

The Origins of Science, lecture by Peter Tetley

Structural functionalism, as we saw last week, used a biological metaphor to direct the analysis of society. This metaphor, or analogy in the work of Comte, originates in the 19th century concern with progress and change. The use of structural functionalism as an illustration of the nature of recent sociological work was intended to illustrate also the nature of scientific method as applied to the subject matter of sociology, which was, and is, held to be scientific. In order to appreciate the significance of scientific reasoning as applied to sociology then we need to consider the nature of scientific argument in the 19th century and then examine the ways in which these scientific analogues were appropriated by sociologists—notably Spencer, Durkheim and the anthropologists.

Until the late 16th, early 17th century the idea of progress was of little concern or relevance to any person living in the culture of the Catholic Church or the various Protestant denominations which had developed as a response to Catholicism. Life was lived in ‘this vale of tears’ and there was nothing except acceptance and resignation of this fate for any person. As Augustine pointed out in the 4th century life in this earthly city was a necessary and painful preliminary to life in the heavenly city but we could expect nothing except pain and sorrow in our earthly lives. There was no possibility of amelioration and no point in seeking amelioration. However, the rapid changes in the period from about 1550 onwards led to several developments that were related. First, the rejection by Francis Bacon of the methods of Plato and Aristotle as ‘false sophistries’ led to his claim that his new method—his *novum organum*—was not only an adequate replacement but a complete revolution in the sciences. This new method was essentially the introduction of a method of inductive generalisation whereby systematic enumeration of all the instances of a particular event, or phenomenon, would lead to the achievement of a generalisation that would encompass all examples. Popper describes this as ‘the empty bucket theory of the mind’. Bacon’s reinterpretation of the method of science was followed soon after by Descartes who again claimed to have revolutionised method. Descartes’ revolution comprises the radical separation of mind and matter and the assertion that the only tangible proof of existence is thought and that thought must be guaranteed by God. God therefore exists; because God exists Descartes thinks and because Descartes thinks Descartes exists—at the very least as a thinking being. This circular proof of the existence either of God or Descartes’ thought is called the ontological proof of the existence of God. However, what this proof does not do is guarantee the material reality either of the earth, material objects or individuals. The distinction between these two forms of method is a distinction between idealism and materialism: Descartes is idealist; Bacon is materialist.

The second development was the introduction into the history of human beings (‘mankind’) of a conception of progress. Vico’s history (1725) divided the history of human beings into three stages:

	RELIGIOUS	HEROIC	HUMAN
Transition	Metaphor-metonymy	Metonymy-synecdoche	Synecdoche-irony
Sub-phase	Birth/growth	Maturity	Death/dissolution
Society	Theocratic	Aristocratic	Democratic
Language	Mute	Heraldic	Articulate
Law	Divine	Contractual	Forensic
Reason	Divine	Natural	Civil
Writing	Hieroglyphic	Imaginative	Vulgar

Vico's account of this history of mankind is based on the distinction he makes between historical and scientific knowledge. Historical knowledge is the knowledge actors have of their actions and the events they are involved in; scientific knowledge is knowledge of spectators. Vico, whilst providing a general account of cyclical change, of birth, growth, decline, death and rebirth specifically exempts Christian and Hebrew cultures from such a cycle. Christian cultures exist to fulfil the purpose God has in mind for them. This is, in effect, the idea of progress. The third development is the introduction of a specific concept of evolution that is proposed initially in biology and geology and is then applied to society. The central problem that the natural historians had was what is God's purpose? Could it be discovered through the history of the planet? What was this history? The early geologists answered this question by proposing that the fossil record was a record of the history of the world. They did this by suggesting that there were two fundamental processes at work on the world: fire and deposition. Observational evidence recorded that sediments in water were deposited in a uniform manner-in strata; observational evidence also demonstrated that in rocks on land strata were distorted and showed intrusions and folding. Such evidence suggested (i) that there were other processes than deposition (the early creationists had suggested that 4004BC at 11.00 am was the date for the creation of the earth and that all we saw around us was the result of water) and (ii) that if this were so then the time scale of the world must be considerably greater than any one had previously realised. Further evidence to support this view came with the realisation that the objects deposited in the strata were the remains of organisms that had existed previously—fossils. Nevertheless, the interpretation of the geological evidence was still associated with the idea of purpose and progress. The geological evidence simply confirmed man's place in the history of the world and, in particular, the singular significance of Christian cultures in North West Europe.

This view was associated with the early stages of evolutionary biology. Lamarck's concept of evolution was the doctrine of emergent evolution. Lamarck proposed that beings when created and living in the environment acquire characteristics that enable them to adapt to their environment. These characteristics are inherited by beings in successive generations. This theory of acquired characteristics has had a long life—it was the basis, for example, of Lysenko's advice to the Agricultural Ministry of the USSR to plant the steppe lands in Central Asia—a notably unsuccessful proposal. However, this view of evolution was directly challenged by a new proposal. Darwin and Wallace, independently, arrived at broadly similar conclusions regarding the process of biological change. Biological organisms they argue, experience random and unpredictable changes in form, function, and characteristics. Assuming that the environment remains stable, or changes at a much slower rate than the pace at which biological organisms change, this random process of 'mutation' confers on some individuals an advantage with regard to the possibility of surviving in the environment. At the same time the process of 'mutation' confers on some individuals a distinct disadvantage with regard to survival. On the other individuals the change will be minimal or non-existent. For those individuals who have disadvantages the chance of survival is reduced; for those individuals who are advantaged the chance of survival will be enhanced. The outcome of this process of natural selection is that favoured individuals will survive, less favoured ones will tend to die and if the advantage is a characteristic which is inherited then this characteristic will tend to occur in later generations thus conferring an overall advantage. The problem for both Darwin and Wallace was the absence of a mechanism of change but this was solved with Mendel's discovery of the process of genetic mutation. Namely, natural selection operates as a process by mutation operating on the genetic characteristics of the individual. As Peter Medawar points out:

'Any substantial adaptation, it is argued, can only be achieved by adding up, over very many generations, of single all but infinitesimal adaptive changes which, being of inappreciable advantage to their owners, offer nothing for selection to get to grips upon. Luckily, selection

does not abide by human judgments of its efficacy; it can be shown that even so slight and selective advantages as that which allows one thousand and one of its possessors to perpetuate themselves for every thousand that lack it, must eventually prevail'

The use of biological analogies and metaphors in sociology falls into two parts—the first, represented by Comte, is the use of the idea of society as the equivalent of a biological organism. Comte's method was not evolutionary: it was rather the strict application of positivist method. However, the second way in which biological analogies are used in sociology is by using biological explanations (for example, evolutionary change) as a way of explaining social change. One of the first exponents of this argument is Herbert Spencer and we will consider Spencer's contribution next week.

References:

Bottomore and Nisbet: *A History of Sociological Analysis*.

[Some sections of this have been also in *Social Research Glossary*]