pointlessness of much of our own life.'
The language of explanation

- A theory T can explain a fact E without being either true or empirically adequate
  - thus to say that T explains E does not commit us to either the realism or the empirical adequacy of T
  - so the question of the acceptability of an explanation is separate
    - when we say we ‘have an explanation’ this implies that our explanation is acceptable
- The grammar of explanation is such: fact E explains fact F relative to theory T
  - e.g. the gravitational pull of the moon explains the ebb and flow of the tides in Newton’s theory

A biased history (of theories of explanation)

1. Hempel
   - States two criteria for what constitutes an explanation
     - explanatory relevance - the explanatory information must give good grounds for believing that the phenomena occurs
     - testability - the statements of a scientific explanation must be empirically testable
   - Explanatory relevance:
     - this information is of two types:
       - the laws supplied by theory
       - factual information
       - in non-statistical theories, the information implies the fact that is explained, in statistical theories, the information bestows high probability on that fact
   - Explanatory relevance is neither necessary nor sufficient to explanation
     - insufficient - we can have good grounds to believe, e.g., that a galaxy is receding from us if its light exhibits a red shift, without it explaining that phenomenon. Red shift is a consequence of the galaxy moving away from us, not the reason for the motion
     - unnecessary - we can explain without giving good grounds to believe that a phenomena will occur - in cases of low probability. e.g. paresis - only those with syphilis get paresis, but far from all of those with syphilis get is (say 1 in 10). this means that we can warn someone with untreated syphilis that they may contract paresis (explanation), but doesn’t give them good grounds to believe that they will do so
   - We would have to modify the account such that the explanatory information gives us good and relevant grounds for believing the phenomena has, does or will occur
     - this invites us to the problem of what is meant by relevance
   - Testability is met by all scientific theories, so can’t help ameliorate the difficulties with Hempel’s account

2. Salmon: Statistically Relevant Factors
   - For Salmon, explanation is not an argument, but an assembly of statistically relevant factors
Alexander Rosenberg - The Philosophy of Social Science

Chapter Five: Functionalism and Macrosocial Science

- Do the social sciences deal with facts about social institutions etc (social facts), or facts about individuals?
  - if social facts are irreducible, then sociology/social sciences are autonomous
  - methodological individualism = if there are social facts, they can be reduced to facts about individuals

Holism and human action

- How can we establish social facts?
  - philosophical argument - intentional notions, explanations in terms of beliefs, desires etc presuppose social facts
    - e.g. cashing a cheque cannot be explained to someone who doesn’t understand the rules that give the exchange its meaning, and these rules only make sense to someone who understands the institutions of persuasion, enforcement etc
    - we cannot characterise such behaviour without reference to meaning, an account of physical behaviour won’t capture the intentional concepts
  - hence reference to social facts is necessary in individual explanations
  - methodological individualist - statements referring to social facts can only be tested in observations about individuals
    - so such statements must be translatable to claims about individuals
    - but this doesn’t hold because not all theoretical statements in physics can be translated into statements about observations
  - rather, the test of statements that transcend observations should be their explanatory power, not testability
    - in this case, the philosophical argument doesn’t carry much weight, because intentional descriptions (social facts) only describe - they do not explain
  - holism must show not just that our descriptions of individual actions presuppose social facts, but that our explanations of action presuppose social facts
    - but if the existence and interactions of individuals are necessary and sufficient for the existence of society and social facts, then social facts should be explicable in terms of facts about individuals (question begging?)
    - one response for the holist is to claims that the existence/interaction of individuals isn’t sufficient - society is more than the sum of its parts

The autonomy of sociology

- Durkheim on the existence of social facts
  - like cause, like effect - if suicide numbers double over the course of 50 years, but are blamed on the same things (illness, poverty, jealousy) in the same proportions, then these things cannot have been the causes (for why would they have doubled in incidence?)
    - so the change in rate (a statistical social fact) cannot be explained by
This humano-centrism led to the advocacy of the study of mankind. This is the genesis of modern humanism.

- At this time the theoretical sciences lagged behind, and shortly after the Renaissance spirit was over, the scientific revolution took off
  - Kepler, Galileo, Newton
  - teleology was mostly abandoned in favour of laws, though the laws posited were still seen as exhibiting design, and thus until Hume teleological residue remained
  - Bacon and Descartes were the philosophical spokesmen of the scientific revolution
    - Bacon preached inductivism and experimentalism, Descartes preached rational abstraction from the data of experience

- Neither of these schools saw themselves as challenging the truths of Christianity, but as complementing them
  - arguably Judeo-Christian monotheism is the perfect seedbed for theoretical science: it recognises the reality of the natural world, whilst affirming the existence of a supernatural world with the power to design the mechanisms of nature. This is opposed to Confucianism, or Hinduism

- In fact both inevitably challenged Christianity:
  - humanism was overwhelmingly secular; individualism challenged the Catholic doctrine (hence the rise of Protestantism)
  - science inevitably challenged the pre-scientific truths of religion; the first-generation philosophes adopted Deism rather than Christianity, and the third generation of enlightenment thinkers tended towards atheism and Deism. Darwin gave a scientific, naturalistic answer to the question of man's place in nature

- From the Enlightenment to 20th Century, science and humanism were allied against authoritarianism in doctrine, despotism in government, irrationality and inhumanity in socio-political arrangements
  - By the 20th Century religion had lost all authority on matters of fact, and its domain because values and norms. Science saw itself as providing value neutral offerings to society

- As the 20th Century went on, rifts opened between science and humanism
  - the erosion of humanistic values and decline of high culture
  - transformation of the conceptions of the value of education and its harnessing to the needs of post-industrial society
  - devaluation of humanities in education
  - perceived danger of the power of knowledge unrestrained by understanding of humanity
  - AND at the theoretical and intellectual level of the dividing line between scientific methodology and humanism - is methodological naturalism valid or encroachment?

3. Scientism and the Doctrine of the Unity of Science

- Descartes fostered the vision of the Unity of Science
  - the Cartesian mechanism covered metaphysics, physics, medicine, mechanics and morals, but ended at the the mental, which he defined in terms of consciousness and thought.
  - BUT:
while still maintaining the methodological principle in question, that fact is always, in itself, a good reason for abandoning that claim

- MI is incompatible with Marxist social theory, but this is not a good reason to abandon Marxism
  - hence MI is not valid methodologically
  - Marxism argues that phenomena occur because of class interest
    - even where a capitalist believes his interests to coincide with those of the whole nation, he believes it not because of a psychological disposition, but because of his objective interests - he has many reasons for believing the statement (though none of these objective interests are his reasons in the subjective meaning sense)

- Proposition 2 of Watkins’ MI - The Alteration Principle: ‘Any social tendency would be altered if the individuals concerned had the appropriate beliefs and desires as their reasons for action, and if there were no unremovable physical obstacles to change.’
  - even if this were true, which it probably isn’t (e.g. smoking), it doesn’t discount the possibility of social phenomena that are which are not explainable in terms of agents’ reasons (i.e. the first proposition of MI doesn’t follow from it)
    - it may be that some social phenomena cannot be explained with reference to agents’ reasons, though they do depend on the absence of certain agents’ reasons
      - e.g. the flight of a crowd in a theater when a fire breaks out is an automatic reflex and hence short-circuits the belief/psychological disposition mechanism. Yet the phenomenon would not have occurred had the individuals possessed other beliefs, say, that the fire was part of the show. So the phenomenon cannot be explained with reference to reasons, i.e. the crowd would have acted differently had they possessed different beliefs and dispositions
  - Marxism doesn’t deny that an explanation of large-scale social phenomena will refer in part to individualistic psychological phenomena - but beliefs are moulded by class interests

- What about the fact that every social phenomena is created/generated by individuals?
  - Marxists don’t deny that the social phenomenon of ideology is the product of informal training in habits of belief, a training which consists of individual acts guided by beliefs and dispositions
    - in fact, this point is admitted by all, so if this is the claim of MI, it is trivial

- Proposition 3 - the Individualist Constraint on Causation: ‘Every social phenomenon is caused by the acts of individuals. Except for atypical and noncrucial cases, these acts are caused, in turn, by the beliefs and psychological dispositions of the agents’
  - this is methodologically valid, but doesn’t entail proposition 1, because explaining large scale phenomena in social science often involves explaining why it would have happened even without the sequence of individual actions/beliefs/dispositions that caused it (the Necessity Constraint)

- The Necessity Constraint is:
  - relative to background social conditions of the phenomena to be explained
  - not inconsistent with Proposition 2
such an explanation could refer to more abstract entities e.g. ideals, analytic functions

therefore we have good reason to believe in the existence of such abstract entities

Such an argument, as the previous one did, requires an element of realism (in this case over the existence of natural numbers, for example)

Although Quine and others have used indispensability arguments to post the existence of abstract entities - sets, numbers etc - via empirical science, we may try to explain the existence of mathematical entities through solely mathematical explanations

Mathematical explanations of mathematical facts

In the history of maths there has been a preference for theories that convince AND show why they are true, rather than theories that convince but do not explain

however, mathematical explanations do not only come in the form of proofs.

Systematizations and new frameworks also explain (c.f. Kitcher and unification)

in these cases proofs are considered explanatory insofar as they form part of the framework

So, Steiner sees explanatoriness as a property of proofs, whereas Kitcher sees it as a property of the whole theory or framework

Kitcher on explanation and generalization

Cournot identifies two types of generalization:

fruitful generalizations identify the rationale for many particular truths, and the connection and common origins of which

sterile generalizations extend the findings of important cases to unimportant cases

Kitcher argues against the thesis that ‘a deductive argument is explanatory if and only if its premises are at least as general as its conclusion’

Kitcher claims that generalizations can be either trivial or significant, and significant generalizations have explanatory power

they show us how we can modify existing rules we can obtain a language and a theory ‘within which results analogous to those we have already accepted would be forthcoming’

But for K generalizations are not the only source of explanation

also rigorization and systemization - i.e. UNIFICATION

Not all explanation is causal - mathematical and formal syntactical explanations

‘the explanatory derivation is similar to derivations we could provide for a more general result; the nonexplanatory derivation cannot be generalized, it applies only to the local case’ (Kitcher)

Thus generality is crucial to explanation. Steiner sort of rejects this - explanatoriness cannot be accounted for in terms of generality BUT explanatory proofs must be generalizable
these criteria apply even where the universal criteria are not satisfied
- meaning and appropriateness of belief
- the best way of arriving at beliefs
- so there may be contextual ways of determining consistency, truth,
  meaningfulness, appropriateness, sound method to reach belief, based on
  good/bad reasons

So:

- position 1 is vindicated insofar as it recognizes contextual facts, but mistaken insofar as it
  ignores truth requirements
- position 3 is only mistaken insofar as it ignored contextual considerations
- position 4 is misleading because it suggests that universal criteria are not universal
- position 5 is ambiguous - Winch seems to neglect/deny universal criteria

Analysis of conformity to universal criteria of rationality might not get us very far - constraint
rather than determinant

- but both are required to understand beliefs
  - universal criteria allow us to see how beliefs can be rationally criticised, or not
  - contextual criteria allow us to see the point and significance that the beliefs have
Thomas Kuhn - The Structure of Scientific Revolutions

Chapter 9: The Nature and Necessity of Scientific Revolutions

● Why call a change of paradigm a revolution?
  ○ in the case of politics, revolutions are necessitated when the existing institutions have ceased to adequately meet the problems posed by their environment. Same in science
  ○ once civil society has divided into opposing camps, political recourse fails (incompatible goals), hence revolutions are extrapoliical, or extrainstitutional, events
  ○ similarly in science. When debating paradigm choice, a paradigms is defended with the use of the very same paradigm - necessarily circular
  ○ Paradigm conflict cannot be resolved by logical or probabilistic argument, because there are insufficient common premises/values between paradigms. Thus the paradigms must be shown to be compelling or persuasive in some other way
  ○ Yet still, despite the historical ‘fact’ that paradigms have been rejected, are there intrinsic reasons why the adoption of a new paradigm demands the rejection of an old one? In other words, are there intrinsic reasons why scientific revolutions must occur?

● There are many types of phenomena which might emerge without contradicting or destroying previous paradigms - life on far off planets, a theory that unifies already existing disparate theories. These are examples of cumulative scientific development, but it is rare in practice

● Yet historically scientific development has demanded the destruction of prior paradigms

● In order for new discoveries to emerge, paradigms must be destroyed - they can only emerge to the extent that previous attitudes about nature and instruments have been wrong. Hence the theories under which those instruments are on exhibit and the theories under which the anomaly can be codified are logically incompatible

● There are only three types of phenomena about which new theories can develop:
  ○ those already well explained by existing paradigms (rare and seldom accepted because reject existing paradigm)
  ○ those that can be indicated by existing paradigms but require further articulation - most of science, but not new paradigms
  ○ recognizing anomalies, intractable puzzles that refuse to be assimilated into existing paradigms

● Clearly in the last case, any theory that permits the puzzle to be solved must be incompatible with the paradigm that came before it, which was unable to predict, assimilate or contain the anomaly. Thus the two paradigms are logically incompatible
  ○ It is not logically impossible that science could proceed in a cumulative manner, but insofar as science proceeds through paradigms, it is historically implausible

● Objection from early logical positivist school: any theory that has been accepted must be correct (in some sense). No two (historically) accepted theories can be incompatible. Thus Einstein’s relativity did not prove Newtonian dynamics incorrect, but rather science supposedly never demanded that Newton’s laws should be applied to certain scale problems, or to a certain level of precision. Newtonian theory is a special case of Einstein’s relativity, and no theory can possibly conflict with one of its special cases
  ○ Some variant of this line of argument is sufficient to make any theory ever used by a
The Function of General Laws in History

- General laws etc are vital to historical understanding
- General laws take the form of universal hypotheses, whereby whenever an event of specific kind C occurs, an event of kind E occurs in a certain spatiotemporal relation (usually Cause and Effect)
- Laws connect events in patterns of prediction and explanation
- A scientific explanation consists of:
  - a set of statements of some of the conditions of the world - C1, C2 etc
  - a set of universal hypothesis such that:
    - both sets of statements are reasonably well confirmed by empirical evidence
    - from the two sets the sentence stating the occurrence of event E can be deduced
- A complete description of an event would include a complete explanation, which would require all characteristics of the event being described according to universal laws. This is impossible, in both history (social sciences) and the natural sciences
- The use of universal empirical hypotheses distinguish genuine from pseudo-explanations, which rely upon metaphor, vague analogies and intuitive ‘plausibility’
- For any scientific explanation, the original conditions, the universal statements and the relationship between the two can all be checked empirically
- The logical structure of scientific prediction is very similar to that of scientific explanation:
  - a statement about a future event is derived from
    - statements about known past or present conditions
    - statements of applicable general laws
- It may be said that an explanation is not complete unless it could have functioned as a prediction
- However, explanations are rarely stated so completely as to exhibit a predictive character; often most or many universal generalizations AND original/determining conditions are omitted entirely
- Historical explanation, as well as explanation in empirical sciences, aims to show that events were to be expected in the light of certain conditions - rests on assumption of universal laws
- Explanations offered in history often fail to explicitly state the general regularities they presuppose, for two possible reasons:
  - The regularities relate to individual psychology, which is supposed to be familiar to all and hence taken for granted
  - It would be difficult to state the purported regularities in such a way as they would be consistent with all empirical observation e.g. people tend to migrate to areas with better living conditions; or explanations in terms of class struggle etc
- We could suggest that the phenomena are of a statistical character, and thus the generalizations only need to be probabilistic (isn’t this just ignorance of all conditions and all generalizations?)
- Clearly explanatory analysis of historical events can only offer an explanatory sketch, which does not admit so readily of an empirical test
  - however, in contrast to nonempirical explanations or sketches, empirical explanations will at least indicate what kind of evidence might tend to confirm them
- In order to test a given explanation, we should try to reconstruct the conditions of the argument as
evidence it is rational to collect
  ○ could we similarly demand substantive rationality of the desires?
    ■ maybe
  ○ we must draw a stronger connection between desires and behaviour, but one that excludes akratic behaviour - behaviour that shows a weak will - from being considered rational:
    ■ Given C, B is the best action with respect to the full set of weighed desires
● The success of rational-choice models in economics rests on their ability to yield unique, determinate predictions in terms of maximizing behaviour.
  ○ But what if:
    ■ there are several equally good options
    ■ there is no best option at all
    ■ uniquely maximizing behaviour is in general not possible?
  ○ where there are several equally good options
    ■ clearly in the real world, even among equally good options, one is ultimately chosen
    ■ if we had a theory of which would be chosen it would be an improvement over the one that leaves it indeterminate, but would destroy the ‘existence proof’ by introducing a discontinuity in the reaction functions
    ■ given a situation with multiple optimal strategies (i.e. several equally good options), why should the actor choose the (social/market) equilibrium strategy?
      ● game theory fails to deal with
  ○ where optimal behaviour does not exist: e.g. an agent has incomplete preferences
    ■ noncomparability may be particularly important where our rankings are sensitive to the welfare of others - cf. Sen’s ‘sympathy’ preferences can be formed over outcomes or actions - Elster assumes that actions can be derived from outcomes, ‘so that one prefers an action over another because one prefers the outcome it brings about’
      ● action preferences can be incomplete even where outcome preferences are complete - in the case of uncertainty, where we cannot determine the likelihood of a certain action bringing about a preferred outcome
    ■ there may be no equilibrium, or several, none of which can be singled out as the solution
      ● e.g. the game “pick a number - and the player who has picked the largest number wins” has no equilibria set, because the strategy set is unbounded
      ● or a game of “Chicken”, which has two equilibria, and no rationality that will help the players to converge
  ○ how much evidence is it rational to collect before forming the belief upon which you act?
    ■ every decision to act is accompanied by a ‘shadow decision’ about when to stop collecting information, and the former can be no more rational than the latter
    ■ there must be an optimal amount of time that should be spent on information gathering
      ● because if we had full knowledge, we could find the point at which marginal value of information equals marginal cost
      ● in the absence of full knowledge, the agent is aware that there is a

- Edgeworth’s principle of man as selfinterested animal is persistent in economic models and foundational in economic theory
  - in Edgeworth’s time egoism and utilitarianism were seen as the exhaustive approaches to action
    - this is narrow - between the claims of the self (egoism) and the claims of all (utilitarianism) lie intermediate groups - families, friends, communities, classes etc
  - Edgeworth’s model, based on egoistic behaviour, led to a correspondence between exchange equilibria in competitive markets and ‘the core’ of the economy
    - ‘the core’ - outcomes which are Pareto efficient, in which nobody is worse off than he could be without trade, and no group of individuals could improve their position by altering the trade amongst themselves
      - yet these outcomes are not necessarily impressive in terms of social welfare
  - often this question has been posed in terms of ‘what good outcomes can egoistic behaviour achieve?’
    - this often assumes egoism, and hence avoids the issue of how
    - first we should consider what egoistic behaviour consists in, and whether it is realistic (correct)

- One reason we might use the concept of a selfseeking egoist in economic models is because it is possible to formulate all behaviour so that no matter what is chosen, it represents the agent’s interests
  - that is if we define interests/preferences as revealed/residing exclusively in action
    - e.g. if I eat a banana rather than an apple, I was acting selfinterestedly, and revealed a preference
  - one constraint on this is consistency
    - if I make inconsistent choices then for that to be rational I must be either be inconsistent or have changing preferences
  - this seems like an evasion of the issue
  - the rationale of this approach is that we can only understand someone’s preferences through the actual choices that they make
  - without preference and welfare the egoist approach presumes both too little and too much: too little because there are nonchoice sources of information on preference and welfare, and too much because choice may reflect a compromise between various considerations, with personal welfare being just one

- The rational choice theory may appear circular, because behaviour is explained by preferences, which in turn are defined by behaviour
  - in spite of this circularity, the thesis is not meaningless, because it can be falsified - where choice is inconsistent
    - but this still doesn’t answer the question of whether the choices people make are selfinterested; of whether egoism is accurate

- In considering apparent deviations from egoism, we might distinguish between two concepts:
there will be inevitable gaps
- hence if we are to model such a law, we need to go beyond observed instances

Laws and counterfactuals
- Laws support counterfactuals - what would have happened in a possible but not actual situation
- On the SRT model, every empty regularity is true. That means that ‘All Fs are Gs’ and ‘All Fs are not Gs’ are both true, where there are no Fs
  - but with a counterfactuals show that this is a problem - if there had been an F, then it would have been either G or not-G, but not both
    - hence counterfactual analysis shows that the two empty regularities cannot both be laws
    - same for two distinct functional laws that give the same results only for the observed instances
- Counterfactuals also allow us to distinguish between nomic and accidental regularities
  - where a regularity is accidental, we can imagine a circumstance in which an F would have been not-G, but not so where a regularity is nomic
- The fact that laws support counterfactuals is not on its own enough to show the minimalist to be wrong
  - this is believed because counterfactuals allow us to go beyond actual instances, and towards what would have happened in possible but non-actual circumstances
    - the problem here is that counterfactuals imply a ceteris paribus clause, which must include the laws of nature staying the same
      - so we see counterfactuals implicitly refer to laws, counterfactuals cannot help us in the analysis of laws
      - laws support counterfactuals only insofar as counterfactuals refer to laws
        - where a counterfactual does not keep constant the laws of nature, then laws do not support it
          - e.g. ‘how fast would things have accelerated had the gravitational constant been twice what it is’ is a counterfactual not supported by laws of gravitation

Laws that are not regularities - probabilistic laws
- Regularities that are not laws:
  - accidental regularities
  - contrived regularities
  - uninstantiated trivial regularities
  - competing functional regularities
    - the response of the minimalist is usually to add conditions to reduce the range of regularities
    - but what if regularities are not even necessary? i.e. there are laws which are not regularities
- Imagine a probabilistic law which says that nuclei of a certain kind have a probability p of decaying within time t
  - for the minimalist, this law is equivalent to the fact that of all the relevant particles, a
Laws and accidents

- So it seems we have an account of regularities that captures all those regularities we consider
  nomic regularities
  - but actually laws are independent of regularities...
- The systematic account is an improvement on the simple regularity theory because under it,
  accidental regularities are likely to have alternative explanations in terms of other laws
  - but we can imagine a world with many laws, each with few instances. in such a world it
    is plausible that there would be (extraordinarily coincidental) accidental regularities that
    actually have more instances than the laws
  - in such a world accidental regularities would form part of the best system, rather
    than the actual laws
- this suggests the systematic account has not overcome the difficulties of
  the simple regularity theory

Laws, regularities, and explanation

- (assumption regarding the practice of explanation) Laws cannot ‘do their job of’ explaining their
  instances if they are merely regularities
  - a fact cannot explain itself
    - so the ‘law’ (regularity) that ‘(Fa & Ga) & (Fb & Gb) & (Fc & Gc)’ etc cannot
      explain the fact that ‘Fa & Ga’, for example
    - when we ask for an explanation, the regularity is what we want explained
  - this is not achieved by simply stating the regularity

Laws, regularities, and induction

- The opponent of minimalism claims that laws explain their instances, and that inferring a law
  from its instances is inference to the best explanation - we infer the existence of a law, because
  such a law is the best explanation of observed instances
  - the minimalist cannot view inductive inference as inference to the best explanation,
    because the minimalist’s laws cannot explain their instances
    - so induction becomes finding observed regularities and extending them into the
      unobserved
- The problem is that minimalism (regularities) doesn’t provide us with any basis for choosing
  between inductive inferences
  - e.g. an inference that ‘all emeralds have been green, therefore all future emeralds will be
    green’ is as good as ‘all emeralds have been seen, therefore a future X (emirire) is either
    an emerald and observed before 30 June 2012, or a sapphire and not observed before 30
    June 2012’
    - on the minimalist account, there is no obvious difference between inducing with
      the emerald law and inducing with the emirire regularity
    - if laws are distinct from the regularities they explain, we can state the difference:
      the emerald law will explain why the next emerald will be green, whilst the
      emirire regularity has no explanatory power
      - (does this beg the question against the minimalist, in assuming that the