historians now make, and what choices did past historians make? What was unthinkingly assumed by past historians? What choices – factual choices – are deliberately made now but were unthinkingly made then? What methods should we use in recovering these choices: the logical implications or presuppositions of past texts? Setting up an understanding of pragmatic meaning in terms of historians' contemporary audiences? Using Collingwood's idea of absolute presuppositions as a way of characterising past assumptions leads to a range of questions which I recommend should be taken seriously not only in writing the history of historiography but in writing history more generally.

Notice that when we write the history of historiography in terms of the choices of individual historians there is an individualist approach here. We, however, are writing this history primarily in terms of the choices which historians *do not* make but which are apparent to later historians[16]. But there is a further point which is that the authors themselves may be 'accidentally' representing their society – their choices (which includes non-choices) are their society's choices – and so we might need a holistic rather than individualist solution. Do not forget that when it comes to discovering or recovering past choices we can use two modes, first, the discovery of the actual choices that are made, and second, we can *ascribe* choices to people, using a model[17]. Here we may use the elements of economic theory. *Our* choices as historians are choices between such alternatives.

Historians who believe they are objective are because of that belief commonly resistant to theory because it suggests they have choices which they often do not believe they have. But in examining the work of past historians where things were taken for granted in the name of objectivity even present historians can recognise the error in that attitude and try to avoid making the same error themselves. In one sense current historians are at the cutting edge of understanding just because they say things which, at the most recent level of understanding, have no practical alternative and so appear as objective to them. But later historians, aware not of *possible* but rather of *practically available* alternatives of which we are unaware, can see our present limitations in a way which we cannot.

In conclusion, history is not yet at ease with its own theory, and philosophy of history has not yet learnt all that it should from Kuhn. There is a wide range of philosophical models of historiography, but we have yet to write that philosophically informed history of historiography with which these models can be compared. Such a history might make a major difference to our historical understanding, just as Kuhn's history of science made a major difference to our understanding of science.

Queen's University
Belfast

16 Or, Maria Grever comments, apparent to some dominant group of historians.

17 See my *Understanding History* (Ottawa, 1991), chapter 5.

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HISTORY AND THE RETURN TO SCIENCE[1]

Martin Stuart-Fox

There are two senses in which it might be argued that the distance between history and science can and should be reduced in response to the excessive epistemological pessimism of postmodernism[2]. One is methodological, the other theoretical. This paper will briefly examine each of these senses. It will argue that the methodological gap is closed if science and history are similarly understood as historical enterprises conducted over time by groups of expert researchers and scholars; and that the theoretical gap is closed once history is set within the broad paradigm provided by evolutionary theory based upon the Darwinian principles of variation and selection.

I. METHODOLOGY

One way of comparing history with science is to note that both attempt to understand the world present to our senses. Science attempts to understand the natural world, its physics and chemistry, its geology and biology. History attempts to understand those aspects of the world that have been constructed or modified by human activity, notably those aspects constituting our historical sources, including not only texts, images, buildings, etc., but also the memory traces retained in human brains. Historians account for the existence of these sources by reconstructing the circumstances, the motivations, actions and events, that in all likelihood gave rise to them.

1 This paper expands on an outline presented at the twentieth International Congress of Historical Sciences, Sydney, on 8 July 2005, in the panel of the International Commission on History and Theory of Historiography. I have deliberately included supporting references from other papers given at the conference.

2 I would agree with Nancy Partner that we are already living in a post-postmodern age: N. Partner, «Narrative Power, Narrative Coercion», paper presented to the twentieth International Congress of Historical Sciences, Sydney, 5 July 2005. The legacy of postmodernism has not been entirely negative, however. It has, as Partner pointed out, extended the use of «narrative» as a theoretical concept, thus further historicizing our understanding of the world. It has contributed to undermining the notion of truth as absolutely attainable and substituted for it the notion of truth as contested and historical, as something for we must constantly strive. Though many might not see this as positive, relativism, properly understood, does have the advantage of promoting tolerance. And, most importantly, postmodernism has directed attention to human cognition, its evolution and its variety in the form of the beliefs, attitudes, values, etc. on the basis of which human beings act upon the world. So historically postmodernism can be seen as linked to the 'cognitive turn' in the social sciences.

The distinction between natural and constructed aspects of the world is, of course, the one made by Giambattista Vico, who privileged historical over scientific knowledge. Vico argued that we can never understand why the world was created as it was, because we can never know the mind of God, but we can understand why human societies are as they as, because we *can* know what was in the minds of other human beings[3]. The distinction is not a clear-cut one – human activities modify natural environments – but it will do as a first approximation for methodological purposes.

The philosophy of science from Bacon to Popper attempted to establish firm epistemological foundations for scientific knowledge. More recently, however, attention has increasingly shifted from the status of scientific knowledge as the product of any one mind to its construction by many minds over time; in other words, to science as an ongoing social project. Three developments have been crucial in bringing about this shift, deriving from the sociology of knowledge, the history of science, and theorisation of the way knowledge grows. The first showed how the production of knowledge was influenced by social dynamics and the exercise of power[4]. The second, thanks initially to Thomas Kuhn, demonstrated that the status of scientific knowledge depended on more than the rationality of individual minds: it also depended on historical processes[5]. Debate on how those processes could best be understood, the third development, gave rise notably to evolutionary epistemology[6].

This is where we are today. Science is understood as a constantly evolving body of knowledge, whose methodology combines rigorous empirical analysis of the object of study with the formulation of explanatory hypotheses or models, in a process of dialectical interaction over time (question, tentative hypothesis, empirical investigation, theoretical explanation, critical response, new questions, new research, and so on). This process is both self-corrigible and progressive (in the sense of working towards more accurate theories over time) and is driven by curiosity, rejection of authority, and criticism. All scientific knowledge remains hypothetical, for there is always the possibility, however slim in specific cases, of future modification in the light of new research or theory. The likelihood that a hypothesis provides an accurate explanation depends on the extent of confirmation, in relation to both empirical evidence and consistency with the existing body of

3 G. Vico, *The New Science of Giambattista Vico*, tr. from the 3rd ed., 1744, by Th. Goddard Bergin and M. H. Fisch (Ithaca, 1948), Book 1.

4 The classical text is K. Mannheim, *Ideology and Utopia: An Introduction to the Sociology of Knowledge* (London, 1936).

5 Th. S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1996). See also P. Thagard, *Conceptual Revolutions* (Princeton, 1992). For an argument for closer cooperation between science and history, see P. Holm, «The shifting Baseline: Science and its Need for History», paper presented to the twentieth International Congress of Historical Sciences, Sydney, 4 July 2005.

6 D. T. Campbell, *Methodology and Epistemology for Social Science: Selected Papers*, ed. E. S. Overman (Chicago, 1988). See also *Evolutionary Epistemology, Rationality, and the Sociology of Knowledge*, eds. G. Radnitzky and W. W. Bartley, III (Chicago and La Salle, 1987).

strongly confirmed theory. Failure to meet the requirement for theoretical consistency leads to paradigm change. On a meta-level, even what R. G. Collingwood called «absolute presuppositions»[7] must be held in question, though in practice this is only possible in time, from the vantage of one who does not share them (as Foucault understood)[8]. What we accept as true at any time, therefore, is in part a measure of durability of the covering theory, its capacity to withstand criticism. The pursuit of scientific knowledge is thus a communal process, ongoing and open-ended, conducted by all and only those qualified to participate. It is, however, nonetheless rational for being social and historical[9].

A second aspect of science is that it is instrumental. We seek knowledge about the world primarily not for its own sake (even in so-called pure research), but in order to use it to act upon the world for our benefit. That benefit is better served as our knowledge about the world improves in accuracy, as measured by the degree to which the expected outcomes of our actions (predictions) prove to be correct[10]. Because science is a communal project, no real division exists between pure and applied science (or science and technology, for that matter), apart from the interests of individual scientists. It is the instrumentality of science that provides its ultimate test as knowledge.

I have focused on these two aspects of science – how the truth claims of scientific knowledge depend on historical and social factors and its instrumental dimension – because failure to appreciate their significance has helped create a perceived methodological gap between history and science. There is an irony to the fact that most historians have failed to notice how the historicization of science has strengthened the methodological claims of history, provided that differences and similarities are properly understood.

So how does historical methodology compare with scientific methodology? One essential difference is that in history (and the other social sciences), interpretation as well as causation enters into explanation. History is centrally about human motivation and intention reflecting desired goals, interests, and values, and how these translate into action. This process entails interpretation, which imparts meaning. History is concerned with meaning in three senses. Its more obvious interest is in what human actors meant to achieve by doing what they did, and how and why they succeeded or failed. Then there is the meaning that inheres in explanation. But there is a further dimension of meaning that resides in the implicit relationship between past and present – the meaning past actions have from the present perspective of the historian. History, to reiterate, is hermeneutic: it provides not just explanation, but also interpretation. This is not the case for science.

7 R. G. Collingwood, *Essay on Metaphysics* (Oxford, 1940).

8 M. Foucault, *The Order of Things* (London, 1970).

9 P. Thagard, «Mind, Society, and the Growth of Knowledge», in *Philosophy of Science*, 61 (1994): 629-645.

10 Cf. T. A. F. Kuipers, *From Instrumentalism to Constructive Realism: On Some Relations Between Confirmation, Empirical Progress, and Truth Approximation* (Dordrecht, 2000).

Historical hypotheses in the form of narrative reconstructions are thus both explanatory and interpretive. Indeed it is often all but impossible to separate the two strands. For example, an historical hypothesis might rank the significance of multiple causes of some complex event. This will provide an explanation, but it will also impart meaning. To this must be added intended meaning, for even the most structural and impersonal historical accounts at some causal level rest upon the motivations and intentions of human agents[11]. I want to focus, however, on the meaning presented to the reader by an historical account as a whole. Such meaning will inevitably reflect the historically contingent assumptions and values of the historian. Its acceptance depends on the relationships established in the mind of the reader between the past as narrated and the reader's own assumptions and values, as shaped by personal circumstances – something I shall return to below. It is not the meaning that inheres in causal explanation that sets history apart from science, but this broader sense of meaning through which history contributes to the construction of personal and group identity by showing us how we have come to be as we are[12].

Both historians and philosophers have argued that the hermeneutic dimension of history separates it methodologically from science. Yet there are important methodological similarities. Historians study the past, but they can only do so by means of what the past has left in the present; that is, those aspects of the world that result from human activity. Like scientists they undertake rigorous empirical analysis of the evidence before them (source criticism), and ask questions: how did these texts or other objects come into existence? Through what series of events? For what purpose? What were the intentions of the actors involved? Did they achieve what they set out to do, and if not, why not? Like scientists, historians approach their objects of study with tentative explanatory hypotheses in mind, which they then test against available evidence. As in science criticism leads to new research posing new questions, which in turn lead to new hypothetical interpretations.

What makes it difficult to perceive the methodological similarities between history and science is that historians usually couch their hypothetical explanatory reconstructions in the form of narrative accounts, whereas scientists seek equations and models. Narratives both describe the context in which events take place, and explain, if in abbreviated form, the causal connections between them (which derive from implied 'relevant generalisations' to which the reader can give assent[13].) Meaning associated with such connections is unproblematical: in science too causal relationships imply meaning in this sense. It is the meaning implied by the

[11] This raises the debate over methodological individualism. See *Modes of Individualism and Collectivism*, ed. J. O'Neill (London, 1973).

[12] 'We' refers to group membership, defined narrowly or broadly. Histories of the 'other' may always be subsumed in a broader category, up to the inclusivity of 'humankind'.

[13] 'Relevant generalisation' (relevant, that is, to the reader) is preferable to 'covering law' in the context of historical explanation, because it allows for probabilities and exceptions.

account as a whole that presents difficulties[14]. What needs to be recognized is that the reconstructions presented in historical narratives are always hypothetical, just as are scientific explanations or models. They are informed by rigorous research, but the interpretations they offer need to be critically examined. Only if an interpretation stands up to criticism will it be accepted – until replaced by another, better one. In the case of historical narratives, the broad interpretations they present are critically assessed by the community of professional historians, both in the review process and by the extent to which they figure in subsequent histories, on the basis of not just use of evidence to make causal connections, but also their consistency with other accepted historical interpretations. This critical judgment by an historian's peer group is not a guarantee, if positive, of historical truth, but it does constitute an important methodological similarity with science. Whether or not a scientific theory is accepted as forming the basis for an ongoing research programme, and whether or not an historical interpretation is accepted as a basis for subsequent historical research (and inclusion in subsequent histories), are both determined by peer group response.

This brings me to the instrumental aspect of history, something most historians ignore. The meanings entailed in hypothetical historical interpretations constitute the use value of history, whether or not this is the stated intention of historians. Meanings are useful for the contributions they make both to the identities of individuals and the group(s) to which they belong, and to the worldviews they form (again both individual and shared across groups). Both identity and worldview influence behaviour and action, in response to circumstances. Whether or not the meaningful interpretation of past events offered by an historian contributes to the identity of a non-expert reader depends, however, on how it relates to her already existing structure of cognition built up through experience, education, and so on. This structure of cognition in its broad outline is what constitutes worldview. New interpretations are more likely to be incorporated as worldview is being formed, through processes of cognitive selection that are both externally and internally driven[15]. Some historical interpretations may not be rigorously based on the analysis of sources, but rather designed to promote certain behaviours. Such history, often written by propagandists to promote some cause rather than by professional historians, is political in intent, insofar as the behaviours instigated are political (that is, designed to pursue through the exercise of power certain goals and outcomes in competition with other alternative behaviours). In fact much political propaganda makes what most historians would view as an illegitimate instrumental use of history[16].

[14] Including any meaning implied by the «mode of emplotment» or trope used to construct the narrative. See H. White, *Metahistory* (Baltimore, 1973).

[15] I have discussed this process in M. Stuart-Fox, «Evoiutionary Theory of History», in *History and Theory*, 38, (1999): 33-51; reprinted in *The Return of Science: Evolution, History, and Theory*, eds. P. Pomper and D. G. Shaw (Lanham, 2002), 123-144.

[16] This political use to which history is often put (either overtly, as by Marxists of feminists, for example, or covertly) makes it difficult critically to decide upon the acceptance or rejection of an

The use or misuse of history in an instrumental sense does not differentiate historical from scientific knowledge, however, since science too is instrumental. What has led both historians and philosophers of history to accentuate the distinction, however is that advocacy, to use Alan Megill's term[17], is inevitably part of what historians do, for narrative interpretations aim to convince by means other than just setting out a string of causal connections. Historical interpretations are rhetorically embroidered, perhaps, as Hayden White has argued, unavoidably so, given the figures of speech that inform their narrative presentation[18]. But advocacy, though it imposes moral responsibilities on the historian, does not make it impossible to distinguish history from propaganda: it just makes it more difficult. The blurring of categories occurs because the instrumental use of history overlaps with the politics of group identity. We will never prevent this happening, but we can minimize the effect though rigorous, evidentially grounded criticism over time, resulting in eventual acceptance of an alternative view of the past, informed by more universalistic values than those of narrow political expediency[19].

A similar argument applies to the distinction between history and myth. Here the blurring of categories is due to the fact that both provide meaning for the present in terms of the past. Many origin myths contain reference to what purports to be an historical core event that provides justification for present custom and practice. So myth, like history, contributes to the construction of group identity[20]. Again criticism is capable of sorting out historically attested from other components (based on supporting evidence from other sources), leading in time to eventual acceptance of an alternative narrative. What adds to the confusion over the distinction between history and myth is the common rhetorical use of 'myth' as a term to denigrate an interpretive historical hypothesis with which someone does not agree[21].

To distinguish history from myth and history from propaganda both depend on criticism applied over time, but they relate quite differently to problems of

historical explanation, and so to agree on paradigmatic theories in the social sciences. But the natural sciences, it should be noted, are not immune to this problem. The theory of evolution, though overwhelmingly accepted by biologists is still rejected by fundamentalist Christians and orthodox Muslims and Jews. And acceptance of the theory of global is beset by just such political pressures.

17 A. Megill, «What are the Marks of a 'récit véridique' in History?», paper presented at the twentieth International Congress of Historical Sciences, Sydney, 5 July 2005.

18 White, *Metahistory*.

19 With ups and downs, it is possible to discern since Voltaire a trend towards writing histories that are more universally acceptable, even for national histories. In part this reflects the historical struggle for the liberation of oppressed social groups and against prejudice (decolonisation, anti-racism, etc.), and in part it reflects the professional training of historians and the humanistic values of the discipline.

20 This is particularly true in the case of origin myths. For the case of the Lao, see M. Stuart-Fox, *The Lao Kingdom of Lān Xāng: Rise and Decline* (Bangkok, 1998), 22-29.

21 The confusion has been compounded by W. McNeill in his paper «Mythistory, or Truth, Myth, History, and Historians» in McNeill, *Mythistory and Other Essays* (Chicago, 1985) through this unfortunate titular neologism. Cf. C. Lorenz's discussion in «Drawing the line: 'Scientific' history between myth-making and myth-breaking» presented at the twentieth International Congress of Historical Sciences, Sydney, 4 July 2005.

historical methodology. While the former juxtaposes alternative sources of meaning, the latter results from differences in the use to which historical knowledge may be put to promote desired social behaviour. What they have in common is that both have been used to throw doubt on the objectivity of historical knowledge by comparison with the paradigm supposedly provided by scientific knowledge. But this is unwarranted, because the scientific paradigm does not guarantee absolute truth – for the good reason that the methodology of science, like that of history, is indisputably historical.

'Objectivity' has been traditionally understood by historians as qualifying the knowledge they deduce and convey about the past. To call knowledge 'objective' makes a claim about epistemic status, and so measures the rationality of historical methodology and its capability of arriving at truth about the past. The process consists broadly of two steps: deduction of historical facts from available evidence; and construction of a narrative account connecting these facts. Critical acclaim provides confirmation, but the process does not stop there. Significant past events are studied repeatedly in the light of an ever-changing present, which may provide new material evidence, or new techniques of analysis, or new theoretical insights. Past knowledge is superseded by what claims to be a more accurate or insightful or comprehensive interpretation of what happened and why. But this is no different in essence from the replacement of one scientific theory or model by another. Both are historical processes, understanding of which allows us better to make critical judgments about the status of any knowledge we currently possess.

Recognition of process has already happened in science, where the work of Popper, Kuhn, Lakatos and other philosophers and historians of science have made scientists more aware of the fragility of the epistemological claims they make, more aware of science as process rather than outcome. For science to be 'objective' it must meet not just rigorous methodological standards, but also criteria of improved explanatory accuracy and comprehensiveness that entail comparison with historically prior knowledge. But this historicization of science has not been matched by an historicization of history. For that we need to build a history of historiography into our criteria of objectivity. Judgment of whether the interpretation a new history offers is 'objective' should entail not just an assessment of how it relates to available sources, but also how it relates to the interpretations of previous histories. It is this comparative and historical dimension that allows other expert historians to judge the 'objectivity' of a history – not in some impossible absolute, all-or-nothing sense, but as providing a more comprehensive, rigorous and methodologically and theoretically sophisticated reconstruction and interpretation of past events than any previously available[22].

22 I first suggested the inclusion of a critical historiographical dimension in our understanding of historical objectivity, and so of the status of historical truth, in M. Stuart-Fox, «Can History be True? A review essay», in *Australian Journal of Politics and History*, 44 (1998): 113-28. J. Gorman made a similar point in his paper «The Truth of Historical Theory» presented at the twentieth International Congress of Historical Sciences, Sydney, 8 July 2005, in which he argued for a «philosophical history

In summary, the additional dimension of intention on the part of historical actors and of meaning in the hypothetical interpretative narratives of historians are not enough to override essential methodological similarities between science and history, provided both are understood as open-ended communal pursuits through time. What comes to be accepted as historical knowledge results from the same kind of rigorous empirical investigation, hypothesis formation and testing, and critical reception by the relevant expert peer group as does scientific knowledge. Historical hypotheses in the form of narrative interpretations may seem more problematical because more contested, but this reflects the lack of any broad paradigmatic theory of history acceptable to professional historians, not methodological laxity – which brings me to the second part of this paper.

II. THEORY

Modern science tells us that life has been evolving on earth for some four billion years. Evolutionary biology arranges the phyla of organisms in the form of a branching tree, diagrammatically plotting speciation against time. There was no inevitability in the resulting sequences, however. Great extinctions occurred due to radical environmental change, or the impact of chance events, such as the massive meteorite impact that may have led to the disappearance of the dinosaurs, an accident without which the efflorescence of the mammals would very likely never have occurred.

The evolution of *Homo sapiens* was no less a matter of chance. We know now that at various times several different hominid lines competed, not just in Africa, but when successive hominid species encountered each other in Europe and Asia[23]. We know that *Homo erectus* survived much longer in East Asia than elsewhere, almost certainly until the later arrival of *Homo sapiens sapiens*. And now there is the discovery of an ultra-pygmy hominid on Flores[24].

Homo sapiens began to evolve around 200,000 years ago in Africa, subsequently out-competing all other hominid species and spreading around the globe. The predominant view among scholars is that a large part of that success was due to the evolution of culture and consciousness, in some form of combination, and that this took place in relation to both the natural and social environment. The evolution of culture provided a means of flexibly relating to varied and variable environments. Consciousness allowed planning and deliberate social coordination. The last stage in this process came with the appearance of *Homo sapiens sapiens* through the evolution of the modern mind capable of symbolic communication in the form of language, art and ritual somewhere around

of historiography» to reveal «the absolute presuppositions of past historiography» and thereby provide a standard for assessment of historical «objectivity».

23 See, for example, among many recent publications I. Tattersall, *The Fossil Trail* (Oxford, 1995).

24 K. Wong, «The Littlest Human», in *Scientific American*, 292, 2 (Feb. 2005): 40-49.

50,000 year ago[25]. Subsequently hunter-gatherers established permanent settlements based on agriculture and the domestication of draught animals. Not much more than 5,000 years ago, the first written signs appeared and civilisation arose – the beginning, in the view of some historians, of 'history proper'.

Such in brief outline is the story revealed by evolutionary biology, physical anthropology and archaeology. Given this context, to draw a line between prehistory and history seems arbitrary in the extreme. Writing may reveal more about a culture than its material remains, but it does not mark some radical transition that separates in some absolute sense (requiring an entirely new theoretical understanding) what came after from what went before. Plenty of tribal peoples remain illiterate to this day. All the great early civilisations – Egypt, Mesopotamia, the Indus valley, Shang China, Meso-America – derived from earlier prehistoric roots stretching back millennia. What is remarkable is not the shift from prehistory to history, but the continuity of adaptive cultural evolution.

The human species is not the exceptional, whimsical creation of some god. It has evolved in relation to other forms of life on earth and in response to environmental change in ways which we can understand because it is a natural process. The over-arching theory which explains human evolution is, of course, the Darwinian theory of variation and natural selection. Essentially this explains how change occurs over time in the form and behaviour of organisms. In other words, it is historical.

In essence Darwin's theory of evolution is remarkably simple and straightforward. All it says is that if organisms comprising an inter-breeding population display variation, and some selective mechanism ensures that only some variants breed, eventually those variants will become the norm. So, for example, over time a population of animals dark in colour will become light in a snowy environment because lighter individuals will more easily escape predators. When global warming melts the ice, the reverse will apply. Selection occurs because the drive to reproduce in all organisms results in more offspring than the environment can support. Those that are best equipped to compete for food and mates in the face of hostile environmental forces will survive and reproduce. Those unable to compete will die before they can leave any offspring[26].

Darwin did not know what was responsible for the variation that was evident in any population, but he did understand that because environmental forces are random in their impact, at the macro level the direction of evolution can never be predicted in advance. The evolution of populations is always in response to changes in environment, which they track more of less closely[27]. So fish trapped in an underground lake by tectonic movements lose their eyes and pigmentation. But

25 See, for example, W. Noble and I. Davidson, *Human Evolution, Language and Mind* (Cambridge, 1996). Some would, however, argue for an earlier date. See K. Wong, «The Morning of the Modern Mind», in *Scientific American*, 292, 6 (June 2005): 64-73.

26 A good recent exposition is E. Mayr, *What Evolution Is* (London, 2001).

27 The fit measures adaptedness. If the gap widens too far, extinction occurs.

they develop other senses that better equip them to survive in their new environment. Only in this sense can changes be evaluated as improvements. What we can broadly predict is that responses will occur over the long term to persistent environmental trends, such a global warming, but we cannot predict with any accuracy what those responses will produce by way of species change.

Two things to note are first that evolutionary theory claims to provide no more than an explanatory mechanism to account for change in and differentiation between the breeding populations that constitute species; and second that this process entails no necessary progress, even in organic complexity. Organisms may become structurally simpler, as in the case of some parasites. That Darwin's theory of evolution entails no necessary progress has been widely misunderstood – by both Marx and Spencer for two – which is why Darwin's ideas were so improperly applied in the nineteenth century[28].

Darwinian evolutionary theory has gone through three stages of development. First came the critical response to *The Origin of Species*. Then came a lull until a new theoretical advance accounted for what gave rise to variation. This was the rediscovery of Mendelian genetics, which was incorporated into Darwinian evolution to produce the so-called 'synthetic theory' whose elaboration began in the 1930s. This stimulated a second burst of evolutionary thinking, which saw evolution became established not as debatable theory, but as the overriding biological explanatory paradigm – in the way that relativity and quantum theory became for physics.

This success allied to the operational generalization of the evolutionary mechanism (as 'variation and selective retention') and its application to explain the growth of knowledge, and of science itself, (as 'evolutionary epistemology') opened the way for a third phase of evolutionary thinking, this time in the social sciences. This is where we are today. Evolutionary theory is being applied not only in archaeology and anthropology, but also in psychology, sociology, economics and even politics[29]. It is regrettable that many historians seem unaware of this burst in theoretical activity.

These applications rest on certain realizations that have been long in coming. One is that humankind is a living species like any other, sharing an extraordinary proportion of our genes with so-called 'lower' organisms; that human culture has co-evolved over millions of years with biological evolution from Miocene apes, to the australopithecines and early hominids; and that the environment we live in, including that to a great extent human-made, exerts selective pressures on the way

[28] In the form of Social Darwinism, on which see P. Brantlinger, *Dark Vanishings: Discourse on the Extinction of Primitive Races, 1800-1930* (Ithaca, 2003).

[29] See, for example, H. Maschner, *Darwinian Archaeologies* (New York, 1996); L. Workman and W. Reader, *Evolutionary Psychology: An Introduction* (Cambridge, 2004); J. Lepreato, *Crisis in Sociology: The Need for Darwin* (New Brunswick, 1999); *The Evolving Economy: Essays on the Evolutionary Approach to Economics*, ed. Ulrich Witt (Cheltenham, 2003); P. H. Rubin, *Darwinian Politics* (New Brunswick, 2002); S. K. Sanderson, *Social Transformations: A General Theory of Historical Development* (Oxford, 1995).

in which individuals behave that are analogous in effect to the selective pressures exerted on organisms by the natural environment (as, for example, the effect of competition)[30]. This is the context for the application of evolutionary thinking in the social sciences.

At first evolutionism in anthropology was essentially adaptationist. Culture was seen as the means by which populations of human beings in different parts of the world adapted to the environments in which they found themselves. Once populations became settled, cultural production began to alter the material environment, creating conditions for larger and more complex social groups to congregate. These processes created new material and social environments to which new adaptive responses were required[31]. So cultures evolved in all their variety, in isolation, or borrowing from each other as communications improved, or forced to adapt to conquest and coercion.

Early attempts to explain social and cultural phenomena by natural selection, as contributing to reproductive success (calculated mathematically as inclusive fitness) had only limited application to certain semi-instinctual aspects of human behaviour (such as sexual attraction and maternal bonding)[32]. Attempts by sociobiologists to apply biological explanations more widely were unconvincing[33]. More recently, sophisticated modelling has been used to demonstrate the interaction in human evolution between biological and cultural evolutionary processes[34].

None of these evolutionary approaches is satisfactory as a theory of history, but they are getting closer to what would be required. An evolutionary theory of history must explain history in the theoretical context of the adaptive cultural evolution of *Homo sapiens*, just as the evolution of *Homo sapiens* is explained in the theoretical context of the evolution of all life on earth. To be analogous to biological evolutionary theory, however, some mechanism would have to operate by which variation was selectively retained and reproduced. But variation in what?

The common answer has been variation in culture, either in the behavioural and material elements of culture conceived as discrete and imitable units, or more recently, as a cognitive view of culture has come to dominate, in discrete elements of cognition, in the form of ideas, concepts or memes[35]. That variation is cognitive

[30] Cf. G. Cziko, *Without Miracles: Universal Selection Theory and the Second Darwinian Revolution* (Cambridge, Mass., 1995).

[31] For an argument along these lines, see R. Boyd and P. J. Richerson, *Not by Genes Alone: How Culture Transformed Human Evolution* (Chicago, 2005).

[32] For an example of this approach, see J. H. Barkow, *Darwin, Sex, and Status: Biological Approaches to Mind and Culture* (Toronto, 1989).

[33] Though for a defense, see J. Alcock, *The Triumph of Sociobiology* (Oxford, 2001). The whole debate over the validity of sociobiology is examined in U. Segerstråle, *Defenders of the Truth: The Battle for Science in the Sociobiology Debate and Beyond* (Oxford, 2000).

[34] One of the most convincing is R. Boyd and P. J. Richerson, *The Origin and Evolution of Cultures of Cultures* (Oxford, 2005).

[35] The term was coined by R. Dawkins, *The Selfish Gene* (Oxford, 1976). Various attempts have been made to define and locate it. One such is R. Aunger, *The Electric Meme: A New Theory of How We Think* (New York, 2002).

makes good sense. Cultural production begins with thought, shaded by emotive or volitional states. We decide to perform some action (go shopping, take part in some ritual) or make some object with an idea in mind. Thought is translated into action or behaviour, which may or may not result in some further material product. Ideas may be replicated in other minds through communication and learning. There they may be acted upon to produce similar actions and outcomes. Innovative ideas will produce new outcomes, which must compete against older alternatives. The winner will depend on the selective forces operating (on several levels)[36].

A Darwinian theory of cultural evolution opens the way for an evolutionary theory of history. Of course lots of matters remain to be resolved. One has to do with the extent to which analogies between biological and cultural evolution hold. Another important one concerns the interaction between biological and cultural evolution. But these are essentially matters for empirical investigation. My own view is that despite the convincing arguments of evolutionary psychology that cognition is modular and that modules, though integrated, evolved over different periods of human evolution, the conscious communication of ideas expressed symbolically in gesture and language constitutes a system that has very largely escaped from genetic constraints. But what kind of system is it? As it incorporates a mechanism of variation and selective retention, it can only be an evolutionary system.

For anthropologists and cultural historians, a theory of cultural evolution would already be a theory of history. But most historians are not interested primarily in cultural change. They are interested in individual and group decisions and actions designed to influence others, exert power, have some political or social effect. They are interested in social change, in events which involved large numbers of people, such as revolutions, or wars, or political or religious movements. They want to explain how events occurred. An evolutionary theory of history that explains the mechanism of the selective incorporation of ideas and meanings in individual mind, their selective expression in action (whether materially productive or linguistic) and the cumulative communal effect this has, does provide such an explanatory framework.

It may be objected that historians simply do not have enough sources to provide an explanation of complex events as the cumulative effect of individual thought and action. True enough, but then nor do evolutionary biologists have information on the reproductive histories of breeding populations to show how they gave rise to new species. Still the theory, by defining the mechanism, allows us to understand how the process happens, for it allows us by extrapolation to fill in gaps in the evidence. This is always an essential role of theory. In science theory permits us to work from particular instances to the general case. In history the reverse applies: theory allows us to deduce individual contributions from the collective outcome. While the application of evolutionary theory of history lies in the past, its confirmation, as for Darwinian theory of biological evolution, lies in

[36] Stuart-Fox, «Evolutionary Theory of History».

the present, through research programs in cognitive psychology and small-group sociology, and in politics and economics and cultural studies, for example in the use of power or through advertising, to exert selective pressure.

III. THEORY AND METHOD

A final question is: how would acceptance of a paradigmatic evolutionary theory of history affect historical method? The short answer is, not a lot. Historians already seek to understand why historical actors did what they did in terms of where they got their ideas from (parents, teachers, spouses, advisers), why they selected a particular course of action (as a result of previewing alternatives and their effects, in the face of political and social pressure), and what selective forces then were brought to bear on the chosen action to produce the intended result, or modify it, or frustrate it. The trick is to see this as a selective process, on a series of levels, which explains historical outcomes (events) as a result of the selective retention of some variant idea or belief at the expense of others. Each outcome creates a new situation, often unforeseen, which exerts new selective pressures for a new set of responses. Histories written according to this understanding of historical change as an evolutionary process might differ in emphasis (perhaps more on mental formation, more on selective pressures – particularly the exercise of power) and be more open-ended in relation to outcomes, but they will hardly be unrecognizable. They will still have narrative form and advocate interpretations to convince and influence behaviour. History will not become a natural science, but the methodological and theoretical divide will be perceived to be much less significant than historians – particularly self-designated postmodernist historians – mistakenly believe it to be at present.

University of Queensland
Brisbane