**
  - Galenists: Key diagnostic method = inspection of urine.
    - Allows categorization of diseases: malaria, vertigo, alcoholism all due to same humoral imbalance (all give urine a white color).
  - Paracelsus: No information can be obtained from the urine except by chemical methods (distillation, extraction, coagulation).

- **Bloodletting**
  - For sanguine temperaments (excess of blood), Galenists prescribed bloodletting.
  - Paracelsians objected: air (life-giving principle) in the lungs forms arterial blood; hence bloodletting results in a drain of the life-essence from a patient.