Lecture II

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Paradigm meanings

- It is an achievement accepted by a given community.
- It is likely to be codified in a classical book (*Phyisca*, *Almagest*).
- It is unprecedented attracting many followers.
- It leaves sufficient space for further research (poses problems, rather than just solves them).
- It is a ‘tradition of research’.

Paradigm's pervasiveness

- It grants a researcher a place in the community.
- The researcher is unlikely to subsequently challenge the paradigm.
- The commitment is to the same rules and standards.

Example: optics

- The current paradigm (wave-particle duality) is relatively young.
- Its predecessors are no longer mentioned in textbooks.
- No paradigm before optics became mature.
- Without a paradigm in place, research tended to go back to the basics.
- Shared rules and standards are a prerequisite for turning ‘philosophy’ into science.

Paradigms and facts

- In the absence of a paradigm, the collection of facts is chaotic, since every fact seems as important as any other.
- Paradigm sets the rules of selection, evaluation, and criticism.
- (Another example: electricity.)
- Conclusion: the path to normal science is torturous.

The losing side

- Once inside the community, the researcher does not challenge the status of the paradigm.
- Those who obstinately challenge are ignored, isolated, die out, or go to the philosophy department.
- Textbooks separate between experts and laymen. Their approach is emphatically ahistorical.

The practice of normal science

- Extending the application of the grand theory to more specific instances.
- No attempt at inventing a radically new grand theory.
- Articulating the phenomena and theories already suggested by the paradigm.

The main directions of 'normal' research

- Particularly interesting facts: stellar positions, chemical composition, wave lengths. Repeated attempts to increase accuracy and scope.
- Experiments to confirm the dominant paradigm.
- Refining the theoretical elements of the paradigm itself: for example, determining the value of the gravitational constant.
- Further applications of the paradigm.

Puzzle-solving

- Little attention to experiments that do not articulate the dominant paradigm.
- The results of the experiments are often anticipated. The achievement consists in the novel and sophisticated ways of reaching the unsurprising result.
- Scientists are ‘expert puzzle-solvers’. (Pejorative?)
- Scientists may have all kinds of motives, such as originality, knowledge of nature, finding order.
- But they are seldom engaged in these activities whilst doing normal science.

Rules

- General laws.
- Metaphysical assumptions: e.g. atomism.
- Empiricism.