

THE RECEIVED VIEW OF SCIENTIFIC METHOD



- SCIENTIFIC METHOD AS FORMULATED BY THE ENGLISH PHILOSOPHER FRANCIS BACON IN THE 16TH CENTURY.
- SCIENCE WAS OBJECTIVE KNOWLEDGE-BASED ON METHODS OF OBSERVATION.
- SCIENCE WAS FREE FROM HUMAN SUBJECTIVE BIASES.
- SCIENTIFIC KNOWLEDGE WAS THE PRODUCT OF INDIVIDUAL MINDS

KUHN'S CRITIQUE



- **THOMAS KUHN (July 18, 1922 – June 17, 1996) A PHYSICIST WHO DEVELOPED AN INTEREST IN THE PHILOSOPHY OF SCIENCE. WAS INFLUENCED BY THE INTER-WAR DEBATES ON SCIENCE PARTICULARLY ABOUT SCIENTIFIC METHOD.**
- **IN 1962 PUBLISHED HIS MOST INFLUENTIAL BOOK – THE STRUCTURE OF SCIENTIFIC REVOLUTIONS – A BOOK THAT CHALLENGED ALL RECEIVED VIEWS OF SCIENCE.**

SCIENTIFIC KNOWLEDGE- MOVES IN LINEAR OR REVOLUTIONARY MODES?



- **EXISTING VIEW- SCIENTIFIC KNOWLEDGE ADVANCES IN A CUMULATIVE, GRADUAL LINEAR MODE THROUGH THE ADDITION OF MORE AND MORE OBSERVABLE AND VERIFIABLE DATA WHICH SUPPORT PARTICULAR THEORIES OR LAWS.**
- **KUHN'S VIEW- SCIENTIFIC PROGRESS OCCURS THROUGH REVOLUTIONARY PERCEPTUAL AND CONCEPTUAL LEAPS.**

KUHN AND LUDWICK FLECK



- KUHN OWED SOME OF HIS IDEAS TO THE POLISH MICROBIOLOGIST LUDWICK FLECK WHO WROTE AN IMPORTANT BOOK WAY BACK IN 1935 CALLED THE GENESIS AND DEVELOPMENT OF A SCIENTIFIC FACT : AN INTRODUCTION TO THE THEORY OF THOUGHT STYLE AND THOUGHT COLLECTIVE
- FLECK WAS THE FIRST PHILOSOPHER OF SCIENCE TO REJECT THE BACONIAN MODEL OF SCIENCE IN THE MOST FUNDAMENTAL WAY. KUHN ELABORATED HIS IDEAS.

WHAT WERE THE QUESTIONS THAT BOTHERED KUHN?



- KUHN DREW ATTENTION TO THE FOLLOWING QUESTIONS-
- WHAT IS SCIENTIFIC OBSERVATION?
- IS OBSERVATION NEUTRAL OR THEORY LADEN?
- ARE SCIENTISTS PRONE TO FALSIFICATION OR VERIFICATION? WAS KUHN ACCEPTING OR QUESTIONING KARL POPPER?



KUHN'S QUESTIONS II



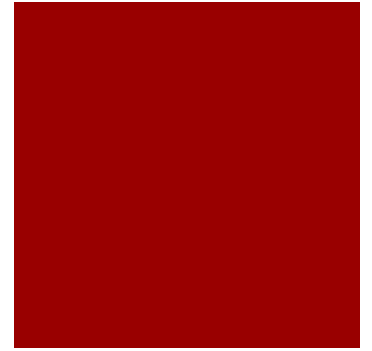
- HOW ARE SCIENTIFIC DISPUTES SETTLED? WHO DECIDES WHICH IS THE BEST THEORETICAL EXPLANATION OF SCIENTIFIC FACT?
- WHAT ARE IN SUM THE KEY FORMS OF SCIENTIFIC WORK?

THE PATTERN OF SCIENTIFIC REVOLUTIONS



- KUHN IDENTIFIED **2 KEY FORMS** SCIENTIFIC WORK –
- **NORMAL SCIENCE AND REVOLUTIONARY SCIENCE**
- **NORMAL SCIENCE- SCIENTIFIC WORK WITHIN AN ESTABLISHED PARADIGM**

FROM NORMAL SCIENCE TO REVOLUTIONARY SCIENCE

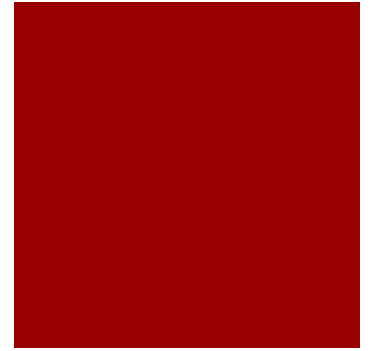


- **REVOLUTIONARY SCIENCE-
SCIENTIFIC WORK IN SEARCH OF A
NEW PARADIGM.**
- **WHAT IS A PARADIGM?**

THE KUHNIAN PARADIGM

**COMES FROM THE GREEK, PATTERN,
SAMPLE, EXAMPLE**

- **KUHN USED THE TERM AS A UNIVERSALLY
RECOGNIZED FRAMEWORK OF
CONCEPTS, PROCEDURES, RULES, VALUES,
AND LANGUAGE OF SCIENTIFIC INQUIRY
AND EXPLANATION.**



PARADIGM COMPONENTS



- PROVIDES A MODEL FOR SCIENTISTS TO WORK AND ASK QUESTIONS-
- WHAT IS TO BE OBSERVED AND SCRUTINIZED?
- WHAT KIND OF QUESTIONS ARE TO ASKED IN RELATION TO THE SUBJECT?
- HOW THESE QUESTIONS ARE TO BE STRUCTURED?
- HOW TO CONDUCT EXPERIMENTS?
- HOW THE SCIENTIFIC RESULTS ARE TO BE INTERPRETED?

NORMAL SCIENCE TO PARADIGM SHIFT



- **PRE-PARADIGM PHASE-** WHEN RESEARCH QUESTIONS STILL CONFUSED, METHODS OF RESEARCH UNCERTAIN, LANGUAGE UNCERTAIN ETC. THE PHASE OF CRITIQUE BUT NOT RESOLUTION
- **PARADIGM-** AFTER THIS CONFUSED PHASE THE PHASE OF SETTLED CONSENSUS ON FRAMEWORK, METHOD, LANGUAGE, ARGUMENT.

FROM ONE PARADIGM TO ANOTHER : THE MECHANICS OF SHIFT



- **NORMAL SCIENCE- THE PHASE OF PARADIGM CONSOLIDATION- PUZZLE SOLVING, NO NEW QUESTIONS ASKED, REFINING EXISTING THEORETICAL MODELS**
- **THE APPEARANCE OF ANOMALIES- IGNORE- THE ACCUMULATION OF ANOMALIES NO LONGER POSSIBLE TO ACCOMMODATE WITHIN OLD THEORETICAL FRAMEWORK**

THE SEARCH FOR A NEW PARADIGM



- THE PHASE OF REVOLUTIONARY SCIENCE
- THE NEW PARADIGM OCCURS THROUGH A PERCEPTUAL CHANGE AND UNDERSTANDING OF THE OLD PROBLEM.
- THROUGH ESTABLISHMENT OF CONSENSUS-ARGUMENT, PERSUASION, DISCIPLINING, - THROUGH WHAT KUHN IMPLIES A SOCIAL MODALITY.
- NEW PARADIGM ACHIEVED THROUGH BOTH SCIENTIFIC ARGUMENT AND SOCIAL CONSENSUS AMONG SCIENTISTS

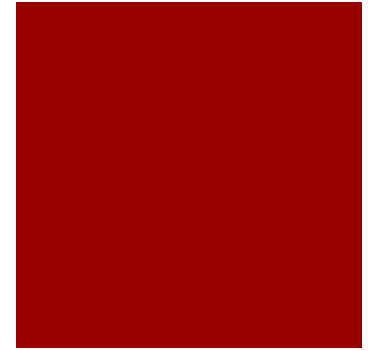
RELATION BETWEEN OLD AND NEW PARADIGM



- COMPLETE BREAK ? OR EMBODYING CONTINUITIES?
- KUHN'S EARLY POSITION –OLD AND NEW PARADIGMS – INCOMMENSURABLE
- LATER REVISION- AREAS OF COMMON QUEST, CONTINUITIES IN QUESTIONS.

LEGACIES OF KUHN

- REJECTION OF THE OLD LINEAR MODEL OF SCIENTIFIC PROGRESS
- GREATER UNDERSTANDING OF THE IMPORTANCE OF SOCIAL PROCESSES IN SCIENTIFIC KNOWLEDGE MAKING



SOCIOLOGY OF SCIENTIFIC KNOWLEDGE



- **KUHN'S IDEAS WERE TAKEN OVER BY SOCIOLOGISTS, HISTORIANS, ANTHROPOLOGISTS WHO GAVE A BROADER MEANING TO THE IDEA OF SOCIAL PROCESSES AND ARGUED AGAINST KUHN THAT SOCIAL INTERESTS DROVE SCIENTIFIC ARGUMENTS.**
- **RACE, GENDER, ETC PRIME EXAMPLES**
- **KUHN HAD ONLY REFERRED TO THE SOCIAL PROCESSES WITHIN SCIENTIFIC COMMUNITIES.**

NEW HISTORIES OF SCIENCE



- OLDER HISTORIES OF SCIENCE- DOMINATED BY INDIVIDUAL HISTORIES OF DISCOVERY, SCIENTIFIC BIOGRAPHIES OR INTERNAL HISTORIES OF SCIENCE I E HISTORY OF SCIENTIFIC CONCEPTS-
- LARGELY INTERNAL ACCOUNTS

NEW HISTORIES OF SCIENCE- PUT SCIENCE IN SOCIAL CONTEXT-INCLUDED BOTH INTERNAL AND EXTERNAL CONTEXTS- STEVEN SHAPIN –THE SCIENTIFIC REVOLUTION

CHANGES IN APPROACHES TO TECHNOLOGY



- KUHN INFLUENCED NEW WRITINGS OF TECHNOLOGY TOO.
- OLDER UNDERSTANDING- LINEAR MODEL OF TECHNOLOGICAL INNOVATION
- BASIC SCIENCE- APPLICATION- DEVELOPMENT - PRODUCTION