The Meme Machine

Susan Blackmore

With a Foreword by
Richard Dawkins
author of *The Selfish Gene*

The Meme Machine

Susan Blackmore is a Reader in Psychology at the University of the West of England, Bristol, where she lectures on the psychology of consciousness. Dr Blackmore's research interests include near–death experiences, the effects of meditation, why people believe in the paranormal, evolutionary psychology, and the theory of memetics. She is the current Perrott–Warrick Researcher, studying psychic phenomena in borderline states of consciousness, and has received the Distinguished Skeptic's Award from CSICOP, the Committee for the Scientific Investigation of Claims of the Paranormal. Susan Blackmore writes for several magazines, has an occasional column in the *Independent* newspaper, and is a frequent contributor and presenter on radio and television.

The Meme Machine

SUSAN BLACKMORE

OXFORD
UNIVERSITY PRESS

OXFORD
UNIVERSITY PRESS
Great Clarendon Street, Oxford 0X2 6DP

Oxford University Press is a department of the University of Oxford.
It furthers the University's aim of excellence in research, scholarship,
and education by publishing worldwide in

Oxford New York
Athens Auckland Bangkok Bogota Bombay Buenos Aires Calcutta
Cape Town Chennai Dar es Salaam Delhi Florence Hong Kong Istanbul
Karachi Kuala Lumpur Madrid Melbourne Mexico City Mumbai
Nairobi Paris Sao Paulo Singapore Taipei Tokyo Toronto Warsaw

and associated companies in Berlin Ibadan
Oxford is a registered trade mark of Oxford University Press

Published in the United States
by Oxford University Press Inc., New York

First published 1999
First issued as an Oxford University Press paperback 2000

British Library Cataloguing in Publication Data
(Data available)

Library of Congress Cataloging in Publication Data
(Data available)

ISBN-13: 978-0-19-286212-9

10

Typeset by Joshua Associates Ltd., Oxford

Printed in Great Britain by
Clays Ltd, St Ives plc

For Adam

Foreword

by Richard Dawkins

As an undergraduate I was chatting to a friend in the Balliol College lunch queue. He regarded me with increasingly quizzical amusement, then asked: 'Have you just been with Peter Brunet?' I had indeed, though I couldn't guess how he knew. Peter Brunet was our much loved tutor, and I had come hotfoot from a tutorial hour with him. 'I thought so', my friend laughed. 'You are talking just like him; your voice sounds exactly like his.' I had, if only briefly, 'inherited' intonations and manners of speech from an admired, and now greatly missed, teacher. Years later, when I became a tutor myself, taught a young woman who affected an unusual habit. When asked a question which required deep thought, she would screw her eyes tight shut, jerk her head down to her chest and then freeze for up to half a minute before looking up, opening her eyes, and answering the question with fluency and intelligence. I was amused by this, and did an imitation of it to divert my colleagues after dinner. Among them was a distinguished Oxford philosopher. As soon as he saw my imitation, he immediately said: 'That's Wittgenstein! Is her surname _____ by any chance?' Taken aback, I said that it was. 'I thought so', said my colleague. 'Both her parents are professional philosophers and devoted followers of Wittgenstein.' The gesture had passed from the great philosopher, via one or both of her parents to my pupil. I suppose that, although my further imitation was done in jest, I must count myself a fourth-generation transmitter of the gesture. And who knows where Wittgenstein got it?

The fact that we unconsciously imitate others, especially our parents, those in quasi-parental roles, or those we admire, is familiar enough. But is it really credible that imitation could become the basis of a major theory of the evolution of the human mind and the explosive inflation of the human brain, even of what it means to be a conscious self? Could imitation have been the key to what set our ancestors apart from all other animals? I would never have thought so, but Susan Blackmore in this book makes a tantalisingly strong case.

Imitation is how a child learns its particular language rather than some other language. It is why people speak more like their own parents than like other people's parents. It is why regional accents, and on a longer timescale separate languages, exist. It is why religions persist along family lines rather than being chosen afresh in every generation. There is at least a superficial analogy to the longitudinal transmission of genes down generations, and to the horizontal transmission of genes in viruses. Without prejudging the issue of whether the analogy is a fruitful one, if we want even to talk about it we had better have a name for the entity that might play the role of gene in the transmission of words, ideas, faiths, mannerisms and fashions. Since 1976, when the word was coined, increasing numbers of people have adopted the name 'meme' for the postulated gene analogue.

The compilers of the *Oxford English Dictionary* operate a sensible criterion for deciding whether a new word shall be canonised by inclusion. The aspirant word must be commonly used without needing to be defined and without its coinage being attributed whenever it is used. To ask the metamemetic question, how widespread is 'meme'? A far from ideal, but nevertheless easy and convenient method of sampling the meme pool, is provided by the World Wide Web and the ease with which it may be searched. I did a quick search of the Web on the day of writing this, which happened to be 29 August 1998. 'Meme' is mentioned about half a million times, but that is a ridiculously high figure, obviously confounded by various acronyms and the French *même*. The adjectival form 'memetic', however, is genuinely exclusive, and it clocked up 5042 mentions. To put this number into perspective, I

compared a few other recently coined words or fashionable expressions. Spin doctor (or spin-doctor) gets 1412 mentions, dumbing down 3905, docudrama (or docu-drama) 2848, sociobiology 6679, catastrophe theory 1472, edge of chaos 2673, wannabee 2650, zippergate 1752, studmuffin 776, post-structural (or poststructural) 577, extended phenotype 515, exaptation 307. Of the 5042 mentions of memetic, more than 90 per cent make no mention of the origin of the word, which suggests that it do indeed meet the *OED's* criterion. And, as Susan Blackmore tells us, the *Oxford English Dictionary* now does contain the following definition:

> meme An element of a culture that may be considered to be passed on by non-genetic means, esp. imitation.

Further searching of the Internet reveals a newsgroup talking shop, 'alt.memetics', which has received about 12000 postings during the past year. There are on-line articles on, among many other things, 'The New Meme', 'Meme, Counter-meme', 'Memetics: a Systems Metabiology', 'Memes, ar Grinning Idiot Press', 'Memes, Metamemes and Politics', 'Cryonics, religions and memes', 'Selfish Memes and the evolution of cooperation', and 'Running down the Meme'. There are separate Web pages on 'Memetics', 'Memes', 'The C Memetic Nexus', 'Meme theorists on the Web', 'Meme of th week', 'Meme Central', 'Arkuat's Meme Workshop', 'Some pointers and a short introduction to memetics', 'Memetics Index' and 'Meme Gardening Page'. There is even a new religion (tongue-in-cheek, I *think),* called the 'Church of Virus', complete with its own list of Sins and Virtues, and its own patron saint (Saint Charles Darwin, canonised as 'perhaps the most influential memetic enginee of the modern era') and I was alarmed to discover a passing reference to 'St Dawkin'.

Susan Blackmore's book is preceded by two others entirely devoted to the subject of memes and both good in their different ways: Richard Brodie's *Virus of the Mind: The New Science of the Meme,* and Aaron Lynch's *Thought Contagion: How Belief Spreads through Society.* Most significant of all, the distinguished philosopher Daniel Dennett has adopted the idea of the meme, building it in as a cornerstone of his theory of mind, as developed in his two great books *Consciousness Explained,* and *Darwin's Dangerous Idea.*

Memes travel longitudinally down generations, but they travel horizontally too, like viruses in an epidemic. Indeed, it is largely horizontal epidemiology that we are studying when we measure the spread of words like 'memetic', 'docudrama' or 'studmuffin' over the Internet. Crazes among schoolchildren provide particularly tidy examples. When I was about nine, my father taught me to fo a square of paper to make an origami Chinese junk. It was a remarkable feat of artificial embryology passing through a distinctive series of intermediate stages: catamaran with two hulls, cupboard with doors, picture in a frame, and finally the junk itself, fully seaworthy or at least bathworthy, complete with deep hold, and two flat decks each surmounted by a large, square-rigged sail. The point of the story is that I went back to school and infected my friends with the skill, and it then spread around th school with the speed of the measles and pretty much the same epidemiological time-course. I do not know whether the epidemic subsequently jumped to other schools (a boarding school is a somewhat isolated backwater of the meme pool). But I do know that my father himself originally picked up the Chinese Junk meme during an almost identical epidemic at the same school 25 years earlier. The earlier virus was launched by the school matron. Long after the old matron's departure, I had reintroduced her meme to a new cohort of small boys.

Before leaving the Chinese Junk, let me use it to make one more point. A favourite objection to the meme/gene analogy is that memes, if they exist at all, are transmitted with too low fidelity to perform a gene-like role in any realistically Darwinian selection process. The difference between high-fidelity genes and low-fidelity memes is assumed to follow from the fact that genes, but not memes, are

digital. I am sure that the details of Wittgenstein's mannerism were far from faithfully reproduced when I imitated my pupil's imitation of her parents' imitation of Wittgenstein. The form and timing of the tic undoubtedly mutated over the generations, as in the childhood game of Chinese Whispers (Americans call it Telephone).

Suppose we assemble a line of children. A picture of, say, a Chinese junk is shown to the first child who is asked to draw it. The drawing, but not the original picture, is then shown to the second child, who is asked to make her own drawing of it. The second child's drawing is shown to the third child, who draws it again, and so the series proceeds until the twentieth child, whose drawing is revealed to everyone and compared with the first. Without even doing the experiment, we know what the result will be. The twentieth drawing will be so unlike the first as to be unrecognisable. Presumably, if we lay the drawings out in order, we shall note some resemblance between each one and its immediate predecessor and successor, but the mutation rate will be so high as to destroy all semblance after a few generations. A trend will be visible as we walk from one end of the series of drawings to the other, and the direction of the trend will be degeneration. Evolutionary geneticists have long understood that natural selection cannot work unless the mutation rate is low. Indeed, the initial problem of overcoming the fidelity barrier has been described as the Catch-22 of the Origin of Life. Darwinism depends on high-fidelity gene replication. How then can the meme, with its apparently dismal lack of fidelity, serve as quasi-gene in any quasi-Darwinian process?

It is not always as dismal as you think and, as Susan Blackmore insists, high fidelity is not necessarily synonymous with digital. Suppose we set up our Chinese Whispers Chinese Junk game again, but this time with a crucial difference. Instead of asking the first child to copy a drawing of a junk, we teach her, by demonstration, to make an origami model of a junk. When she has mastered the skill and made her own junk, the first child is asked to turn round to the second child and teach him how to make one. So the skill passes down the line to the twentieth child. What will be the result of this experiment? What will the twentieth child produce, and what shall we observe if we lay the twenty efforts out in order along the ground? I have not done it, but I will make the following confident prediction, assuming that we run the experiment many times on different groups of twenty children. In several of the experiments, a child somewhere along the line will forget some crucial step in the skill taught him by the previous child, and the line of phenotypes will suffer an abrupt macromutation which will presumably then be copied to the end of the line, or until another discrete mistake is made. The end result of such mutated lines will not bear any resemblance to a Chinese junk at all. But in a good number of experiments the skill will correctly pass all along the line, and the twentieth junk will be no worse and no better, on average, than the first junk. If we then lay the twenty junks out in order, some will be more perfect than others, but imperfections will not be copied on down the line. If the fifth child is ham-fisted and makes a clumsily asymmetrical or floppy junk, his quantitative errors will be corrected if the sixth child happens to be more dextrous. The twenty junks will not exhibit a progressive deterioration in the way that the twenty drawings of our first experiment undoubtedly would.

Why? What is the crucial difference between the two kinds of experiment? It is this: inheritance in the drawing experiment is Lamarckian (Blackmore calls it 'copying-the-product'). In the origami experiment it is Weismannian (Blackmore's 'copying-the-instructions'). In the drawing experiment, the phenotype in every generation is also the genotype -it is what is passed on to the next generation. In the origami experiment, what passes to the next generation is not the paper phenotype but a set of instructions for making it. Imperfections in the execution of the instructions result in imperfect junks (phenotypes) but they are not passed on to future generations: they are non-memetic. Here are the first five instructions in the Weismannian meme line of instructions for making a Chinese junk:

1. Take a square sheet of paper and fold all four corners exactly into the middle.

2. Take the reduced square so formed, and fold one side into the middle.

3. Fold the opposite side into the middle, symmetrically.

4. In the same way, take the rectangle so formed, and fold its two ends into the middle.

5. Take the small square so formed, and fold it backwards, exactly along the straight line where your last two folds met.

…and so on, through 20 or 30 instructions of this kind. These instructions, though I would not wish t call them digital, are potentially of very high fidelity, just as if they were digital. This is because the all make reference to idealised tasks like ‘fold the four corners exactly into the middle’. If the paper not exactly square, or if a child folds ineptly so that, say, the first corner overshoots the middle and the fourth corner undershoots it, the junk that results will be inelegant. But the next child in the line will not copy the error, for she will assume that her instructor *intended* to fold all four corners into th exact centre of a perfect square. The instructions are self-normalising. The code is error-correcting. Plato would enjoy it: what passes down the line is an ideal essence of junk, of which each actual junk is an imperfect approximation.

The instructions are more effectively passed on if verbally reinforced, but they can be transmitted by demonstration alone. A Japanese child could teach an English one, though neither has a word of th other's language. In the same way, a Japanese master carpenter could convey his skills to an equally monoglot English apprentice. The apprentice would not copy obvious mistakes. If the master hit his thumb with a hammer, the apprentice would correctly guess, even without understanding the Japanes expletive ' ** **** ** !', that he meant to hit the nail. He would not make a Lamarckian copy of the precise details of every hammer blow, but copy instead the inferred Weismannian instruction: drive the nail in with as many blows of your hammer as it takes your arm to achieve the same idealised end result as the master has achieved with his – a nail head flush with the wood.

I believe that these considerations greatly reduce, and probably remove altogether, the objection that memes are copied with insufficient high fidelity to be compared with genes. For me, the quasi-genetic inheritance of language, and of religious and traditional customs, teaches the same lesson. Another objection, discussed, like the first, in Susan Blackmore's illuminating chapter on 'Three problems with memes' is that we do not know what memes are made of or where they reside. Memes have not yet found their Watson and Crick; they even lack their Mendel. Where genes are to be found in precise locations on chromosomes, memes presumably exist in brains, and we have even less chance of seeing one than of seeing a gene (though, in an article referred to by Blackmore, the neurobiologist Juan Delius had pictured his conjecture of what a meme might look like). As with genes, we track memes through populations by their phenotypes. The 'phenotype' of the Chinese junk meme is made of paper. With the exception of 'extended phenotypes', such as beaver dams and caddi larva houses, the phenotypes of genes are normally parts of living bodies. Meme phenotypes seldom are.

But it can happen. To return to my school again, a Martian geneticist, visiting the school during th morning cold bath ritual, would have unhesitatingly diagnosed an 'obvious' genetic polymorphism. About 50 per cent of the boys were circumcised and 50 per cent were not. The boys, incidentally, wer highly conscious of the polymorphism and we classified ourselves into Roundheads versus Cavaliers (I have recently read of another school in which the boys even organised themselves into two footbal teams along the same lines). It is, of course, not a genetic but a memetic polymorphism. But the Martian's mistake is completely understandable; the morphological discontinuity is of exactly the kind that one normally expects to find produced by genes.

In England at that time, infant circumcision was a medical whim, and the Roundhead/Cavalier polymorphism at my school probably owed less to longitudinal transmission than to differing fashion in the various hospitals where we happened to have been born – horizontal memetic transmission, ye again. But through most of history circumcision has been longitudinally transmitted as a badge of religion (of *parents'* religion I hasten to point out, for the unfortunate child is normally too young to *know* his own religious mind). Where circumcision is religiously or traditionally based (the barbaric custom of female circumcision always is), the transmission will follow a longitudinal pattern of heredity, very similar to the pattern for true genetic transmission, and often persisting for many generations. Our Martian geneticist would have to work quite hard to discover that no genes are involved in the genesis of the roundhead phenotype.

The Martian geneticist's eyes would also pop out on stalks (assuming they were not on stalks to begin with) at the contemplation of certain styles of clothing and hairdressing, and their inheritance patterns. The black skull-capped phenotype shows a marked tendency towards longitudinal transmission from father to son (or it may be from maternal grandfather to grandson), and there is clear linkage to the rarer pigtail-plaited sideburn phenotype. Behavioural phenotypes such as genuflecting in front of crosses, and facing east to kneel five times per day, are inherited

longitudinally too, and are in strongly negative linkage disequilibrium with each other and with the previously mentioned phenotypes, as is the red-dot-on-forehead phenotype, and the saffron robes/ shaven head linkage group.

Genes are accurately copied and transmitted from body to body, but some are transmitted at greate frequency than others–by definition they are more successful. This is natural selection, and it is the explanation for most of what is interesting and remarkable about life. But is there a similar meme-based natural selection? Perhaps we can use the Internet again to investigate natural selection among memes? As it happens, around the time the word 'meme' was coined (actually a little later), a rival synonym, 'culturgen', was proposed. Today, culturgen is mentioned twenty times on the World Wide Web, compared with memetic's 5042. Moreover, of those twenty, seventeen also mention the source of the word, falling foul of the *Oxford English Dictionary's* criterion. Perhaps it is not too fanciful to imagine a Darwinian struggle between the two memes (or culturgens), and it is not totally silly to ask why one of them was so much more successful. Perhaps it is because meme is a monosyllable simila to gene, which therefore lends itself to quasi-genetic sub-coinings: meme pool (352), memotype (58) memeticist (163), memeoid (or memoid) (28), retrometa (14), population memetics (41), meme complex (494), memetic engineering (302) and metameme (71) are all listed in the 'Memetic Lexicon' at *http://www.lucifer.com/virus/mem-lex.html§MEME* (the numbers in parentheses count th mentions of each word on the Web on my sampling day). Culturgen-based equivalents would be mor obvious but less snappy. Or the success of meme against culturgen may have been initially just a non Darwinian matter of chance–memetic drift (85)–followed by a self-reinforcing positive feedback effect ('unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath', Matthew 25: 29).

I have mentioned two favourite objections to the meme idea: memes have insufficient copying fidelity, and nobody really knows what a meme physically is. A third is the vexed question of how large a unit deserves the name 'meme'. Is the whole Roman Catholic Church one meme, or should w use the word for one constituent unit such as the idea of incense or transubstantiation? Or for something in between? Susan Blackmore gives due attention to such questions, but she rightly concentrates on a more constructive approach, developing the positive explanatory power of the 'memeplex' – an abbreviation which she prefers over the full 'coadapted meme complex', and I shall be surprised if in time her book does not bring about a Darwinian reversal of their numerical fortunes (today, 20 and 494, respectively).

Memes, like genes, are selected against the background of other memes in the meme pool. The result is that gangs of mutually compatible memes – coadapted meme complexes or memeplexes – a found cohabiting in individual brains. This is not because selection has chosen them as a group, but because each separate member of the group tends to be favoured when its environment happens to be dominated by the others. An exactly similar point can be made about genetic selection. Every gene in a gene pool constitutes part of the environmental background against which the other genes are naturally selected, so it's no wonder natural selection favours genes that 'cooperate' in building thos highly integrated and unified machines called organisms. Biologists are sharply divided into those fo whom this logic is as clear as daylight, and those (even some very distinguished ones) who just do no understand it – who naively trot out the obvious cooperativeness of genes and unitariness of organism as though they somehow counted against the 'selfish gene' view of evolution. Susan Blackmore not only understands it, she explains the matter with unusual clarity and goes on to apply the lesson with equal clarity and force to memes. By analogy with coadapted gene complexes, memes, selected against the background of each other, 'cooperate' in mutually supportive memeplexes – supportive within the memeplex but hostile to rival memeplexes. Religions may be the most convincing

examples of memeplexes but they are by no means the only ones. Susan Blackmore's treatment is, as ever, provocative and revealing.

I believe a sufficient case has been made that the analogy between memes and genes is persuasive and that the obvious objections to it can be satisfactorily answered. But can the analogy do useful work? Can it lead us to powerful new theories that actually explain anything important? This is wher Susan Blackmore really comes into her own. She warms us up with some fascinating vignettes which get us used to the memetic style of reasoning. Why do we talk so much? Why can't we stop thinking? Why do silly tunes buzz round our heads and torment us into insomnia? In every case she begins her response in the same way: 'Imagine a world full of brains, and far more memes than can possibly fin homes. Which memes are more likely to find a safe home and get passed on again?' The answer comes back readily enough, and our understanding of ourselves is enriched. She pushes on, with patience and skill applying the same method to deeper and more exacting problems: What is languag for? What attracts us to our mates? Why are we so good to each other? Did memes drive the rapid, massive, and peculiar evolutionary expansion of the human brain? Along the way, she shows how the theory of memes can throw light on particular areas where she has special expertise from her academic career as a psychologist and sceptical investigator of the paranormal: superstition and near death experience.

In the end, showing greater courage and intellectual *chutzpah* than I have ever aspired to, she deploys her memetic forces in a brave – do not think foolhardy until you have read it – assault on the deepest questions of all: What is a self? What am I? Where am I? (famous questions posed by Daniel Dennett long before he became the philosophical mentor of all meme theorists). What of consciousness, creativity and foresight?

I am occasionally accused of having backtracked on memes; of having lost heart, pulled in my horns, had second thoughts. The truth is that my first thoughts were more modest than some memeticists, including perhaps Dr Blackmore, might have wished. For me, the original mission of th meme was negative. The word was introduced at the end of a book which otherwise must have seeme entirely devoted to extolling the selfish gene as the be-all and end-all of evolution, the fundamental unit of selection, the entity in the hierarchy of life which all adaptations could be said to benefit. There was a risk that my readers would misunderstand the message as being *necessarily* about genes in the sense of DNA molecules. On the contrary, DNA was incidental. The real unit of natural selection was any kind of *replicator*, any unit of which copies are made, with occasional errors, and with some influence or power over their own probability of replication. The genetic natural selection identified by neo-Darwinism as the driving force of evolution on this planet was only a special case o a more general process that I came to dub 'Universal Darwinism'. Perhaps we would have to go to other planets in order to discover any other examples. But perhaps we did not have to go that far. Could it be that a new kind of Darwinian replicator was even now staring us in the face? This was where the meme came in.

I would have been content, then, if the meme had done its work of simply persuading my readers that the gene was only a special case: that its role in the play of Universal Darwinism could be filled by any entity in the universe answering to the definition of Replicator. The original didactic purpose of the meme was the negative one of cutting the selfish gene down to size. I became a little alarmed a the number of my readers who took the meme more positively as a theory of human culture in its ow right – either to criticise it (unfairly, given my original modest intention) or to carry it far beyond the limits of what I then thought justified. This was why I may have seemed to backtrack.

But I was always open to the possibility that the meme might one day be developed into a proper hypothesis of the human mind, and I did not know how ambitious such a thesis might turn out to be.

Any theory deserves to be given its best shot, and that is what Susan Blackmore has given the theory of the meme. I do not know whether she will be judged too ambitious in this enterprise, and I would even fear for her if I did not know her redoubtable qualities as a fighter. Redoubtable she is, and hard nosed too, but at the same time her style is light and personable. Her thesis undermines our most cherished illusions (as she would see them) of individual identity and personhood, yet she comes across as the kind of individual person you would wish to know. As one reader I am grateful for the courage, dedication and skill she has put into her difficult task of memetic engineering, and I am delighted to recommend her book.

Preface

This book owes its existence to an illness. In September 1995 I caught a nasty virus, and struggled to keep working until I was finally forced to give up and take to my bed. I stayed there for many months unable to walk more than a few steps, unable to talk for more than a few minutes, unable to use my computer – in fact unable to do anything but read and think.

During this time I began on my pile of 'urgent books I must read this week' which had long been oppressing me. One of them was Dan Dennett's latest book *Darwin's Dangerous Idea.* At about the same time one of my PhD students, Nick Rose, wrote me an essay on 'Memes and Consciousness'. Somehow the meme meme got to me. I had read Dawkins's *The Selfish Gene* many years before but, suppose, had dismissed the idea of memes as nothing more than a bit of fun. Suddenly I realised that here was a powerful idea, capable of transforming our understanding of the human mind – and I hadn even noticed it. I then read everything I could find on memes. Since I had to refuse all invitations to give lectures, take part in television programmes, go to conferences, or write papers, I could devote myself properly to the study of memes.

Most of the ideas in this book came to me while I was lying in bed during those months, especially between January and March 1996. As I gradually got better I began to make extensive notes. Some two years after I first became ill I was well enough to work again, and decided to keep on saying no t all those invitations, and to write this book instead.

I would like to thank the illness for making it possible, and my children Emily and Jolyon for not, apparently, minding that their mother was uselessly lying in bed all the time. I would like to thank m partner Adam Hart–Davis for not only looking after me when I was ill, but for encouraging my enthusiasm for memes in every way possible and for putting 'the book' first.

Dan Dennett was one of the first to hear my ideas and I thank him for his 'avuncular advice'. Several people helped greatly by reading earlier drafts of all or part of the book. They are Richard Dawkins, Dan Dennett, Derek Gatherer, Adam Hart–Davis, Euan MacPhail, Nick Rose, and my edito Michael Rodgers who has given me much sound advice and encouragement. Helena Cronin helped enormously by inviting me to lecture on memes and putting me in touch with many helpful critics. Finally I would like to thank the Perrott–Warrick Fund for their financial support for the research on sleep paralysis and the paranormal discussed in Chapter 14. Without all this help, these particular memes would never have come together.

SJ

Bristol
October1998

Contents

CHAPTER 1

Strange creatures

We humans are strange creatures. There is no doubt that our bodies evolved by natural selection just as other animals' did. Yet we differ from all other creatures in many ways. For a start we speak. We believe ourselves to be the most intelligent species on the planet. We are extraordinarily widespread and extremely versatile in our ways of making a living. We wage wars, believe in religions, bury our dead and get embarrassed about sex. We watch television, drive cars and eat ice cream. We have had such a devastating impact upon the ecosystems of our planet that we appear to be in danger of destroying everything on which our lives depend. One of the problems of being a human is that it is rather hard to look at humans with an unprejudiced eye.

On the one hand, we are obviously animals comparable with any others. We have lungs, hearts and brains made of living cells; we eat and breathe and reproduce. Darwin's theory of evolution by natura selection can successfully explain how we, along with the rest of life on this planet, came to be here, and why we all share so many characteristics. On the other hand, we behave quite differently from other animals. Now that biology has so successfully explained much of our similarity with other creatures we need to ask the opposite question. What makes us so different? Could it be our superior intelligence, our consciousness, our language, or what?

A common answer is that we are simply more intelligent than any other species. Yet the notion of intelligence is extremely slippery, with interminable arguments about how to define it, how to measure it, and to what extent it is inherited. Research in artificial intelligence (AI) has provided some nice surprises for those who thought they knew what makes human intelligence so special.

In the early days of AI, researchers thought that if they could teach a computer to play chess they would have reproduced one of the highest forms of human intelligence. In those days the idea that a computer could ever play well, let alone beat a Grand Master, was unthinkable. Yet now most home computers come with passable chess programmes already installed, and in 1997 the program *Deep Blue* beat World Champion Garry Kasparov, ending unquestioned human supremacy at the game. Computers may not play chess in the same way as humans, but their success shows how wrong we ca be about intelligence. Clearly, what we thought were human beings' most special capabilities may nc be.

Quite the opposite goes for some apparently quite unintelligent things like cleaning the house, digging the garden or making a cup of tea. Time and again AI researchers have tried to build robots t carry out such tasks and been defeated. The first problem is that the tasks all require vision. There is popular (though possibly apocryphal) story about Marvin Minsky at **MIT** (the Massachusetts Institut of Technology) that he once gave his graduate students the problem of vision as a summer project. Decades later the problem of computer vision is still just that – a problem. We humans can see so effortlessly that we cannot begin to imagine how complex the process has to be. And in any case, this kind of intelligence cannot distinguish us from other animals because they can see too.

If intelligence does not provide simple answers perhaps consciousness might. Many people believe that human consciousness is unique and is responsible for making us human. Yet scientists cannot even define the term 'consciousness'. Everyone knows what their own consciousness is like but they cannot share that knowledge with anyone else. This troublesome fact – the subjectivity of consciousness – may explain why for most of this century the whole topic of consciousness was more or less banned from scientific discussion. Now at last it has become fashionable again, but scientists

and philosophers cannot even agree on what an explanation of consciousness would look like. Some say that the 'Hard Problem' of subjectivity is quite different from any other scientific problem and needs a totally new kind of solution, while others are sure that when we fully understand brain function and behaviour the problem of consciousness will have disappeared.

Some people believe in the existence of a human soul or spirit that transcends the physical brain and explains human uniqueness. With the decline in religious belief fewer and fewer people intellectually accept that view, yet most of us continue to think of ourselves as a little conscious 'me' inside our brain; a 'me' who sees the world, makes the decisions, directs the actions and has responsibility for them.

As we shall see later, this view has to be wrong. Whatever the brain is doing it does not seem to need help from an extra, magical self. Various parts of the brain carry on their tasks independently of each other and countless different things are always going on at once. We may feel as though there is a central place inside our heads in to which the sensations come and from which we consciously make the decisions. Yet this place simply does not exist. Clearly, something is very wrong with our ordinary view of our conscious selves. From this confused viewpoint we cannot say with certainty that other animals are not conscious, nor that consciousness is what makes us unique. So what does?

What makes us different?

The thesis of this book is that what makes us different is our ability to imitate.

Imitation comes naturally to us humans. Have you ever sat and blinked, or waved, or 'goo gooed', or even just smiled, at a baby? What happens? Very often they blink too, or wave, or smile back at you. We do it so easily, even as an infant. We copy each other all the time. Like seeing, it comes so effortlessly that we hardly think about it. We certainly do not think of it as being something very clever. Yet, as we shall see, it is fantastically clever.

Certainly, other animals do not take naturally to it. Blink, or wave, or smile at your dog or cat and what happens? She might purr, wag her tail, twitch, or walk away, but you can be pretty sure she will not imitate you. You can teach a cat, or rat, to beg neatly for its food by progressively rewarding it, but you cannot teach it by demonstrating the trick yourself – nor can another cat or rat. Years of detailed research on animal imitation has led to the conclusion that it is extremely rare (I shall return to this in Chapter 4). Though we may think of mother cats as teaching their kittens to hunt, or groom, or use the cat door, they do not do it by demonstration or imitation. Parent birds 'teach' their babies to fly more by pushing them out of the nest and giving them the chance to try it than by demonstrating the required skills for them to copy.

There is a special appeal to stories of animals copying human behaviour, and pet owners are fond of such tales. I read on the Internet about a cat who learned to flush the toilet and soon taught a second cat the same trick. Now the two of them sit together on the cistern flushing away. A more reliable anecdote was told by Diana Reiss, a psychologist at Rutgers University. She works with bottlenose dolphins, who are known to be able to copy vocal sounds and artificial whistles, as well as simple actions (Bauer and Johnson 1994; Reiss and McCowan 1993). She trained the dolphins by giving them fish as a reward and also by a 'time out' procedure for punishment. If they did the wrong thing she would walk away from the water's edge and wait for one minute before returning to the pool. One day she threw a fish to one of the dolphins but had accidentally left on some spiky bits of fin. Immediately the dolphin turned, swam away, and waited for a minute at the other side of the pool.

That story touched me because I could not help thinking of the dolphins as *understanding* the

action, as having intelligence and consciousness and intentionality like ours. But we cannot even define these things, let alone be sure that the dolphin was using them in this apparent act of reciprocation. What we can see is that it *imitated* Dr Reiss in an appropriate way. We are so oblivious to the cleverness of imitation that we do not even notice how rare it is in other animals and how often we do it ourselves.

Perhaps more telling is that we do not have separate words for radically different kinds of learning. We use the same word 'learning' for simple association or 'classical conditioning' (which almost all animals can do), for learning by trial and error or 'operant conditioning' (which many animals can do), and for learning by imitation (which almost none can do). I want to argue that the supreme ease with which we are capable of imitation, has blinded us to this simple fact – that *imitation* is what makes us special.

Imitation and the meme

When you imitate someone else, something is passed on. This 'something' can then be passed on again, and again, and so take on a life of its own. We might call this thing an idea, an instruction, a behaviour, a piece of information … but if we are going to study it we shall need to give it a name.

Fortunately, there is a name. It is the 'meme'.

The term 'meme' first appeared in 1976, in Richard Dawkins's best–selling book *The Selfish Gene*. In that book Dawkins, an Oxford zoologist, popularised the increasingly influential view that evolution is best understood in terms of the competition between genes. Earlier in the twentieth century, biologists had blithely talked about evolution occurring for the 'good of the species' without worrying about the exact mechanisms involved, but in the 1960s serious problems with this view began to be recognised (Williams 1966). For example, if a group of organisms all act for the good of the group then one individual who does not can easily exploit the rest. He will then leave more descendants who in turn do not act for the group, and the group benefit will be lost. On the more modern 'gene's eye view', evolution may *appear* to proceed in the interests of the individual, or for the good of the species, but in fact it is all driven by the competition between genes. This new viewpoint provided a much more powerful understanding of evolution and has come to be known as 'selfish–gene theory'.

We must be absolutely clear about what 'selfish' means in this context. It does not mean genes *for* selfishness. Such genes would incline their carriers to act selfishly and that is something quite different. The term 'selfish' here means that the genes act only for themselves; their only interest is their own replication; all they want is to be passed on to the next generation. Of course, genes do not 'want' or have aims or intentions in the same way as people do; they are only chemical instructions that can be copied. So when I say they 'want', or are 'selfish' I am using a shorthand, but this shorthand is necessary to avoid lengthy explanations. It will not lead us astray if we remember that genes either *are* or *are not* successful at getting passed on into the next generation. So the shorthand 'genes want *x*' can always be spelled out as 'genes that do *x* are more likely to be passed on'. This is the only power they have – replicator power. And it is in this sense that they are selfish.

Dawkins also introduced the important distinction between 'replicators' and their 'vehicles'. A replicator is anything of which copies are made, including 'active replicators' whose nature affects the chances of their being copied again. A vehicle is the entity that interacts with the environment, which is why Hull (1988a) prefers the term 'interactors' for a similar idea. Vehicles or interactors carry the replicators around inside them and protect them. The original replicator was presumably a simple

self–copying molecule in the primeval soup, but our most familiar replicator now is DNA. Its vehicle are organisms and groups of organisms that interact with each other as they live out their lives in the seas or the air, the forests or fields. Genes are the selfish replicators that drive the evolution of the biological world here on earth but Dawkins believes there is a more fundamental principle at work. H suggested that wherever it arises, anywhere in the universe, 'all life evolves by the differential survival of replicating entities' (1976, p. 192). This is the foundation for the idea of Universal Darwinism; the application of Darwinian thinking way beyond the confines of biological evolution.

At the very end of the book he asked an obvious, if provocative, question. Are there any other replicators on our planet? The answer, he claimed, is 'Yes'. Staring us in the face, although still drifting clumsily about in its primeval soup of culture, is another replicator – a unit of imitation.

> We need a name for the new replicator, a noun that conveys the idea of a unit of cultural transmission, or a unit of *imitation*. 'Mimeme' comes from a suitable Greek root, but I want a monosyllable that sounds a bit like 'gene'. I hope my classicist friends will forgive me if I abbreviate mimeme to *meme*.

As examples, he suggested 'tunes, ideas, catch–phrases, clothes fashions, ways of making pots or c building arches'. He mentioned scientific ideas that catch on and propagate themselves around the world by jumping from brain to brain. He wrote about religions as groups of memes with a high survival value, infecting whole societies with belief in a God or an afterlife. He talked about fashions in dress or diet, and about ceremonies, customs and technologies – all of which are spread by one person copying another. Memes are stored in human brains (or books or inventions) and passed on by imitation.

In a few pages, Dawkins laid the foundations for understanding the evolution of memes. He discussed their propagation by jumping from brain to brain, likened them to parasites infecting a hos treated them as physically realised living structures, and showed how mutually assisting memes will gang together in groups just as genes do. Most importantly, he treated the meme as a replicator in its own right. He complained that many of his colleagues seemed unable to accept the idea that memes would spread for their own benefit, independently of any benefit to the genes. 'In the last analysis the wish always to go back to "biological advantage" ' to answer questions about human behaviour. Yes, he agreed, we got our brains for biological (genetic) reasons but now we have them a new replicator has been unleashed. 'Once this new evolution begins, it will in no necessary sense be subservient to the old' (Dawkins 1976, pp. 193-4). In other words, memetic evolution can now take off without regard to its effects on the genes.

If Dawkins is right then human life is permeated through and through with memes and their consequences. Everything you have learned by imitation from someone else is a meme. But we must be clear what is meant by the word 'imitation', because our whole understanding of memetics depend on it. Dawkins said that memes jump from 'brain to brain via a process which, in the broad sense, can be called imitation' (1976, p. 192). I will also use the term 'imitation' in the broad sense. So if, for example, a friend tells you a story and you remember the gist and pass it on to someone else then that counts as imitation. You have not precisely imitated your friend's every action and word, but something (the gist of the story) has been copied from her to you and then on to someone else. This i the 'broad sense' in which we must understand the term 'imitation'. If in doubt, remember that something must have been copied.

Everything that is passed from person to person in this way is a meme. This includes all the words in your vocabulary, the stories you know, the skills and habits you have picked up from others and th games you like to play. It includes the songs you sing and the rules you obey. So, for example, whenever you drive on the left (or the right!), eat curry with lager or pizza and coke, whistle the them

tune from *Neighbours* or even shake hands, you are dealing in memes. Each of these memes has evolved in its own unique way with its own history, but each of them is using your behaviour to get itself copied.

Take the song 'Happy Birthday to You'. Millions of people – probably thousands of millions of people the world over – know this tune. Indeed, I only have to write down those four words to have a pretty good idea that you may soon start humming it to yourself. Those words affect you, probably quite without any conscious intention on your part, by stirring up a memory you already possess. And where did that come from? Like millions of other people you have acquired it by imitation. Something, some kind of information, some kind of instruction, has become lodged in all those brain so that now we all do the same thing at birthday parties. That something is what we call the meme.

Memes spread themselves around indiscriminately without regard to whether they are useful, neutral, or positively harmful to us. A brilliant new scientific idea, or a technological invention, may spread because of its usefulness. A song like Jingle Bells may spread because it sounds OK, though it is not seriously useful and can definitely get on your nerves. But some memes are positively harmful like chain letters and pyramid selling, new methods of fraud and false doctrines, ineffective slimming diets and dangerous medical 'cures'. Of course, the memes do not care; they are selfish like genes and will simply spread if they can.

Remember that the same shorthand applies to memes as to genes. We can say that memes are 'selfish', that they 'do not care', that they 'want' to propagate themselves, and so on, when all we mean is that successful memes are the ones that get copied and spread, while unsuccessful ones do not. This is the sense in which memes 'want' to get copied, 'want' you to pass them on and 'do not care' what that means to you or your genes.

This is the power behind the idea of memes. To start to think memetically we have to make a giant flip in our minds just as biologists had to do when taking on the idea of the selfish gene. Instead of thinking of our ideas as our own creations, and as working for us, we have to think of them as autonomous selfish memes, working only to get themselves copied. We humans, because of our powers of imitation, have become just the physical 'hosts' needed for the memes to get around. This is how the world looks from a 'meme's eye view'.

Meme fear

This is a scary idea indeed. And perhaps that is why the word 'meme' is so often written with inverted commas around it, as though to apologise for using it. I have even seen eminent lecturers raise both hands and tweak them above their ears when forced to say 'meme' out loud. Gradually, the word has become more generally known, and has even been added to the *Oxford English Dictionary*. There are discussion groups and a *Journal of Memetics* on the Internet, and the idea almost seems to have acquired a cult following in cyberspace. But in academia it has not yet been so successful. A perusal of some of the best recent books on human origins, the evolution of language and evolutionary psychology shows that the word does not appear at all in most of them ('meme' is not in the indexes of Barkow *et al*. 1992; Diamond 1997; Dunbar 1996; Mithen 1996; Pinker 1994; Mark Ridley 1996; Tudge 1995; Wills 1993; Wright 1994). The idea of memes seems extremely relevant to these disciplines, and I want to argue that it is time for us to take on board the notion of a second replicator at work in human life and evolution.

One of the problems with the idea of memes is that it strikes at our deepest assumptions about who we are and why we are here. This is always happening in science. Before Copernicus and Galileo,

people believed they lived at the centre of the universe in a world created especially for them by God. Gradually, we had to accept not only that the sun does not revolve around the earth, but that we live on some minor little planet in an ordinary galaxy in a vast universe of other galaxies.

A hundred and forty years ago Darwin's theory of evolution by natural selection provided the first plausible mechanism for evolution without a designer. People's view of their own origin changed from the biblical story of special creation in the image of God, to an animal descended from an apelike ancestor – a vast leap indeed, and one that led to much ridicule and fanatical opposition to Darwin. Still – we have all coped with that leap and come to accept that we are animals created by evolution. However, if memetics is valid, we will have to make another vast leap in accepting a similar evolutionary mechanism for the origin of our minds and our selves.

••••

What will determine whether the theory of memes is worth having or not? Although philosophers of science argue over what makes a scientific theory valid, there are at least two commonly agreed criteria, and I will use these in judging memetics. First, a theory must be able to explain things better than its rival theories; more economically or more comprehensively. And second, it must lead to testable predictions that turn out to be correct. Ideally, those predictions should be unexpected ones – things that no one would have looked for if they were not starting from a theory of memetics.

My aim in this book is to show that many aspects of human nature are explained far better by a theory of memetics than by any rival theory yet available. The theory starts only with one simple mechanism – the competition between memes to get into human brains and be passed on again. From this, it gives rise to explanations for such diverse phenomena as the evolution of the enormous human brain, the origins of language, our tendency to talk and think too much, human altruism, and the evolution of the Internet. Looked at through the new lens of the memes, human beings look quite different.

Is the new way better? It seems obviously so to me, but I expect that many people will disagree. This is where the predictions come in. I shall try to be as clear as I can in deriving predictions and showing how they follow from memetic theory. I may speculate and even, at times, leap wildly beyond the evidence, but as long as the speculations can be tested then they can be helpful. In the end the success or failure of these predictions will decide whether memes are just a meaningless metaphor or the grand new unifying theory we need to understand human nature.

CHAPTER 2

Universal Darwinism

Darwin's theory of evolution by natural selection is, to my mind, the most beautiful in all of science. It is beautiful because it is so simple and yet its results are so complex. It is counter–intuitive and ha to grasp but once you have seen it the world is transformed before your eyes. There is no longer any need for a grand designer to explain all the complexity of the living world. There is just a stark and mindless procedure by which we have all come about – beautiful but scary.

I want to spend most of this chapter explaining the theory. The problem is that this beautifully simple idea is often misunderstood. Perhaps its very simplicity makes people think there must be something more to it, or that they have missed the point when they have actually grasped it. Evolutio by natural selection is very, very simple and not at all obvious.

Darwin explained the basic principle in his great work *On the Origin of Species by Means of Natural Selection*, first published in 1859. Before that time many people had been impressed by the relationships between organisms, and by progressions in the fossil record, and had speculated about evolution. Among them were Charles's grandfather Erasmus Darwin, and Jean–Baptiste de Lamarck. However, no one had described a plausible mechanism by which evolution might work, and this was Darwin's great contribution.

He reasoned that if living creatures vary (as they certainly do) and if, due to their geometric increase in numbers, there is at certain times a struggle for life (which cannot be disputed), then it would be most extraordinary if there were not some variation that was useful to a creature's welfare. The individuals with these characteristics will then have the best chance of being 'preserved in the struggle for life' and will produce offspring with the same characteristics. This was the principle he called 'natural selection'.

Darwin's argument requires three main features: variation, selection and retention (or heredity). That is, first there must be variation so that not all creatures are identical. Second, there must be an environment in which not all the creatures can survive and some varieties do better than others. Thir there must be some process by which offspring inherit characteristics from their parents. If all these three are in place then any characteristics that are positively useful for survival in that environment must tend to increase. Put into Richard Dawkins's language, if there is a replicator that makes imperfect copies of itself only some of which survive, then evolution simply *must* occur. This *inevitability* of evolution is part of what makes Darwin's insight so clever. All you need is the right starting conditions and evolution just has to happen.

The evolutionary algorithm

The American philosopher Daniel Dennett (1995) has described the whole evolutionary process as an algorithm, that is, a mindless procedure which, when followed, must produce an outcome. Nowadays we are used to the idea of algorithms, although Darwin, Wallace and other early evolutionists would not have been. Many of the things we do are based on algorithms, whether it is adding up sums, dialling a telephone number or even making a cup of tea. Our interactions with machines are particularly algorithmic and the prevalence of machines makes it easier for us to think this way – tak a cup, put it under the spout, choose the drink, put in the right amount of money, press the button, tak

the cup out – if you do the right steps in the right order then the result is a cup of cappuccino, do it wrong and you have a mess on the floor. The computer programs that hold our medical records or run the graphics in our computer games are all algorithms, as are the ways we interface with word processors and financial packages.

Algorithms are 'substrate–neutral', meaning they can run on a variety of different materials. A human with a pencil and paper, a hand–cranked adding machine, and a digital computer can all follow the same algorithm for some mathematical procedure and come to the same answer. The substrate does not matter – only the logic of the procedure does. In the case of Darwin's own argument the substrate was living creatures and a biological environment, but as Dennett points out his logic would apply equally to any system in which there was heredity, variation, and selection. This, again, is the idea of Universal Darwinism.

Algorithms are also completely mindless. If a system is set up so that it follows a given procedure then it does not also need a little mind, or extra–something, inside to make it work. It just must mindlessly happen. This is why Dennett describes Darwin's theory as 'a scheme for creating Design out of Chaos without the aid of Mind' (1995, p. 50). The design simply must come about when millions of creatures, over millions of years, produce more offspring than can survive. The ones that live do so because they are better adapted to the environment in which they find themselves. They then pass on their characteristics to their offspring and so it goes on. The environment itself is constantly changing because of all these developments, and so the process is never static.

Algorithms must always produce the same result if they start from the same point. This seems to suggest that, if evolution follows an algorithm, its results must be predetermined and predictable. This is not the case, and chaos theory explains why not. There are many simple processes, like dripping taps or moving gases, or the path drawn out by a swinging pendulum, which are chaotic. They follow simple and mindless algorithms but their end results are complex, chaotic and unpredictable. Beautiful shapes and patterns can emerge, but although the *kind* of pattern may be repeatable, the detail cannot be predicted without running the procedure right through. And since chaotic systems can be highly sensitive to initial starting conditions, a tiny difference at the beginning may lead to an entirely different outcome. Evolution is like this.

The complexity theorist Stuart Kauffman also likens the evolution of life to an incompressible computer algorithm. We cannot predict exactly how it will all unfold and can only 'stand back and watch the pageant'. We can, however, 'find deep and beautiful laws governing that unpredictable flow' (Kauffman 1995, p. 23).

We can now see that even if evolution is only following a simple algorithm, it is a chaotic system and its outcome can be incredibly complex. Moreover, the results cannot be predicted without running it –and it is only being run once. We can do experiments to test predictions of the theory, but we cannot rerun the evolution of life on earth to see whether it might go a different way next time. There is no next time. Until we find life on other planets there is only this once.

Many interesting arguments remain: such as just how much pattern and order inevitably springs up in the universe even without selection; the role of historical accidents in shaping the path of life, and whether evolution will always tend to produce certain kinds of thing, such as wormlike creatures with a mouth at the front, symmetrical animals with pairs of legs, or eyes or sex. Their resolution will help our understanding of evolution enormously but none of this really matters for grasping the basic principle of the evolutionary algorithm. When this algorithm gets going the inevitable result is that design is created out of nowhere – but we cannot predict exactly what sort of design it will be. Evolution emphatically did not have to end up with us. It had to end up with something more than it started with – and that something just happens to be this world with us in it.