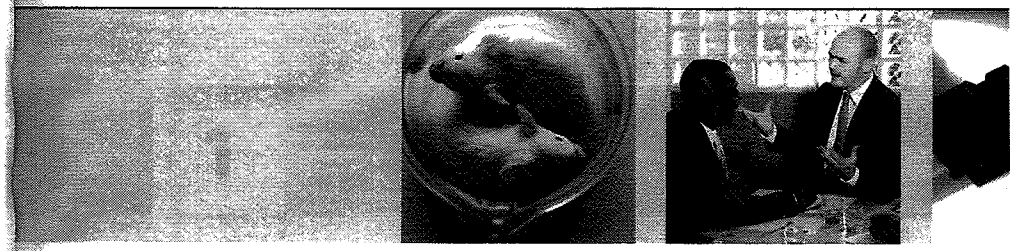
HFE	UK Human Fertilisation and Embryology (Act)
HFEA	UK Human Fertilisation and Embryology Authority
HGA	'human generations ago'
HGC	UK Human Genetics Commission
HGP	Human Genome Project
HIV	human immunodeficiency disease
HT (R)	herbicide tolerant (resistant)
ICH	International Conference on Harmonisation
ICSI	intracytoplasmic sperm injection
IFM	integrated farm management
IFOAM	International Federation of Organic Agricultural Movements
IGF-I	insulin-like growth factor-I
IPM	integrated pest management
IPPC	Intergovernmental Panel on Climate Change
IPR	intellectual property rights
IVF	*in vitro* fertilization
JHCI	UK Joint Health Claims Initiative
kcal	kilocalorie
LEAF	UK Linking Environment and Farming
LDC	less developed country
MAFF	UK Ministry of Agriculture, Fisheries and Food
MJ	megajoule
MNC	multinational corporation
MND	motor neurone disease
MOET	multiple ovulation/embryo transfer
MP	member of the UK House of Commons (Parliament)
MRC	UK Medical Research Council
NAVS	UK National Anti-Vivisection Society
NBD	'narrow but deep' element of the UK GM Nation? debate
NERC	UK Natural Environment Research Council
NGO	non-governmental organization
NHS	UK National Health Service
NOEL	no-effect level
Nuffield	UK Nuffield Council on Bioethics
OECD	Organization of Economic Cooperation and Development
OST	UK Office of Science and Technology
p.a.	per annum
PCB	polychlorinated biphenyls
PCR	polymerase chain reaction
PGD	pre-implantation genetic diagnosis
PERV	porcine endogenous retrovirus
PKU	phenylketonuria
PMI	pronuclear microinjection
PND	prenatal genetic diagnosis
POST	UK Parliamentary Office of Science and Technology
PP	Precautionary Principle
PUS	public understanding of science
PZD	partial zonal drilling
QAAHE	Quality Assurance Agency for Higher Education
RSPCA	UK Royal Society for the Prevention of Cruelty to Animals
R&D	research and development
SARS	severe acute respiratory syndrome
SCNT	somatic cell nuclear transfer
sic	'so' (Latin): confirming the accuracy of the quotation
SRP	UK GM Science Review Panel
SUZI	subzonal insemination
Three Rs	reduction, replacement and refinement
TFR	total fertility rate
TS	Tay–Sachs disease
UK	United Kingdom
UKXIRA	UK Xenotransplantation Interim Regulatory Authority
UN	United Nations
UNDP	United Nations Development Program
UNEP	UN Environment Program
UNICEF	UN Children's Fund
UNFPA	UN Population Fund
US(A)	United States (of America)
USSR	Union of Soviet Socialist Republics
VAD	vitamin A deficiency
WHO	UN World Health Organization
WTO	World Trade Organization
ZIFT	zygote intrafallopian transfer



PART ONE

The theoretical background to bioethics

Philosophy is not the underlabourer of the sciences, but rather their tribunal; it adjudicates not the truth of scientific theorising, but the sense of scientific propositions. Its aim is neither to engage nor abjure science, but restrain it within the bounds of sense.

P M S Hacker (1996)
Wittgenstein and Analytical Philosophy

1 The nature of bioethics

2 Theories of ethics

3 A framework for ethical analysis

1

The nature of bioethics

OBJECTIVES

When you have read and discussed this chapter you should:

- be aware of the remit of bioethics and its various definitions
- appreciate the significance of historical and philosophical perspectives to a sound understanding of how scientific knowledge is acquired and used
- understand how biosciences and biotechnologies can be ethically abused
- be aware, in general terms, of the ethical responsibilities of bioscientists
- be aware of different theories concerning the biological basis of altruism

1.1 Introduction

If the word *bioethics* crops up in general conversation, most people's initial reaction is to look blank. But mention of certain buzz words usually triggers a seemingly knowing response; and bioethics is usually instantly recognizable if it is related to questions such as:

- should we allow the use of cloning by somatic cell nuclear transfer (the technique used to produce Dolly) to help an infertile couple have a child?
- should genetically modified (GM) crops be grown in the UK, where it will be very difficult for organic farmers to maintain their required GM-free status?
- should GM pigs be used to provide organs (xenografts) for transplantation into human patients, with a much reduced risk of immunological rejection?

These are just three examples of high-profile biotechnologies which raise profound ethical concerns. But, in fact, they are rather deceptive examples if they seem to imply that ethics is only involved when some startling, headline-grabbing proposal is announced. For, as we shall see, bioethics is involved at all stages where facts and values interact, and there are few occasions when they do not. So bioethics also concerns less

prominent issues such as:

- whether meat-eating is ethically acceptable
- whether people should be able to choose the sex of their children
- how we need to modify our lifestyles to ensure that future generations inherit a world worth living in.

The problem is that ethics is often interpreted in a rather narrow way. For example, in discussions of the impacts of certain technological innovations it is not unusual to see these listed as 'economic, safety, environmental, and *ethical*'. But the logic of that approach implies that it might be acceptable to countenance *unethical* economics, *unethical* safety, and *unethical* environmental protection measures. Isolating ethics in such a way risks limiting its significance to sentiment, gut-feelings, or religious scruples. Undoubtedly, these concerns matter, but they do not define ethics.

In introducing a new subject it is often necessary to question assumptions that have become second-nature. Within the purely scientific domain, taking certain assumptions for granted usually presents few difficulties. In fact, there are good practical reasons for thinking that questioning the orthodox scientific views presented in formal education is at best time-wasting, and at worst risky. With all due modesty, you might conclude that your lecturers know far more than you about their subjects, so that it would be presumptuous to engage in fruitless questioning. A better degree result is likely to be obtained by learning the facts as they are taught and the orthodox theories that support them. Questioning, it might be considered, can come later – perhaps after graduation (in that illusory period when the pressures are off!) or when pursuing postgraduate studies.

However, one important distinction between education in bioscience and in bioethics is that for the latter questioning assumptions is both *critical* and *indispensable*. While it is dependent on an adequate understanding of the relevant biology, bioethics cannot be taught dogmatically. Students must be encouraged to use their minds, not to have their minds made up for them. Consequently, readers of this book will find that they are presented with a range of arguments, many of which may seem to challenge views commonly accepted in the scientific community. But no attempt is made to provide *the answers* to ethical dilemmas: that is a task for readers themselves.

So, in practice, studying bioethics effectively almost invariably involves discussion and debate, for which books like this can be useful catalysts and guides. The distinguished geneticist Conrad Waddington described books as *tools for thinking with*, which, allowing for the ungainly phraseology, is what this book aims to be.

1.2 Defining bioethics

What do we mean by the term *bioethics*? Perhaps surprisingly, the answer is not straightforward. According to one definition it is *'the study of the moral and social implications of techniques resulting from advances in the biological sciences'*,[1] although, as we shall see in two further definitions below, different writers emphasize different aspects. But we might reasonably regard it as a sub-field of the branch of philosophy called *ethics*,

sometimes also called **moral philosophy**. In this book the words **morality** and **ethics** will generally be used interchangeably (as they often are in common speech), although some differences will be explored in 2.1.1. In any event, ethics should not be thought of as an abstract 'pie in the sky' activity. Moral philosopher Bernard Williams defined a theory of ethics as *'a philosophical structure, which together with some degree of empirical fact, will yield a decision procedure for moral reasoning'*. Or to put it more simply, ethics seeks to answer the question *'What should I do, all things considered?'*[2] So ethics has important practical consequences, in that it aims to help us decide what to do in morally puzzling circumstances.

In fact, assigning this broad remit to ethics can be seen as the attempt to answer one of two big questions which we face as human beings. When we become aware of the world intellectually (for most people in their teens) we start asking questions which, in essence, are of two types: 'What is all this, and how does it work? – the answers to which are sought by *science*; and 'What should we do?' – the answers to which are sought in ethics. Of course, the answers to the two questions are often closely related, not least because what we should do may be largely dependent on *the way things are*, for example in terms of our human (and biological) natures. Science and ethics are also much more closely interrelated in the process of scientific discovery than many people realize, and exploring this relationship makes a good entry point into the study of bioethics, as we shall see in sections 1.3–1.4.

The word *bioethics* seems to have first been used in the 1970s by Van Rensselaer Potter, an American medical scientist, who defined it, rather more expansively than the definition given above, as: *'a new discipline which combines biological knowledge with a knowledge of human value systems, which would build a bridge between the sciences and the humanities, help humanity to survive, and sustain and improve the civilised world.'*[3] People who are professionally committed to developing this approach are called **bioethicists**. The underlying assumption is that in considering bioethical questions, biological understanding is an important part of the reasoning process. Deciding what to do, 'all things considered', cannot be left entirely to pure philosophers because they might miss scientific insights that are essential to a full understanding of the issues.

Because it is such a new field of enquiry, few people will initially have had training in all the relevant disciplines. Some bioethicists started out as philosophers and acquired knowledge of the biosciences later; some, like the author of this book, started out as biologists and subsequently developed an understanding of ethical theory. In fact, the pluralism evident in the ranks of bioethicists has led philosopher Onora O'Neill to suggest that *'Bioethics is not a discipline... It has become a meeting ground for a number of disciplines, discourses, and organisations concerned with ethical, legal, and social questions raised by advances in medicine, science, and biotechnology.'*[4] From some perspectives this might be seen as a weakness, because many (if not most) 'bioethicists' lack at least some of the skills necessary to address rigorously the issues raised by bioethics. Even so, collectively, the varied backgrounds of bioethicists can often result in ethical judgements which are far more than the 'sum of the parts'. This is why so much bioethical deliberation takes place within committees such as government commissions and ethics councils, whose members are chosen to complement each others' skills.

Despite these observations, and whatever the exact definition of the word 'discipline', there would seem to be much merit in seeking to integrate the insights of the different subjects that underpin bioethics if it is to advance beyond the 'talking shop' stage. Consequently, it is an important aim of this book to lay the foundations of a new understanding of the ways bioscience and values interact, which, in Potter's words, means building *'a bridge between the sciences and the humanities'*.

All this raises an interesting question now being addressed by sociologists: *'How did bioethics come to supplant literature, law, and religion as a source of moral instruction and arbitration'* in these matters? For centuries, people looked to novels, plays, and poetry for advice on how to behave ethically – and more than 100 years ago many writers (such as Mary Shelley in *Frankenstein*[5]) were doing what would now be called bioethics – raising questions about the proper use of science. *'Why do we now turn to bioethicists (rather than doctors, the clergy, or lawyers) to help us decide what is right?'*[6] This is a question with no straightforward answer, but being aware of it will remind the reader of the many ways in which bioethical questions permeate our lives.

It should be appreciated that, despite the all-inclusive account of bioethics assumed here, its original focus was on medical issues. After the 1939–45 World War, Nazi doctors and scientists who had carried out research on Jews, gypsies, prisoners and disabled people were tried for their crimes against humanity (1.6.1). As a result, a code of practice for all future research on human subjects was drawn up – the Nuremberg Code (Box 15.2). But matters have moved on over the last 60 years, and it is now widely appreciated that non-medical aspects of biology also raise many ethical concerns. Because medical ethics has become a somewhat specialized branch of bioethics, with its own extensive literature, this book will concentrate on non-medical issues, and relate to the biosciences as distinct from the medical sciences. Even so, the precise remit of medicine is debatable, and certain issues that some people would class as medical ethics are discussed in chapters 5 and 6.

1.3 History and philosophy

A good way to approach this subject is to consider the history of biology. Superficially, history might seem to have little to contribute to scientific understanding. It is, after all, by definition, 'out of date'. But, in reality, a study of the history of scientific ideas reveals much about our current ideas and, equally importantly, about those assumptions that seem so obvious that we don't even question them. By allowing us to stand back and view events dispassionately, history provides a route into the philosophy of science, which is crucial for an appreciation of bioethics. **Philosophy** is a word some science students find a little daunting, even though it is an ambition of many to become PhDs – doctors of philosophy. But philosopher Bertrand Russell's description of philosophy as just *'an unusually obstinate attempt to think clearly'*[7] should dispel any sense of mystique.

Few scientists would deny that the history of their subject can be interesting, but most scientists' knowledge of history tends to be limited to the outline of 'great discoveries'

which often features in the introductory chapters of science textbooks. This orthodox scientific history usually represents earlier scientists as operating in a fog of ignorance, largely influenced by superstition and old wives' tales, which has gradually given way to the discovery of the more and more accurate facts that underpin the modern, truly scientific account of the subject. The theory of heredity is a useful case study for exploring these ideas, because it has implications for almost all the rest of biology.

1.3.1 A brief 'orthodox' history of heredity

Some of the earliest ideas about heredity were that embryos grew from miniature organisms (called 'homunculi' in the case of humans) that were preformed in the father's spermatozoa or mother's ova. Development thus consisted simply of the growth of the preformed individual. The logical consequence of this theory was that the genitalia of the first man – Adam – contained in miniature all the future generations of mankind. This bizarre notion (as we now consider it) was replaced in the nineteenth century by the theory of **blending inheritance**, in which the characteristics of offspring were a mixture of those of their parents, that could, moreover, be modified by environmental factors affecting the parents during their lifetime. Such views were shared by Charles Darwin, who developed the modern theory of evolution in the nineteenth century;[8] and he incorporated them into his theory of **pangenesis**. This theory proposed that all the organs of the body produced particles (**gemmules**) that collected in the genitalia and were transferred to the offspring following copulation.

Only later in the nineteenth century were chromosomes identified as the structures involved in conveying information between generations. This led to the re-discovery of the work of the Augustinian monk Gregor Mendel, first reported in 1865, who had stated the laws of inheritance now bearing his name. According to this account, around about 1900 three European scientists independently realized that Mendel's mathematical principles, derived from a study of garden peas, provided a sound basis for explaining heredity as a whole. Later, work with the fruit fly *Drosophila* showed that in reproduction chromosomes behave exactly as predicted by Mendel's laws.

Genetics could thus now build on the concept of genes as discrete material units, which code for parental characteristics and pass them to their offspring. So some of the original difficulties of Darwin's theory were resolved, and a new genetic theory of **natural selection** became a fundamental biological principle. In 1953, after the discovery that genes were made of deoxyribonucleic acid (DNA), and not protein, James Watson and Francis Crick showed that DNA's double-helical structure provided a means of explaining gene function and the physical basis of heredity. The discoveries of the last half-century have only served to confirm their observations and have allowed the complete sequencing of the human genome.

This orthodox history of heredity emphasizes *discovery*, on the assumption that the scientific method ensures that objective truth is progressively uncovered as the tools and methods of investigation get better and better. And if further proof were required that this is what happens, the technologies devised on the basis of this scientific knowledge seem to provide adequate demonstration: the proof of the pudding is in the eating.

1.4 A new history of biology

However, closer historical analysis suggests that the above account is simplistic, and can be challenged at three levels, as described by historian of biology Peter Bowler.[9]

1.4.1 The conceptual level

The old idea that scientific knowledge grows by a simple accumulation of facts is now considered naïve. 'Facts' only appear as such to people with a particular frame of mind. For example, Mendel's laws only seemed plausible when it was accepted that characters are transmitted from one generation to the next as separate units of 'information' – a view that even Darwin did not accept.

In fact, and more remarkably, historians point out that in these terms Mendel himself was not what we would now call a 'Mendelian'! He was chiefly concerned with the hybridization of species as an alternative to evolution, so that his discovery of regularities in the inheritance of characters was simply a by-product of a line of research that would not have made sense to the scientists who 'rediscovered' Mendel's laws.[10] It follows that acceptance of Mendelism did not depend on the discovery of facts but on the creation of a new conceptual scheme in which such laws could 'make sense'.

It is also important to note that, as pointed out by statistician and geneticist Ronald Fisher in 1936, *'in statistical terms Mendel's results are a little too good to be true'*, because he would have been very lucky indeed to have hit on the ratios he did by chance. Some people attribute the result to an overenthusiastic assistant, or to an unconscious bias in counting. Either way, it seems Mendel got the results he *wanted*.

1.4.2 The professional level

It is important to appreciate that science is a social activity. This means that a new idea will only attain 'factual' status when the group of scientists who make up the specialist field *agree* to accept it. In turn, this means scientists have to be members of a 'club' through which they secure research grants, get their work accepted for publication in the recognized journals, and achieve status in the academic community, e.g. as lecturers or professors.

It is now believed that two important reasons why Mendel's work remained unappreciated for so long were that he was not a recognized academic scientist (working as he did in a monastery) and that he published his results in an obscure journal. But even within the more formal academic channels, acceptance of a new theory is not a straightforward affair: it often depends on the authority or debating skills of the key decision-makers. Research is an expensive activity, and if the grant-awarding authorities are not convinced of its value, a research proposal will not get funded.

As pointed out by Bowler, although science is assumed to be a completely international activity it does have certain national 'flavours' – and in some cases this results in quite large differences in what counts as an important scientific contribution. Such differences may well explain the fact that genetics achieved much prominence in the USA and Britain, but was less important in Germany and France.

1.4.3 The ideological level

Because scientific progress involves some major rethinking by members of a professional community, it is not surprising that it is also affected by the 'mood of the time' and by politics. For example, it has been argued that Darwin's theory of evolution fitted in with the social values of Victorian England, when the dominant capitalist ideology saw life as a competitive struggle in which the industrious and virtuous achieved justified success, whereas the 'idle masses' deserved the poverty they had to endure. In fact, Darwin's ideas were exploited, as so-called **social Darwinism**, by sociologists like Herbert Spencer in order to justify such beliefs.[11]

The effect of this attitude in facilitating acceptance of Mendelism is graphically illustrated by the dominant views of the respective roles of **nature** and **nurture** in determining human character. *Nature* refers to a person's genetic inheritance and *nurture* to the physical and cultural environment in which they grow up. If character is largely determined by a person's genes, it follows that education and upbringing will have little influence. In the late nineteenth century there was growing concern that the birth rate of people who were considered both mentally and physically inferior exceeded that of those thought to be fitter and more talented people, thus diminishing the overall quality of society.

According to the advocates of **eugenics** (a term introduced by Darwin's cousin, Francis Galton), strict controls were necessary to prevent progressive enfeeblement of the nation. For Galton, who based many of his views on a study of distinguished families, eugenics became a kind of moral crusade. This led him to advocate, on the one hand, **negative eugenics**, including confinement in lunatic asylums or actual sterilization of the 'weak-minded' and rigorous immigration controls to prevent dilution of the nation's genetic legacy, and on the other hand, **positive eugenics**, by which the professional classes should be encouraged by tax incentives to have more children. Galton believed that knowledge of the workings of heredity imposed a *'moral duty ... to further evolution, especially that of the human race.'*[12]

Perhaps the starkest instance of the influence of ideology on biology was the belief in the inheritance of acquired characteristics that was official government policy in the Soviet Union (USSR) from the 1930s to the 1960s. In 1940, the Soviet leader Josef Stalin, who rejected Mendelism because it did not conform to the Marxist belief that permanent change could be achieved by environmental influences (i.e. as a result of political changes), sacked the Mendelian geneticist Nikolai Vavilov as president of the Lenin Academy of Agricultural Sciences, and replaced him with Trofim Lysenko. But Lysenko was *'a fanatical charlatan (who) was allowed absolute dictatorship and control over both research in biology and practical agriculture.'* It is a remarkable fact that a country capable of developing a nuclear potential rivalling that of the USA, and being at the forefront of space research, could have been so subject to political control in the field of genetics.[13]

BOX 1.1 THE SOCIAL CONSTRUCTION OF BIOLOGY

Every age constructs a model of the living world, built up from theories, and the social and political imagery of the day, that highlights or emphasizes particular aspects of our understanding.

In the eighteenth century, an age of classification in botany and zoology, the emphasis was on harmony and systemic order. Nature was a catalogue of organic forms, each fashioned by an ingenious creator, each with a place on a 'Great Chain of Being' that stretched from inanimate matter to God. The scientist's task, confronted by this majestic scheme, was to classify its elements, to contemplate the subtlety of the connections that held it together, and to reveal the harmonious functioning of particular parts.

In the nineteenth century, the picture changed with the idea of dynamic, evolutionary change, based on competition and struggle. 'Nature red in tooth and claw' was the image for a new age of rapid industrialization, aggressive business practices, and intensifying struggles between capital and labour. Organisms were approached in a different light as the products, not of design, but of millennia of competition with other species, in which the better adapted eventually outbreed their competitors.

The dominant image of the second half of the twentieth century, deepened by insights of genetics, is less reverential than that of the eighteenth, and places less emphasis on competition and struggle than that of the nineteenth. Nature is a system of systems. Organisms function, reproduce, and evolve as systems ordered by their genes, managed by the programme in their DNA. Life is the processing of information.

(From Yoxen, 1983)

Philosopher Jennifer Trusted has pointed out that, by comparison with physics and chemistry, biology has been particularly prone to the influences of *'ethical, religious, social, cultural, and philosophical beliefs as to the nature of life and our human place in the natural world'*.[14] This is graphically illustrated by Ed Yoxen's concise overview (written in 1983) of two centuries of biology, shown in Box 1.1.[15]

Acknowledging that these social and cultural factors play a much more important role in the development of biology than is often realized, it is also true that advances in methodology are often a critical factor. A good example is provided by the history of cytology, which was greatly influenced by advances in microscopy, as described in the engaging account provided by the distinguished pathologist Henry Harris.[16]

1.4.4 Epistemology

In summary, 'great discoveries', such as those of Mendel, were only possible when people had adopted attitudes about the nature of life that allowed the underlying theories to 'make sense'. These ideas could only gain widespread support when the scientific community was won over, and that was influenced by factors such as loyalty to colleagues, acceptance of the established hierarchy, and the need to be successful in the competition for research funding.

This means that scientific progress depends on the scientific community adopting (some might say, *inventing*) those new models that appear best able to explain the observations made. Often, in devising such models, there is appeal to metaphor, i.e. figures of speech that imply likeness or analogy. Prominent examples are the references to **selfish genes**[17] (in which a chemical is ascribed human characteristics) and to adenosine triphosphate (ATP) as the **energy currency** of the cell[18] (with allusions to current and deposit bank accounts). But it is important to appreciate that such models are embedded in the dominant mind set of the particular time and place in which they are formulated, i.e. they are *theory-laden*. There is no guarantee that the models proposed are the *right*, or the *only*, ones that could be taken to explain the observations.

The important questions raised by this discussion fall into the branch of philosophy called **epistemology**. Defined as the 'theory of knowledge', epistemology is concerned with what it means to say we know something, how we know it, and what the limits to knowledge are. Knowledge is of two broad types – **explicit** knowledge, when the person is aware of the knowledge, and can express it in words, pictures, mathematical formulae, and so on; and **tacit** knowledge, which may still be considered genuine but is not capable of being described.[19] A simple way of explaining tacit knowledge is to say that although dogs presumably have such knowledge of many things (their surroundings, their owners, the smells associated with food, etc.) they cannot express this knowledge. In this sense, by analogy, tacit knowledge resembles many of our psychological states. If, as is claimed by many philosophers, tacit knowledge is a critical element of our understanding of the world, it is certain to have important implications for ethics.

1.5 The scientific method

One reason science is considered to be so successful in explaining the natural world is that it is believed to have a rigorous, objective method – the **scientific method**. For many years the way new scientific laws were established was thought to depend on a process of **induction**, which, as the name implies, is the opposite of **deduction**. That is to say, by amassing accurate data and noting the similarities and differences between related observations it is possible to induce the underlying scientific principles by a process rather like informed guesswork. For example, if every carefully made observation suggests that, at constant temperature, the pressure exerted by a gas is inversely related to its volume it might be induced that this inverse relationship will *always* apply – giving rise in this case to Boyle's Law. So pursuing this approach, it was considered that scientists should seek to confirm scientific laws by accumulating more and more supporting data.

But the belief that induction is *the* scientific method was first questioned by scientists in the nineteenth century, and is now widely discredited. For example, the fact that scientific ideas change so frequently over time, as the above account of ideas about heredity shows (1.3 and 1.4), casts doubt on the claim.

BOX 1.2 KEY PHILOSOPHERS OF SCIENCE

- **Karl Popper** (1902–1994), an Austrian by birth, emigrated to New Zealand in 1937 and subsequently to England, where he became professor of logic and scientific method at London University. In *The Logic of Scientific Discovery* (1954), he claimed that a scientific theory cannot be proved simply by adding confirmatory evidence. Rather one should attempt to disprove (falsify) hypotheses. *'The method of science is the method of bold conjectures and strenuous and severe attempts to disprove them.'*
- **Thomas Kuhn** (1922–1996), an American historian of science, argued in *The Structure of Scientific Revolutions* that Popper's prescriptive approach to scientific method is rarely followed in practice. Instead, most scientists work (rather uncritically) within a set of accepted norms and suppositions, extending and articulating the *paradigm* into new areas of application (*normal science*). When inconsistencies build up, certain (exceptional) scientists challenge the paradigm and, if successful, bring about a **scientific revolution** – which then becomes the basis of the new paradigm.
- Despite their different approaches, each theory can contribute to an understanding of the aims and methods of science.

1.5.1 Popper's rational approach to scientific method

More realistically, science provides only *provisional* knowledge. According to the distinguished philosopher of science Karl Popper (Box 1.2), the distinctive feature of science is its method of critical testing; testing that should consist of attempts to prove a theory *wrong*. In his words, *'the method of science is the method of bold conjectures and strenuous and severe attempts to refute them.'*[20] No theory can *ever* be proved true, not least because the evidence is always incomplete. But theories that do not accord with the facts *can* be **falsified** or **refuted**.

The time-honoured illustration of Popper's view is the 'bold conjecture' that *'All swans are white.'* This can never be *proved*, because even in the unlikely event that we had examined every living swan and found it white, tomorrow a black one might be hatched. Seeking confirmatory evidence for the hypothesis is thus not a sound way of testing it; a better strategy would be to look for non-white swans. In essence, no number of observations of white swans can ever prove the hypothesis is true but, in principle, discovering one black one can *disprove* it. Thus, an important feature of Popper's methodology of science is its dependence on the **hypothetico-deductive method**, that is, the formulation of *rich hypotheses* from which the predicted effects that can be deduced are then subjected to rigorous testing.

Interestingly, a biological metaphor is useful in emphasizing the point. Just as in the struggle for existence only the fittest species survive and propagate their kind, so in the world of ideas only the best theories survive (i.e. those that, because they are more objectively true, best resist the attempts to refute them). Popper regarded this as the logical, rational approach to science.

The problem with induction (1.5) is that it confuses the **context of discovery** with the **context of justification**. Basing your hypothesis on reasoning by analogy is fine for suggesting (and perhaps discovering) new lines of enquiry but, as Popper stressed, justifying a hypothesis demands a sterner test – that of surviving the attempt to knock it down.

1.5.2 Kuhn and normal science

But a strong challenge to Popper's vision of scientific objectivity was made by the historian and sociologist of science Thomas Kuhn (Box 1.2). While not denying that the major advances in science, such as Watson and Crick's elucidation of the structure of DNA, conform to Popper's prescription, Kuhn argued that science is a social phenomenon in that the vast majority of scientists follow the same sorts of codes of behaviour that govern other human groups.[21] For Kuhn, most scientists, most of the time, are not trying to refute theories (which for Popper is the only true method of science) but are doing **normal science**. This is an activity where scientists try to extend the **paradigm** (pronounced 'para-dime'), e.g. by seeing whether a theory established, say for bacteria, also applies in tomatoes or rats. (The paradigm is the basic set of assumptions accepted by a scientific community that seems to 'work' over a period of time.) The paradigm thus exerts a very powerful influence because it determines not only what are considered the sensible questions to ask, but also what count as acceptable answers to those questions. Anyone who doesn't accept these standards tends to be regarded as a crank.

More generally, the paradigm defines the subject matter of a science, how it should be investigated, and how academic standards should be assessed. Kuhn argued that our observations are invariably **theory-dependent**, that is to say, what we see depends in large measure on what we expect to see. For example, it is usually (always?) the case that when people first use a microscope they have difficulty in making out the essential features of the material examined. It is only after they have been instructed on 'what to look for' that they can make sense of the image. Figure 1.1 is a now 'classical' illustration

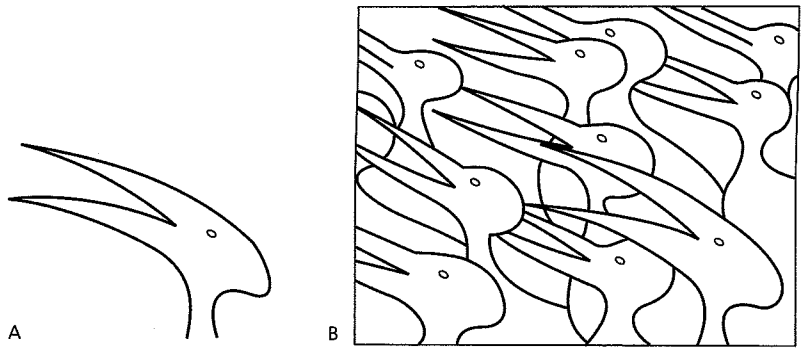


Figure 1.1 The antelope–bird image, indicating the phenomenon of theory dependence. For details, see 1.5.2. [From: Hanson N R (1958) Patterns of Discovery. Cambridge, Cambridge University Press]

of this point. If you had been told figure A was an antelope you would accept, unquestioningly, that it was no different from the other heads in figure B. But when you are told that these other heads are meant to represent birds, closer inspection will reveal that they *are* different.[22] The sense data are the same but the 'explanations' given are different. To see how this affects biological explanations, refer again to the different interpretations of Mendel's results given by Mendel himself and by later scientists (1.4.1).

If you took a cynical view, scientific education might thus be regarded as a process of indoctrination, in which students are presented with a whole new vocabulary (including such esoteric concepts as transcription, homeostasis, and organogenesis) and the approved solutions to otherwise apparently perplexing problems. If students demonstrate they have mastered these adequately, they are awarded degree certificates, ceremoniously allowed to wear appropriate academic dress, and admitted to the inner circle of qualified scientists. In fact, Kuhn, without irony, claims a parallel between the training of scientists and that of novices in a monastery.

Such ideas can come as something of a shock, because they seem to imply that scientists are just as much subject to custom as are people in any other job. Theories, Kuhn suggested, are held largely as matters of fashion or convention rather than due to the demands of logic; and social factors are likely to have a much bigger influence on science than its claimed objectivity would allow. Some of these factors were explored in 1.4.1–1.4.4.

Most science students learning of the competing theories of Popper and Kuhn appreciate that each contains elements of truth. Perhaps *the true* situation lies somewhere between the two extremes described. After all, the observation of one black swan need not necessarily disprove Popper's illustrative hypothesis: someone might have dyed it black, or have mistaken another bird for a swan, or had too much to drink! But it is most unlikely that the social factors Kuhn identified have absolutely no influence on what scientists consider scientific truth. As Bowler points out: *'the establishment of a successful new theory involves the complex and often unpredictable interaction of a host of ideological and professional pressures'.*[23] And it is precisely because these 'external' factors are so important that recognizing their potential influence is essential for anyone who wishes to understand what their subject is really about. But such insights are also crucial for those who want to know how they should act, both as scientists and as members of a society which exploits biological knowledge. It follows that these are critical issues when considering bioethics.

1.6 Abuses of science

If the objectivity of science is one cherished idea that needs to be re-examined, another is the oft-claimed sharp distinction between science (viewed as knowledge) on the one hand, and technology (the practical application of scientific knowledge) on the other. Maintaining that there is a distinction is, of course, often claimed by scientists who wish to pursue their researches untroubled by ethical concerns that might be raised about

the way their discoveries are subsequently used. But, to cite a dramatic case, J R Oppenheimer (the 'father' of the Atom Bomb, which was dropped on Japan in the 1939–45 World War), when recalling his work on the Manhattan project to develop the bomb, admitted: *'In some sort of crude sense which no vulgarity, no humor, no overstatement can quite extinguish, the physicists have known sin, and this is a knowledge which they cannot lose.'*[24]

Explaining how scientists had tried to square their consciences with working on the project, he wrote: *'When you see something that is technically sweet you go ahead and do it and you argue what to do about it only after you have had your technical success.'*[25] As a matter of historical fact, many of the scientists who worked on the Manhattan project subsequently switched their research to molecular biology, a new field which they saw as untainted by military involvement.

1.6.1 Abuses of biology

But biologists have no reason to feel complacent, because it was members of the biomedical community in Germany during the 1939–45 World War who perpetrated what were surely the most ethically indefensible acts in the name of biology. Historian of science Paul Weindling has described how, justifying their actions as necessary to protect the nation's 'genetic treasury', people classed as 'undesirable' (Jews, gypsies, black German half-castes, and carriers of genetic diseases, such as schizophrenia and muscular dystrophy) were subjected to coercive euthanasia and sterilization. This, then, was a particularly aggressive form of the eugenic programme first described by Galton (1.4.3). Biologists even found a perverse justification for the Holocaust (the mass extermination of Jews) by exploiting the opportunity to conduct experiments on people before their death, e.g. in one case, inducing seizures in children in low-pressure chambers to test a new drug for epilepsy; in another, *'killing gypsies to obtain heterochromic pairs of eyes'.*[26]

The lurid enthusiasm for such research shown by some scientists is illustrated by the statement of the then director of the Institute of Brain Research at Berlin. When relating to American officers at the end of the war his conversations with officials at an extermination camp, he had said:

> *I went up to them: 'Look here now, boys, if you are going to kill all these people at least take their brains out, so the material could be utilised.'... I gave them fixatives, jars, and boxes, and instructions for removing and fixing the brains and they came bringing them like the delivery van from a furniture company. There was wonderful material among those brains, beautiful mental defectives, malformations, and early infantile diseases.*[27]

Such abhorrent acts may now seem a long time ago, but sixty years is well within living memory for many. Indeed, in more recent years, the horrors of the programme of ethnic cleansing in the former Yugoslavia showed strong parallels with the Nazi atrocities. Whether or not we consider that these are current dangers in our own society, such events serve as a poignant reminder of how science *can* be recruited for the most unethical purposes. In the present context, we will need to examine whether there is a distinction between bioscience and biotechnology. And a critical question

concerns whether there is a danger that scientists pursuing programmes that are 'technically sweet' might unwittingly promote technologies that turn out to be unethical.

1.7 Bioscience and biotechnology

One way that ethical control over the application of science as biotechnology might, in theory, be encouraged would be to maintain a rigid distinction between academic research, pursued to increase scientific understanding, and its commercial or political exploitation. But, in practice, the distinction would prove almost impossible to enforce; and, most probably, no government now seeks to do so.

For example, in the UK, government-sponsored research in non-medical biology is conducted by the Biotechnology and Biological Sciences Research Council (BBSRC), a title which conflates scientific and technological objectives. One of BBSRC's stated missions is to contribute to *'the economic competitiveness of the United Kingdom'*,[28] and although this may well be ethically justifiable (see chapter 14), it demonstrates that government support for bioscience and biotechnology is not *just* about increasing knowledge, but is explicitly directed to particular social ends. Indeed, the government often actively collaborates with commercial companies in seeking to achieve these objectives. The need to ensure that bioscience is employed in ethically acceptable ways thus becomes a challenging task not only for governments but also for scientists 'at the laboratory bench' (chapter 15).

The conflation of science and technology is even more problematical when the limitations of science are not appreciated. In a speech to the Royal Society in 2002, Prime Minister Tony Blair expressed the view that *'Science is just knowledge... It allows us to do more but doesn't tell us whether doing more is right or wrong.'*[29] What this common misunderstanding reveals is a lack of appreciation of the conceptual, professional, ideological and epistemological influences (1.4.1–1.4.4) which shape scientific knowledge. It is highly questionable that science is ever neutral in the way claimed; rather, it is embedded in society's current value system.

1.8 The importance of bioethics for the biosciences

At this point it will be useful to take stock. What does all this mean for the biosciences? The above considerations would seem to suggest that bioethics is important for students of the biosciences (in the widest sense – since lecturers are also 'students' in the pursuit of their professional interests) in a number of ways.

Some of these ways are specific to their being educated specialists, while others relate to their being members of societies in which science and technology play such a large role culturally, economically and politically. And some affect decisions in their personal or family lives. These ethical dimensions are listed in Box 1.3.

BOX 1.3 HOW BIOETHICS AFFECTS BIOSCIENTISTS

- At the practical/experimental level:
  - the procedures entailed in investigating biological phenomena often involve experimenting on, confining, or killing animals, and altering the natures and environments of both plants and animals in ways that have ethical impacts
  - the Quality Assurance Agency for Higher Education (QAAHE) benchmarks include among *intellectual skills:* 'recognising the moral and ethical issues of investigations and appreciating the need for ethical standards and professional codes of conduct'
- At the epistemological level (1.4.4):
  - the scientific study of life is constantly revealing new ways of understanding living organisms, which often lead to a reappraisal of our ethical assumptions and the acceptable norms of human behaviour
- For professional biologists or biotechnologists ethical concerns raised by the following will influence their decisions, either positively or negatively, to work on particular projects:
  - the implications of biotechnology for the treated organisms (animals, plants, or microbes) and for people and animals affected by use of the technologies, both now and in future
  - as many living organisms colonize the wider global environment, technologies which might induce permanent change (e.g. by genetic modification) raise important ethical issues concerning sustainability and biodiversity
  - the economic implications of biotechnology as a consequence of its domination by a small number of large multinational commercial organizations
- Like all responsible citizens, bioscientists need to address the extent to which developments in the biosciences and biotechnology affect personal lifestyle choices, concerning:
  - their own and their family's health
  - consumption patterns, notably of food
  - reproductive choices
  - financial investments

1.9 Biological dimensions of ethics

An important question for many biologists is 'Where did the concept of ethics come from?', and this chapter concludes with a brief discussion of whether the apparently innate, unselfish character of ethical behaviour is consistent with the ways in which biologists currently understand human life.

An old idea, which seemed to gain support from those aspects of evolutionary theory that emphasized the 'struggle for existence', was that ethics applies specifically to humans living in society and is based on **egoistic prudence**. According to this view, in the earliest stages of human society the population density was so low that there was no real competition for resources. But as numbers increased, frequent conflict was inevitable, and individuals became engaged in a bitter struggle for survival (competing for food, shelter and sexual mates), in which only the fittest survived. This idea was thought to be consistent both with Darwin's theory of natural selection, and with the views of the seventeenth-century philosopher Thomas Hobbes, who claimed that the

'state of nature' was *'a warre, as is of every man, against every man'* for whom life is *'solitary, poore, nasty, brutish, and short'*.[30]

Consequently, survival and social order were only possible when a reluctant bargain was struck, in which people promised not to harm or steal from each other. That is, in their own selfish interests it was prudent to abide by a set of ethical rules or **norms**. (This notional **social contract** is, of course, symbolic, but it seemed quite plausible.) The contract has since been institutionalized in laws, so that responsibility for maintaining it is largely a role of the State, and, for many people, it is the threat of punishment that ensures that they behave in accordance with the notional contract. That people do not always do so willingly is demonstrated by the looting and rape which often follow the breakdown of law and order in the periods immediately following the collapse of totalitarian regimes.

However, more recently this pessimistic view of human nature has appeared to be inconsistent with the facts of biology; nor does it seem to be a view held by Darwin himself. In 1859, he wrote: *'any animal whatever, endowed with well-marked social instincts... would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well, or nearly as well, developed as in man'*, and he backed up his claim with numerous examples of apparently **altruistic** (unselfish) behaviour performed by baboons, dogs, cattle, birds, and even insects.[31]

1.9.1 Altruism

The biological basis of altruism has been the subject of much speculation; but we have to start with a problem of definition. An altruistic act is usually defined as one that 'benefits another organism at a cost to the actor, where cost and benefit are defined in terms of reproductive success'. So, by definition, altruism always entails helping others; but, going beyond reproductive success, does it always have to be detrimental to the altruist? In common parlance, altruism includes those acts that provide some sort of reward to the altruist, even if it is only the satisfaction of having behaved 'honourably'. Indeed, it would be strange to count as 'altruistic' only acts that were grudgingly performed merely out of a sense of duty. In the following discussion, this, broader, definition of altruism will be used.

In discussing the biological basis of altruism, it is important to appreciate that animals are targets of selection in three different contexts, and these correspond to three different types of 'altruistic' behaviour.

Kin selection entails types of behaviour that enhance the fitness of the genotype that is shared by the altruist and those benefiting from the acts. Parental care is probably the most prominent example of this type of 'altruism' – and the image of the nursing mother and her child has become an icon of human love and devotion at its most profound.

Reciprocal altruism amounts to the mutual exchange of favours, as in 'you scratch my back and I'll scratch yours', which might bear some relationship to Hobbes' reluctant bargain (1.9), but need not amount to anything so calculating. Even the longer-term benefits of building a reputation for 'friendliness' might be deemed sufficient justification for investing time and effort in such acts.

Group altruism. The first two types of altruism have evolved through selection pressure on the individual, and because the individual benefits directly from these types of behaviour, it might be questioned whether they count as genuine altruism. But group altruism is represented by social norms and ethical behaviours that have emerged as a result of selection pressure on human cultural groups, and in this case the individual might actually suffer for the benefit of the group. So this is a more authentic form of altruism.

Most animal associations cannot serve as a target for group selection, but the cooperation that characterizes social animals, like humans, provides the appropriate conditions for its emergence. Historian of biology Ernst Mayr argues that the co-evolution of two factors, a larger brain and a larger social group, made possible the emergence of two aspects of this form of altruistic behaviour, viz.

- natural selection: which, working through group selection, rewards those unselfish traits that benefit the group even though they might be detrimental to the individual
- humans' increased reasoning capacity, which allows us to actively chose behaviour benefiting the group rather than relying on instinctive selfishness.[32]

(We might also note that a related phenomenon, group *loyalty*, can have more mundane or more sinister aspects, e.g. when tens of thousands support their football team, or when millions are aroused to aggressive nationalistic feelings by a demagogue's rhetoric.)

1.9.2 Where do ethical norms come from?

Some biologists have attempted to explain ethics and to derive ethical norms from what they consider to be biological facts. Notable is the American sociobiologist Edward O Wilson, who claims that *'the time has come for ethics to be removed temporarily from the hands of philosophers and biologicised'*[33] because *'ethical precepts are reached by consensus under the guidance of the innate rules of mental development'*.[34] But bioethicist Peter Singer argues that this approach is mistaken, because although understanding the biology of altruism is often necessary, it is not sufficient to formulating ethical norms.[35]

Indeed, to some philosophers the attempt to reduce all actions to consequences of genetic programming seems simplistic. According to Mary Midgley, people often act from *'a sense of justice, from friendship, loyalty, compassion, gratitude, generosity, sympathy, family affection and the like'*[36] and it does not seem possible to reduce all these to unconscious attempts to propagate one's genes. To cite just two examples – very large sums of money are often raised in response to mass-media charity appeals (e.g. following the Asian tsunami disaster), while acts of personal kindness, even to strangers (e.g. when people act as blood donors), are quite common.

For ethologist Robert Hinde, moral codes are a product of culture.[37] According to this view, moral codes are constructed, maintained, transmitted and amended by human beings interacting with each other. They depend both on human nature and on experience in the physical, psychological and cultural environments of development. In the same vein, philosopher of science Alex Rosenberg suggests that Darwinian theory is progressively contributing to an understanding of morality, as philosophers show *'how nature may have selected both for cooperative norms and for the emotions that express our commitment to these norms'*.[38]

1.9.3 Dispositions and ethics

From the preceding discussion, we might reasonably deduce that as a consequence of evolution humans have acquired certain natural social dispositions, and that these have acted as the raw material which has then given rise to ethics. (The alternative to this 'naturalistic' explanation of ethics – that morality has been handed down from a supernatural authority – is discussed in 2.2.) But the important distinction between dispositions and ethical behaviour is that the latter entails conscious reflection. Although we cannot always avoid having gut reactions to circumstances, these are not a sound basis for action, not least because they often suggest that we should take actions that are contradictory. So the reason for, and challenge of, ethics would seem to be to arbitrate between the different dispositions, and to derive rational, coherent and consistent codes of behaviour. And, to a large degree, consistency implies impartiality – acting altruistically towards others, irrespective of age, gender, race – even, some would say, species.

The distinguished palaeontologist Gaylord Simpson suggested that three conditions must be met before we can meaningfully talk about our actions being 'ethical':

- there are alternative courses of action
- we are capable of judging the actions in ethical terms
- we are free to choose what is considered to be ethically 'right'.[39]

It follows that this sequence of steps depends on a fourth (which is probably unique, certainly in degree, to humans) – the capacity to *predict* the results of our actions.

As in other aspects of human activity, formerly tacit knowledge (1.4.4) has been to a large degree replaced by explicit knowledge. We no longer act on hunch, but for *reasons*, and those reasons can be explained, discussed and criticized. Often the reasoning leads to the formulation of *principles*, generalizations which help us make ethical decisions in novel circumstances, but which are nevertheless of a kind previously encountered. But these modes of reasoning appear to be specifically human; for, as Darwin remarked: *'of all the differences between man and the lower animals, the moral sense or conscience is by far the most important . . . a sense that is summed up by that short but imperious word* ought.'[40]

THE MAIN POINTS

- Bioethics is a relatively recent field of academic enquiry that deals with the ethical, legal, social and cultural implications of the biosciences and their application in biotechnology.
- Historical and sociological analysis demonstrates that progress in the biosciences is not simply a matter of accumulating objective data. The conceptual models employed to explain scientific observations are shaped by the cultural and political environment, and hence influenced by human values. This is even more the case for biotechnology.
- The specialized knowledge possessed by bioscientists places them under particular ethical obligations in their professional roles.
- The current interpenetration of the biosciences in the academic and commercial worlds has important ethical implications for the way knowledge is produced and used.
- There are competing theories about the biological basis of ethics, but there is general agreement that ethics developed from altruistic dispositions that are exhibited by non-human species.

EXERCISES

These can form the basis of essays or group discussions:

1. Investigate the history (1.4), over the past 150 years, of a specific area of biology (anything from the role of the cell nucleus, to the biochemistry of hormones, to reproduction in plants, to the action of artificial fertilizers in agriculture), identifying the extent to which social and cultural factors influenced scientific theories.
2. Assess the relative influence of Popperian and Kuhnian accounts of scientific theory (1.5) on your specialist area of the biosciences.
3. Is Oppenheimer's warning about the dangers of scientists being lured by the attractions of the 'technologically sweet' (1.6) relevant to modern biosciences; and if so identify where you consider the main dangers lie?
4. The 'mission statements' of all UK research councils include the aim of improving the 'the economic competitiveness of the UK' (1.7). What are the pros and cons of this objective?
5. Does evolutionary theory (1.9) help us to understand the origins and meaning of ethics or are cultural factors much more important?

FURTHER READING

The following provide readable and informative introductions to the history, philosophy and sociology of biology, respectively:

- The *Mendelian Revolution: the emergence of hereditarian concepts in modern science and society* by Peter J Bowler (1989). Baltimore, John Hopkins University Press. A engrossing account which shows the relevance of history to our current understanding of biology.

- *Thinking about Biology* by Stephen Webster (2003). Cambridge, Cambridge University Press. A readable 'practical manual for the thinking student'.
- *Real Science: what it is and what it means* by John Ziman (2000). Cambridge, Cambridge University Press. A very useful analysis written by a theoretical physicist turned sociologist of science.

USEFUL WEBSITES

Websites provide some accessible material, but it is important to be wary of propaganda dressed up as philosophy. Useful sites are:

- **http://www.dartmouth.edu/~bio1/** *History of Biology* (Michael R Dietrich): several articles on Darwinism and evolutionary theory.
- **http://plato.stanford.edu/emtries/popper/** *Stanford Encyclopedia of Philosophy*: contains a useful collection of articles on Sir Karl Popper's philosophy of science.
- **http://www.royalinstitutephilosophy.org/think/articles.php** The journal *Think* aims to provide to a non-specialist readership some highly engaging and accessible writing by leading philosophers, and to counter the popular impression that philosophy is pointless and detached from everyday life. Several articles from the journal appear on the Royal Institute of Philosophy website.

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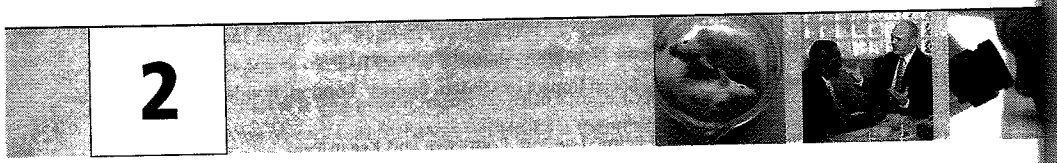

2

Theories of ethics

OBJECTIVES

When you have read and discussed this chapter you should:

- be aware of important discussions on ethical theory, including its relationship with religion and the concepts of free will and natural law
- understand the main features of three major ethical theories: utilitarianism, deontology and virtue theory
- understand how ethical theory can be applied to a specific issue in the biosciences – the use of animals in research
- appreciate the strengths and weaknesses of the different ethical theories and the challenges presented to the biosciences in applying them to present-day concerns

2.1 Introduction

Chapter 1 discussed the general remit of bioethics and indicated why, because it is concerned with human values, it permeates the scientific and technological aspects of the biosciences. But there was no attempt to explore the meaning of the word ethics in any detail – beyond the fact that, first, ethics concerns the question of what we *should do*, and, second, that bioethics relates specifically to what we should do with regard to the biological knowledge and to the skills and techniques developed in biotechnology. We now need to take a closer look at ethical theory.

2.1.1 Ethics and morality

While **morality** refers to general attitudes and standards of behaviour, **ethics** is usually taken to mean the disciplined and systematic enquiry into the nature of morality. Apart from a very small number of people whom the rest of us would regard as psychopaths, this sense of morality seems to be an innate and defining characteristic of human beings (1.9.3). We believe, that is to say, that certain types of behaviour are **right** and others wrong, and/or that we should pursue the **good** and avoid the bad.

It doesn't follow that we know instantly what we should do in all circumstances, or that we always do what we believe we should: complete awareness and moral perfection

are certainly beyond all of us. But it is generally expected that every sane and humane person should be aware of the moral dimensions of human life, and take measures to act accordingly. Putting it bluntly, if witnessing someone else mugging an elderly person in the street, or someone cheating to improve their assessment grades, didn't bother you, most people would consider you were almost as morally defective as the perpetrator of the actual acts.

It would seem that everyone who aspires to lead a life that does not consist simply of mindless reactions to events is compelled to reflect on ethics. Our *sense* of morality may be to a large degree innate and greatly influenced by our upbringing, but our human ability to reason requires us to submit this moral sense to the discipline of rational thought. The process involved is **ethical deliberation**, where 'deliberation' may be defined as 'the careful discussion and consideration of an issue'.[1]

Of course, having deliberated, some people may decide to act in ways that the majority of others consider unethical: there is no guarantee that everyone will agree on *the* ethical course of action in any particular circumstances. Nor is there any guarantee that the majority view is the correct one: ethics is not determined by opinion polls. But an important point is that for behaviour to be considered ethical requires that it be justified – to ourselves, and/or to others – and/or, for some people, to God. That is to say, we need to (be able to) give *reasons* for our actions. This is a necessary condition, although it may not of itself be a sufficient reason to class any particular form of behaviour as ethical.

2.1.2 Ethics and free will

The fact that ethical decisions need to be justified implies that we have some choice in the matter. For out-and-out **determinists**, who deny that people have any **free will**, all behaviour is predetermined. And because, for them, all human actions are simply the inevitable consequences of earlier events, there is no room for ethics. Of course, if we don't have free will, those who do not believe in it cannot do otherwise – so there is no reason to take any notice of what they say. Believers in free will are at least more logically consistent, even if their belief is actually false. This is a fascinating but ultimately insoluble problem! But the reality is that everyone *behaves* in ways that assume that they do have some measure of free will, and it would be very difficult to live at all (certainly as a member of society) if we thought we were incapable of making any real choices. You might think that the fact of free will (e.g. as simply demonstrated by your ability to raise your finger or not, as you desire) is one of the most certain things you *do know* in a world where so much else is doubtful. (Those with an appetite for such questions might find philosopher Daniel Dennett's ideas stimulating, if not exactly 'light reading'.[2])

The assumption made when discussing ethics is that people do have a significant degree of freedom of action. There are clearly some things that we must do to survive (such as breathe and, over a longer time-scale, eat), but the exercise of choice and creativity would seem essential to living a life which aspires to be ethical to any degree. Indeed, if there were no free will it is not only ethics that would be in trouble: all our objective knowledge of the world, which it is the aim of science to discover, would be

undermined – because we should be predetermined to believe what we do regardless of its objective truth.

In fact, the almost universally held belief that we can exercise a measure of choice can be said to be the most crucial factor underlying ethics. Because if we do have choice we are faced with the question of what precisely we *should do* with it – which is what ethics is all about. It also raises another critical philosophical question, which we can hardly avoid coming to a conclusion about, even if we only end up with a working hypothesis. The question is: 'Who or what is the *I* that makes the choices?' Because fully satisfactory answers to that question in scientific terms cannot be given, philosophers explore possible answers in the study of **metaphysics**, which may be defined as 'the philosophical investigation of the nature, constitution and structure of reality'.[3] Non-philosophers will hardly bring the same rigour to their reasoning, but almost inevitably virtually everyone arrives at some sort of answer to the question, which is bound to influence their views on life, including their ethical opinions.

2.1.3 Ethics and others

Another important feature of ethics is that it is largely about our relations with others, where 'others' refers to people, animals, some would say plants and the environment generally, and some would say God. So ethics can be said to be principally about how much one person's interests should take precedence (if at all) over others' interests – or more generally, the order in which different individuals' (or groups') interests should be prioritized.

For someone living on a desert island, the occasions when ethical choices have to be made must be far fewer than for people living in society or in a family. And for some people – such as a doctor, who has to balance the needs of her many patients with those of her family life, who may have to make decisions about telling a patient he has a fatal condition, or notifying the police of information obtained in the consulting room which has public health or criminal implications – the exercise of ethical judgement is a constant and critical demand.

2.2 Ethics and religion

It was suggested in 1.9.3 that ethics may have had its origins in the dispositions inherited from non-human species. But many people assume that ethical behaviour has a different type of origin, being intimately bound up with religion, or that it is part of the legacy of an earlier age when religion was a dominant force. Consequently, accounts are often presented of ethical theories that are claimed to gain their authority from particular scriptural sources, giving rise to Christian Ethics, Buddhist Ethics, Islamic Ethics, etc. Thus, it is widely believed that the required standards of moral behaviour for people following a particular religion are determined by the necessity to obey God's will as prescribed in the sacred texts, such as the Christian Bible or the Islamic Qur'an.

However, as was demonstrated by the philosopher Plato in ancient Greece, this merely shifts the problem, because it raises the question as to why we should obey God's will in the first place. If, say, a supernatural being had created us for his own *bad* purposes, we should presumably not feel it right to obey his will. So it would seem to follow that things cannot be good or bad simply because God commands or prohibits them: there must be some other reason, and in that case the appeal to God's will would be unnecessary.

Moreover, there are a number of other problems with assuming that religion is the source of ethics. First, adherents of the same religion frequently interpret the scriptures differently. Some Christians support 'just wars', meat-eating, and gay rights, while others derive the opposite conclusions from their reading of the scriptures. This presumably has much to do with the fact that the scriptures were written at times when the dominant outlooks of their authors were totally different from those prevailing today in the variety of twenty-first-century cultures. (And we might reasonably ask why it should be assumed that the insights of ancient writers necessarily have greater worth than our own, because, unless we are abandoning responsibility for our actions, ultimately it is *we* who have to make the judgement on whether to accept them.) Moreover, because different religions differ in their ethical stances, and because large numbers of people are agnostics or atheists, if ethics were the preserve of the religious, the possibility of meaningful dialogue between people not sharing particular religious beliefs would be much diminished.

However, it needs to be stressed that the above arguments do not seek to challenge the fact that many sincerely religious people find the motivation and justification for their ethical views in their religious beliefs. The insights derived from the mental or spiritual experiences of people engaged in prayer, meditation, or contemplation can have the profoundest effect on their beliefs about the way they should live. Some exceptional individuals act in ways most people, including non-believers, would agree were 'saintly'. (On the other hand, mere ritualistic observance of rules, such as permitting the eating of fish only on Fridays, would seem to owe little to spiritual experience.)

2.2.1 Newer ideas on religion and ethics

But the influence of religious ways of thinking on ethics cannot be categorized easily. Aldous Huxley wrote of what the philosopher Leibniz called the **Perennial Philosophy**, as the *'highest common factor in all preceding and subsequent theologies... the ethic* [of which] *places man's final end in the knowledge of the immanent and transcendent Ground of all being.'*[4] Such metaphysical beliefs might well inform the ethical positions of people who subscribe to different religions, or even to none. Indeed, if we consider the psychological origins of religion, belief in God might be seen as an expression of a Popperian 'bold hypothesis' (1.5.1), and rather, as Voltaire put it: *'If God did not exist it would be necessary to invent him'.*[5] Reversing cause and effect in the same way, it might be said that *'Religions traditionally reflect and reinforce a culture's deepest ideals.'*[6]

Moreover, the influence of religious ways of thinking on ethics is now subject to radical reappraisal. For example, the idea that traditional religion is best seen as a phase in human spiritual development has been explored by theologian Don Cupitt, who argues that belief in God as a *'very big and friendly unseen Superperson'* is *'neither clearly*

statable nor rationally defensible'. Accordingly, he commends a postmodern non-realist conception of God, in which *'what we should pick out as valuable and try to salvage will be certain forms of religious existence; that is, certain forms and practices of selfhood, certain modes of consciousness and ways of expressing one's life.'* This, he claims, will bring about *'the end of morality and the return of ethics'*.[7]

That said, since it is widely acknowledged that religious insights cannot be *demonstrated* objectively to others, religious experience might be best viewed as a form of tacit knowledge (1.4.4). And if so, it would seem to follow that discussion of ethics is more generally meaningful when conducted in terms that do not appeal to scriptural authority, but instead refer to fundamental aspects of human nature acknowledged by believers and non-believers alike.

2.3 Natural law and the naturalistic fallacy

The Cambridge philosopher G E Moore identified an influential concept in ethical theory more than 100 years ago (although it had been raised by David Hume in the eighteenth century). Moore argued that in the past many people discussing factual matters had confused **facts** with **values** by slipping into ethical language without acknowledging the transition. For, he said, you *'can't get an ought from an is'*, and people who attempted to do so were guilty of committing the **naturalistic fallacy**.[8] Putting it another way, the way things *are* is not necessarily a guide to how they *should* be: for example, the fact of male dominance in most human societies does not mean that we ought to accept this situation as 'right'.

But the naturalistic fallacy is also important in a 'technical' sense in ethical reasoning. For example, the fact that many people in some African countries are severely malnourished does not lead inevitably to the conclusion that they ought to be sent food aid. There has to be another step in the reasoning process, which will most likely take the form of a value judgement that those who are well fed and in a position to do so ought to help other people who are starving. So, the sequence of steps from *is* to *ought* takes the form: (*a*) the facts of a situation need to be established; (*b*) the relevant ethical principles need to be identified; (*c*) the appropriate actions ought to be applied to the situation.

The validity of the naturalistic fallacy has achieved widespread recognition, but it is important to appreciate its limitations. For example, philosopher John Searle noted that if you have made a promise, you *ought* to keep it, because saying you ought not to keep promises would be self-contradictory. So in this case you can get an 'ought' from an 'is' – when the 'is' consists of the fact of having made a promise.[9] It follows that we need to distinguish between brute facts, like 'sparrows have wings' and social facts such as 'Jack promised to marry Jill'.

Even allowing for such exceptions, Moore's claimed separation of fact and value is not universally acknowledged. For example, to certain religious believers God created the universe for a particular purpose, so that the way things *naturally* exist represents a God-ordained order which it is ethically wrong to seek to alter. A prominent example

is the position of the Roman Catholic Church on the role of sexuality. If it is accepted that the sexual attraction between men and women is intended solely to create children, then all practices that frustrate this aim (everything from homosexual acts, to contraception, to abortion) will be seen as offending **natural law**.

But belief in natural law is by no means confined to those who subscribe to religious beliefs, and for many people the idea that 'Nature knows best' challenges the concept of the naturalistic fallacy. For example, it might well be claimed that the desire to procreate, and the caring behaviour shown by parents towards their children, are based on natural moral imperatives; consequently, artificial means ought to be made available to help sub-fertile people have children (5.3.1). Indeed, natural law thinking is acknowledged worldwide. For example, it is enshrined in the United Nations (UN) Declaration of Human Rights, as when Article 16 states that all men and women 'of full age' have *'a right to marry and found a family'*, asserting that *'the family is the natural and fundamental group unit of society'*. It is also evident in the widespread rejection of the prospect of human cloning by nuclear transfer (5.5.3).

A leading scientific critic of the naturalistic fallacy is sociobiologist Edward O Wilson (1.9.2). According to Wilson, *'Ought is the product of material processes* ... [a conclusion] *which points the way to an objective grasp of the origin of ethics*.'[10] A danger of this approach is that it can be seen as politically reactionary, e.g. if it seems to accept the current social circumstances of different countries (such as the disparities between the 'haves' and the 'have-nots' – see chapter 4) as the natural outcome of evolutionary processes. More generally, a rigorous observance of natural law might mean a fatalistic acceptance of everything that happens, on the assumption that all disease, suffering, and natural disasters are simply 'what Nature intended'.

2.4 Moral acts and ethical theory

Very few acts have no ethical implications. Even sitting in a chair, when you could be doing something else such as raising money for charity, is the result of a decision that has ethical implications. Taken to an extreme, you could imagine sinking into a condition of guilt-ridden helplessness if you were to agonize over every act or state of inactivity. But it would surely be irresponsible if, just because we can't do everything we ought, we decided not to bother about acting ethically at all. Many of our actions are, of course, almost intuitive. But acting deliberately and ethically would seem to require that we draw up some general **rules** to help us make decisions about individual cases, as for example when facing the dilemma of whether to give money to a famine relief charity or spend it on ourselves.

On reflection, these rules usually turn out to be specific instances of **principles** with wider applicability. In turn, these may often be justified by appeal to a **theory** of ethical behaviour which we have probably adopted, perhaps largely unconsciously, as a combined result of our upbringing, a process of reasoning and some mental reflection. We can thus envisage that the individual act (e.g. giving or not giving money to charity) is the tip of an **ethical iceberg** (Figure 2.1), the bulk of which is hidden from view – or, in terms of our action, not usually consciously thought about or discussed. But while this

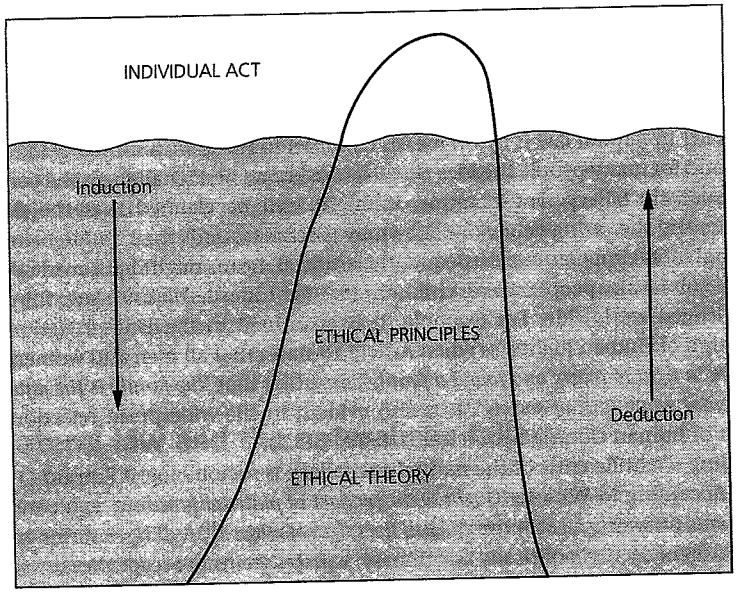

Figure 2.1 An *ethical iceberg*, indicating the relationship between individual acts and ethical theories. In *reflective equilibrium* ethical principles are the outcome of a combination of inductive and deductive processes.

may suffice for ethical concerns at the personal level, such as deciding what to do in the case of donating to a charity, there are many instances when we need to be explicit about the ethical justification for our actions – and this is typically the case with bioethical issues, which often affect society and/or the environment at large.

There are different opinions about the relationship between ethical theory, principles, rules, and actions. It might be as a result of responding to individual circumstances that we decide on rules and principles, and then develop a theory that accommodates them coherently. This might be called the **inductivist** view (see 1.5). Or our theoretical approach might come first, the principles and rules being deduced from the theory. An intermediate position is that people adopt both inductivist and **deductivist** strategies at different times in order to try to achieve a coherent and consistent ethical outlook. That is to say, experience of life, together with an intuitive sense of what seems right and the exercise of reasoning, all contribute to the outlook in a process called **reflective equilibrium** (Figure 2.1). Whatever the exact relationship between the different steps, the scheme outlined does seem to go some way to explaining the interactions between ethical theory and our actions.

The sheer complexity of the different ethical questions that life throws up has led philosophers, going back at least 2500 years, to try to simplify our ethical decision-making by devising explanatory theories. The aim of the next sections is to summarize the main theories; and it may be useful to refer back to these sections when considering specific

bioethical issues later in the book. The emphasis here will be on three main theories: **utilitarianism, deontology,** and **virtue theory.** It needs to be appreciated that the fact that they were formulated hundreds, or even thousands, of years ago, suggests not only that they have proved their worth over the years, but also that some of the assumptions made at the time they were proposed may appear dated. A challenge for bioethics is to interpret these theories in the light of our views of the world revealed by modern bioscience.

2.5 Utilitarianism

The ethical approach called **consequentialism** is the view that our actions should be ethically determined by the consequences likely to result from them. The desired consequences clearly need to be specified to make this a useful theory, and in the most prominent form of consequentialism, called *utilitarianism*, the aim is to *'produce the greatest good for the greatest number.'*[11] The theory was introduced by Jeremy Bentham in the eighteenth century and developed by John Stuart Mill (Box 2.1). In modern terminology, utilitarianism employs the methodology of **cost–benefit analysis.** We need to weigh up the costs

BOX 2.1 FOUNDERS OF UTILITARIANISM

Jeremy Bentham (1748–1832) was a person of outstanding intellectual ability. Beginning to study Latin at 4 years of age and French at 5, he entered Oxford University when only 12 and took his degree at 15. He subsequently spent his life writing and advocating changes to the legal system along utilitarian lines.

He exerted a strong influence on changes to the British law of evidence, on the abolition of laws permitting imprisonment for indebtedness, and in the reform of parliamentary representation. His major work was *An Introduction to the Principles of Morals and Legislation* (1789).

In accordance with his directions, when he died his body was dissected in the presence of friends, and the skeleton preserved in an 'auto-icon', dressed in the clothing of the times. To this day, this effigy can be seen in its glass cabinet at University College London, which was established along Benthamite lines in 1828.

John Stuart Mill (1806–1873) was the son of the Scottish philosopher James Mill, himself a leading advocate of reforms based on Bentham's utilitarianism. Like Bentham, J S Mill was intellectually precocious, beginning the study of Greek at 3 years of age.

Throughout his life Mill propagated principles that he perceived essential for human happiness, which extended from moral principles, to principles of political economy, to the principles of logic and metaphysics.

He wrote several very influential philosophical books, e.g. *System of Logic* (1843), *On Liberty* (1860) and, as an early feminist, *The Subjection of Women* (1869). He was a Member of Parliament from 1865 to 1868.

of doing something and assess the resulting benefits; if the surplus of the latter over the former is thought likely to be maximized then we ought to proceed with it.

There are, however, some problems in defining 'benefit'. According to Bentham, *'Nature has placed mankind under the governance of two sovereign masters, pleasure and pain'*, so that 'good' is what tends to maximize pleasure and at the same time minimize pain. Giving it a mathematical spin, we can refer to this as the **hedonic calculus** (from the Greek meaning 'pleasure'). Bentham considered that pleasure (or pain) could be assessed in terms of factors such as its intensity, duration, degree of certainty, and whether it had a chance of being succeeded by sensations of the opposite kind. But the hedonic calculus runs the risk of reducing ethics to a question of satisfying what might be quite trivial pleasures: e.g. does someone's pleasure at getting very drunk really outweigh the distress caused to those who have to take him home and perhaps to his family (not to mention the effects on his liver)? Moreover, if a sadist derived great pleasure from torturing people the theory might be considered to perversely justify such acts.

Mill tried to avoid such problems by adding a qualitative criterion to Bentham's purely quantitative measures.[12] For example, he maintained that pleasures of the mind are higher pleasures than those of the body (so the joy of playing Beethoven might count more than the exhilaration of playing badminton). In essence, he suggested that rather than pleasure, the good should be defined as the satisfaction of **preferences**, and such preferences might not usually be thought of as pleasurable. Rather than seeking enjoyment, someone might prefer to spend their time visiting people in a hostel for the homeless.

Another refinement was the proposal of a role for **rules** within the utilitarian calculus.[13] Thus, although in the short term it might seem beneficial to break rules (such as that requiring us to tell the truth), ultimately this will lead to a breakdown of trust which will undermine the aim of maximizing happiness. This **rule utilitarianism** contrasts with the **act utilitarianism** that requires each case to be treated separately.

2.5.1 Illustrations of utilitarian reasoning in the biosciences

An example from the biosciences will illustrate the use of the theory. Consider a utilitarian justification for the use of mice in experiments performed to test a new drug for people suffering from obesity. Such people might suffer much physical discomfort, often have to endure other people's unsympathetic or insulting comments, and be at greater risk of suffering from other conditions such as heart disease. On one interpretation of utilitarian theory, the benefits to obese people of the research in question would clearly greatly outweigh the harm to a few mice. The mice, after all, do not have intelligence approaching that of people; they might easily otherwise be caught by cats; those particular mice only exist at all because they were bred for experimental use; and they are, in any case, protected by strict animal welfare laws. This is the form of the standard defence of animal use in medical research, and it is an argument endorsed by successive governments and subject to legal regulations (8.3).

But the utilitarian argument could produce a quite different result if the assumptions made above were not valid. For example: if the mice suffered appreciable pain in the experiments (so that the question of whether they were intelligent was irrelevant); if the conditions in which they were kept, e.g. crowded together in cages in a sterile, featureless environment, seriously reduced their ability to express their normal patterns of behaviour; if a very large number of them were used in the experiments; and if the laws were so loaded that any amount of animal suffering was deemed acceptable provided that some obese people received, perhaps only minor, relief – then the original judgement might need to be revised.

Moreover, if it were possible to obtain the information sought in the experiments by means which did not involve animals at all, e.g. using cells in tissue culture, then the cost–benefit analysis might prove to be deceptive. Indeed, there might be evidence that drug treatment was not the only way of treating the distressing condition of obesity, and that equally or more effective treatments could be achieved by dietary or lifestyle changes. It might thus be possible, solely by appealing to utilitarian reasoning, to decide that these particular animal experiments should *not proceed*. (It is interesting that even in the eighteenth century, Jeremy Bentham included the interests of animals in the utilitarian calculus when he wrote: *'The question is not, Can they reason? nor Can they talk? But, Can they suffer?'*)

The point of the above example is not to argue the case either way (a question to be explored more extensively in chapter 8), but to demonstrate how the theory might be used in justifying an ethical position. It is clear that deciding which is the more acceptable conclusion will depend to a large degree on *evidence*, i.e. about how many people might be helped and how much; how many animals might suffer and how badly; and whether alternative forms of treatment *do* exist. But even if such evidence were available (which it often is not), no definite judgement on the ethical acceptability of the animal experiments could be produced because there is no universal formula for deciding how to assess the relative happiness of mice and men.

2.5.2 Scientism

Utilitarianism is widely used to justify aspects of science and technology where risks are involved – and very few types of behaviour do not carry risks of some kind (chapter 13). But those who employ it as a form of ethical reasoning need to be aware of its theoretical limitations.[14] In a sense, much of the discussion in this book will entail a critique of utilitarian reasoning. This should certainly not be seen as a 'science-bashing' exercise, because undoubtedly science and technology can often be used in ethically acceptable ways. Rather, it should be regarded as a corrective to what might be called a naïve positivist approach (also termed **scientism**). The scientistic approach assumes that relying on a utilitarian justification for science and technology is the *only* way of assessing matters ethically – either because it is assumed that science only deals with *facts* (which are considered to have no ethical content) or because it is assumed technology is necessarily beneficial (or no one would bother to develop it). The discussion in 1.5–1.6 seriously questions both those assumptions.

2.5.3 Some limitations of utilitarian reasoning

One of the serious problems with naïve forms of utilitarianism is that because they measure ethical acceptability on the basis of *net* costs and benefits they can be held to

justify actions which offend normally accepted behaviour. To illustrate the point dramatically, on such a view of utilitarianism circumstances might possibly arise a situation in which (to maximize the surplus of good over harm) it would be acceptable for 49% of the population to live in abject misery as long as 51% were very happy. Indeed, since it is only *consequences* which count as a measure of ethical acceptability, *anything* would strictly speaking be permitted if the *net* amount of happiness were to be maximized. A case could be made on this basis for lying, theft, even murder, if more people ended up happy than were made miserable by the actions (but Mill's refinements could rule out at least some of these actions). A classical 'thought experiment' suggests that killing one person to provide vital organs for transplantation into two patients, saving two lives for the loss of one, would be endorsed by utilitarian theory[15] – particularly if the 'donor' was someone with no friends or family.

A second problem is that, because it is *future* outcomes that decide what should be done, all ethical decisions must be to a degree speculative. Of course, we do have a fairly certain idea of the consequences of many actions (e.g. medicines usually do work for most people), but the more unusual the proposed action, the less likely is it that we will be able to predict how things will turn out. Often, it is more appropriate to talk about a risk–benefit analysis than a cost–benefit analysis (13.1) – although risks can, of course, result both from action and inaction.

A third difficulty concerns the **scope** of the cost or risk analysis. Who or what should count? Do we limit our analysis to people currently alive in our own country or region? Are unborn generations to count? Or the very early human embryo? Are animals and plants to count, or the biosphere as a whole? Many challenges to decisions based on utilitarian reasoning are concerned with such issues. But attempting to include all the relevant interests in the analysis is very difficult; and no one should be in any doubt as to the complexity of the task and the potential loopholes in any analysis that can, realistically, be performed. Indeed, taking all such difficulties into account, philosopher John Mackie described utilitarianism as **'fantasy ethics'**.[16] In fact, in common usage, utilitarianism is often interpreted quite loosely (and inaccurately) as simple cost–benefit analysis, where a practice is considered justified if some (limited) benefits are held to simply *exceed* some (limited) costs.

2.6 Deontology

Deontological theory, which had its origins in the ideas of philosopher Immanuel Kant in the eighteenth century (Box 2.2), refers to the rights and duties we have as individuals with respect to other individuals (**deontology** is derived from the Greek for *duty*). In essence, the theory is based on the observation that, however wisely we try to act, the results are subject to circumstances beyond our control; so the morality of actions ought not to be judged by consequences but by their *motivations*. Accordingly, it is only the **intention** of an act that is good, not the outcome: people should act out of a sense of duty – a principle that is right, in and of itself. To the extent that pursuit of the *right* and the *good* do not necessarily amount to the same thing, deontology prioritizes the right, particularly if the good were to be defined simply as pleasure.

BOX 2.2 IMMANUEL KANT

Immanuel Kant (1724–1804) is commonly regarded as the most outstanding figure in Western philosophy since the ancient Greeks. From the early 1780s he produced a number of highly influential books which left their mark on philosophy for many years, including *Critique of Pure Reason* (1781), *Fundamental Principles of the Metaphysics of Ethics* (1785), *Critique of Practical Reason* (1788), *Critique of Judgement* (1790) and *The Metaphysics of Morals* (1797).

He was born, and spent almost the whole of his life, in Königsberg, East Prussia, where he led a life governed by familiar routine – such that it was said that the people of the town could set their clocks by the punctuality of his daily walk and habits. However, despite his conventional lifestyle, he was an amusing conversationalist and, although he never married, he enjoyed company and never dined alone. He was renowned for his brilliance as a lecturer.

Kant argued (controversially) that although scientific explanations of events appear to suggest that everything is caused by a prior event, as well as this *phenomenal* world there also exists another, *noumenal*, world (a sort of parallel universe), where we make decisions that affect our actions, and where it is permissible to ascribe praise or blame to actions. But only individuals who understand the reasons for so doing can act morally, so that morality is only possible for rational beings.

Kant then proceeded to argue for a system of ethics based on reason, drawing the parallel with science. This led him to claim that the fundamental rule of morality, which, like scientific laws, must be universal, was the categorical imperative: *'Act only according to maxims you can will also to be universal laws.'*

2.6.1 Features of Kant's theory

Kant's main aim was to construct ethical principles which were based on rational procedures. Rather than assuming what 'the good' is, he tried to establish principles that would apply regardless of other peoples' desires or social relations; and this meant that nothing could be a moral principle for one person that could not at the same time be a principle for everybody else. The distinctive features of this theory might be summarized as:

- Each person has a duty to respect the inherent dignity (or **autonomy**) of other people and treat them as *ends in themselves* and *not instrumentally*, i.e. merely as a means to one's own ends.
- Morality consists of performing the right actions, which can be described as **categorical imperatives** (e.g. 'do not tell lies'; 'do help the needy').
- If an ethical right applies to us as an individual, it also applies to everyone else, i.e. it is a **universal right**, which thus places us all under a *duty* to respect it in other people.[17]

So in formulating principles which were based on **reason**, Kant concluded that the only way to live an ethical life was to be guided by what amounted to a **moral law**. In essence, the approach corresponds to the so-called Golden Rule: *'Do as you would be done by'* – a rule sometimes claimed by Christianity as its own, but which is found in

most ethical traditions, including that of the Chinese philosopher Confucius (fifth century BC).[18]

An important aspect of Kant's thinking is that no account is taken of the particular consequences of actions. For example, telling lies is categorically wrong because it undermines the trust that has been developed by other people telling the truth: the liar behaves as a parasite on society. Moreover, performing beneficial acts for the wrong reasons – like participating in a sponsored charity event out of self-interest (because you enjoy it) or to avoid likely criticism if you did not participate – does not count as ethical in Kant's view, although to a utilitarian that would be irrelevant if the event raised money for charity.

2.6.2 Limitations of Kant's deontology

As with utilitarianism, there are some serious problems with deontological theory. One concerns the difficulties that arise when there is a conflict between the duties to act in accordance with different categorical imperatives, whose consequences might be inconsistent. If, for example, you are approached by an apparently demented person, wielding an axe and asking you the whereabouts of your friend, you are faced with the dilemma of wishing both to tell the truth and to protect your friend from likely harm. Your desire to protect the friend by telling a white lie will entail ignoring the categorical imperative to 'always tell the truth', but there are no rules to guide or justify this decision. (Kant appeared to suggest that lying would be wrong even in such circumstances, but others argue that certain exceptions to the rule against lying would not be inconsistent with his beliefs.[19])

There is also a problem in the formulation of the categorical imperatives. Although these are intended to apply to everyone, they might be framed in such a way that they in fact affect only a small section of society. For example, if stealing by hungry people were deemed a categorical imperative, a small minority of hungry people could feel it right to steal: but there are no precise rules for deciding who is 'hungry'.

2.6.3 Kantianism

Over the last 200 years Kant's approach has been adopted and adapted by others to produce forms of ethical reasoning which are rather different from those Kant himself proposed. Nowadays, philosophers often talk of **Kantian ethics** when they want to stress deontological theory as opposed to utilitarian theory, or more generally lay emphasis on actions rather than results.[20]

Two characteristics of a modern Kantian approach are:

- a strong opposition to deception, as being incompatible with respect for persons
- the limitation of acts of coercion to cases that are compatible with respect for persons, such as emergency aid to rescue victims of crime.[21]

But within the broad span of modern Kantian ethics differences of emphasis often become apparent, such as the high priority given to the autonomy of the individual in much bioethical literature in the USA. For some philosophers, especially in Europe, this

places too much emphasis on rights and too little on duties.[22] Perhaps the most prominent modern form of Kantian theory is that developed by John Rawls, which is discussed in 3.3.

2.6.4 Kantian ethics and animals

We have seen that Bentham regarded the interests of animals as ethically relevant because, although they could not reason or talk, undoubtedly, they could suffer. In contrast, for Kant, the ability to reason is a decisive factor as to whether a being has **ethical standing** (3.4). Rejecting the instrumental use of other people, he wrote: *'Unlike objects or animals, humans are never to be used as a means to another's ends.'* However, *'Animals must be regarded as man's instruments ... as a means to an end.'* So Kant argued that we have no direct obligations to animals but only indirect ones. People should not be cruel to animals, not because we have any duties to them but because it might offend the animals' owners and/or it might encourage people to be cruel in dealing with other people.

In recent times Kant's views on animals have been challenged by those who, encouraged by developments in evolutionary biology, see the sharp distinction drawn between animals and humans as arbitrary. Philosopher Tom Regan has adapted Kant's view that people are ends in themselves by claiming that animals (at least those with a sufficiently developed nervous system) also have ethical standing because they are **subjects of a life**, a fact which assigns them **inherent value**. According to Regan, all the animals we eat, hunt, trap and exploit in sport and science have a life of their own quite apart from their utility to us. *'They have a biography and not just a biology. They are somebody not something.'*[23] This Kantian line of reasoning suggests that animals should be assigned rights, analogous if not identical to those we ascribe to humans. If we refer back to the case of animal experimentation discussed above (2.5.1), Regan's belief in the rights of animals persuades him that this, along with all other forms of animal exploitation, is ethically impermissible.

2.7 Virtue theory

Both utilitarianism and deontology seek to define ethics by referring to a single dominant principle. But a prominent recent ethical theory adopts a different starting point, one based on **virtue** and **character**. In fact, although the formulations of so-called *virtue theory* are recent, they have their origins in ancient writings, notably those of Aristotle[24] (Box 2.3).

Virtue theory puts emphasis on the person who performs the actions and makes the choices, rather than on the situations in which choices have to be made. Aristotle believed that the goal of life is to live virtuously to attain a state of happiness. This was to be achieved as a result of the exercise of reason and entailed choosing a **golden mean** between two extremes. For example, exercising the virtue of courage meant acting in a way that was intermediate between rashness on the one hand and extreme

BOX 2.3 ARISTOTLE

Son of a court physician, **Aristotle** (384–322 BC) went to Plato's Academy (effectively the first university – which gave rise to our word 'academic') in Athens when 18 years old and stayed there for almost 20 years. For the next 12 years, after Plato's death, he was tutor to the young Alexander the Great, later returning to Athens, where he set up his own 'university', the Lyceum. With Plato, and Plato's teacher Socrates, Aristotle was one of three philosophers who can be said to have laid the foundations of all subsequent philosophical enquiry.

But his achievements were not limited to what we now class as philosophy. He studied and wrote extensively on physics, cosmology, and mineralogy, and for his anatomical, embryological, and ethological insights he has, in recent times, been called 'the first biologist'.

His ethical ideas are contained in two books, of which the *Nicomachean Ethics* (based on his lectures, which were compiled and edited by his son, Nicomachus) is regarded as the most important.

For Aristotle, the key human attribute is *reason*, which is not only necessary for understanding, but also for right action. Reason is the route to achieving the goal (*telos*) of human life (i.e. happiness, which he called *eudaimonia*), while the skill of considering proposed actions and matching them with *telos* is called prudence (*phronesis*).

timidity on the other. Other natural virtues were wisdom, justice, and temperance; and overall, morality was considered to be a matter of **practical wisdom**. For Aristotle, then, the wise or virtuous person has an 'eye' for what is appropriate in any given situation, and deciding what to do is arrived at by a process of training in virtuous behaviour. Subsequently, Christian thought added three theological virtues to the natural virtues – faith, hope, and charity (love), claiming that the latter was 'the greatest' of these.

In recent years, philosopher Alasdair MacIntyre has suggested that ethics should be less concerned with individual moral decisions (the preoccupation of utilitarianism and deontology) and more with the health and welfare of the community; and he argues that a return to Aristotle's ethical philosophy might be the best way to achieve this.[25] (It is perhaps worth stressing that it is Aristotle's *style* of reasoning that is here referred to: some of his actual beliefs, such as those approving of the roles of slaves and the subjugation of women, are certainly not now generally considered ethically acceptable.) MacIntyre claims that the language and practice of morality are currently in a state of disorder because *'ill-assorted fragments of various parts of our past are deployed together in private and public debates'*. If people could be encouraged to behave virtuously, almost as it were by instinct, a society might be evolved in which citizenship became a priority for all.

2.7.1 Some limitations of virtue theory

'Obviously, the world would be a better place if more lawyers were taught the virtue of honesty, politicians integrity, physicians beneficence, and professors humility.'[26] But despite such attractions, some significant limitations of the theory have been identified. For

example, although Aristotle assumed that happiness is the reward of a virtuous life (virtuous people 'flourish', in his terms), this is not necessarily the case. Some fairly unpleasant, selfish people seem to have a whale of a time, and yet do so without suffering from a guilty conscience (although they may, of course, just be very clever at concealing their real feelings).

Moreover, critics of this approach question what the virtues of this new Aristotelianism might be. The 'good life' is viewed differently in different cultures, and this is surely likely to have important implications for what are regarded as the virtues. For example, in the Muslim world a virtuous man may have up to four wives, but Judaism and Christianity permit only one. Or some might regard euthanasia as an act of compassion, but others as an act of murder. Can a modern virtue theory, with its appeal to ancient wisdom, cope with such different attitudes?

Another aspect of that problem is the application of identified virtues in practice. If, for example, it is agreed that justice and courage are virtues, we are still left with the question of how and when to practise these virtues in specific circumstances, and how to balance competing claims.

2.7.2 Virtue theory and animals

For philosopher Rosalind Hursthouse, virtue theory provides a basis not only for our dealings with other people, but also with animals. She suggests that the theory requires the virtuous person to pursue virtues such as kindness, compassion and responsible behaviour, and condemn *vices* such as callousness, cruelty and irresponsible behaviour; and this demands serious respect for the lives of sentient animals that others might use in experiments, for food or in sport. For Hursthouse this has entailed becoming a vegetarian.

But, as she admits: *'although virtue ethics does tell us what we ought to consider, it does not thereby make our moral decisions easy or straightforward.'*[27] The case is made tellingly by her analysis of the position of another philosopher, Roger Scruton, who is also an adherent of virtue theory but, unlike her, does not consider that this conflicts with his support for fox-hunting or angling.[28]

2.8 Other ethical theories

2.8.1 Normative theories

Normative theories address the fundamental question 'How ought we to live?' That is to say, such theories prescribe, imply or explain certain standards (norms) of conduct that are considered justified or required. In this chapter we have briefly discussed three important normative ethical theories (2.5–2.7), which can be summarized by saying that they place emphasis respectively on *well-being* (utilitarianism), *autonomy* (deontology), and *character* (virtue theory).

But some ethicists stress the value of other normative approaches. These include, for example:

- **communitarianism** – which emphasizes the importance of the interests of whole communities rather than focusing on the concerns of individuals[29]
- **feminist ethics**[30] – which suggests that traditional masculine-oriented ethics has not only laid undue emphasis on *justice* to the detriment of an ethic of *care*, but has also endorsed imbalances of power, such as those between men and women, rich and poor, healthy and disabled, and white people and those of other skin colours
- **ethical relativism**[31] – which claims that the rightness or wrongness of actions is entirely determined by the cultural and social environment in which you live or were brought up – so that *no* opinions can be said, in themselves, to be ethically right or wrong.

In the latter case, it is clear that social norms (like those derived from traditional religious beliefs) have an important impact on notions of right and wrong, and result in sincere disagreements between well-meaning people, e.g. over issues such as abortion and euthanasia. But there are two important counter-arguments, which are implicit in the earlier discussion in this chapter. First, anthropologists conclude that there is much fundamental agreement about ethical codes between different cultures,[32] and second, formal acceptance of ethical relativism would prevent *any* criticism of others' behaviour, even of brutal and intolerant practices such as slavery, torture, female genital mutilation and religious persecution.

2.8.2 Non-normative theories

In addition to normative ethical theories there are two broad categories of non-normative ethics, *descriptive ethics* and *metaethics*.

Descriptive ethics consists of the factual description of moral behaviour and beliefs. It includes sociological, psychological, legal and political accounts, and is represented by public policies, professional codes and common attitudes and beliefs. A number of examples are discussed in this book.

Metaethics addresses more abstract questions such as: 'What is morality?' and 'In what sense can moral judgements be said to be true or false?' Philosophers who address such questions consider theories such as *realism*, *intuitionism*, *naturalism*, *subjectivism*, and *emotivism*.[33] Although a rigorous philosophical enquiry almost inevitably leads into metaethical questions, this book will largely be confined to analysis at the level of normative ethics.

However, by way of illustration we might profitably consider just one metaethical theory – **emotivism**. This theory challenges the whole enterprise of attempting a rational analysis of ethics. This is because emotivists do not believe that ethical statements express anything other than emotional reactions, as if you were to say 'hurray' to things you like and 'boo' to things you don't. Attributed historically to the eighteenth-century Scottish philosopher David Hume, emotivism became prominent in the last century through the writings of the English philosopher A J Ayer.[34] More recently, it has been subjected to much criticism. Undoubtedly, there is a connection between feelings and ethical decisions (and we might question the humanity of someone who, for example, did *not* get angry or disturbed by witnessing or learning of acts of moral depravity), but it is difficult to believe that matters like compassion and justice *only* amount to such feelings. This is because *'emotions can be responses to already discriminated moral properties; and crucially they can (and ought) themselves to be judged morally appropriate or perverse.'*[35] That is to say, we *can* overrule our emotions.

2.9 Can't we make moral judgements?

One of the commonest initial reactions encountered by the author, over many years of teaching bioethics to bioscience students, is that ethics is simply a matter of opinion – often couched in terms such as 'it all depends on what *you* think'. This appears to support the findings of the American psychologist Lawrence Kohlberg, who conducted studies on the moral development of children and adults, and found that people whose ethical ideas are grounded in the norms of their society often pass through a phase of relativism before arriving at a considered ethical position.[36]

A variation on this attitude is the statement by a student at another establishment: *'But surely it's always wrong to make moral judgements?'* – which stimulated philosopher Mary Midgley to respond by writing a book with the title of this section.[37] If you reflect on the student's rhetorical question you soon realize that it is, itself, a moral judgement. Although some justification for it might lie in the view that we should not impose our moral standards on others, in reality, as Midgley notes:

> *getting outside morality would be rather like getting outside the atmosphere. It would mean losing the basic social network within which we live and communicate with others. . . . a state where, although intelligence can still function, there is no sense of community with others, no shared wishes, principles, aspirations or ideals, no mutual trust or fellowship with those outside, no preferred set of concepts, nothing agreed on as important.*

As we saw in 1.9.3, the predisposition to altruistic behaviour and its rationalization in ethical norms seems to be a characteristic of human societies, which has resulted in attempts to devise ethical schemes and apply them by means of principles and rules. But it is apparent from the accounts given in this chapter that the theories proposed have only been partially successful in arriving at an explanation of, and justification for, an ethical life. Each theory appears to satisfy some important aspects of commonly perceived ethical behaviour, but it also has some serious drawbacks in terms of practical application.

In chapter 3 we consider how the various theories contribute to a *common morality*, and how this might form a basis of assessments of the bioethical concerns discussed in subsequent chapters. But each of us, as individuals, might also weave a distinctive ethical garment from those diverse threads of ethical theory that appeal to our own inner convictions. It is a garment that will remind us how we believe we should act, and inform others where we stand.

THE MAIN POINTS

- Ethical deliberation is a rational process, albeit sometimes informed by religious and/or emotional considerations, which principally concerns our relationships to others, both human and non-human.
- In making ethical decisions, a sound approach is to appeal to a set of principles, grounded in ethical theory.
- Utilitarianism is the most prominent consequentialist theory, which in seeking to achieve the 'greatest good for the greatest number', applies cost–benefit analyses.
- Deontological theory emphasizes motives rather than the results of actions. An important principle is to 'Do as you would be done by'.
- Virtue theory stresses the importance of character in ethical decision-making and often attaches priority to the well-being of the community.

EXERCISES

These can form the basis of essays or group discussions:

1. Is the idea of *free will* (2.1.2) compatible with a scientific view of human nature?
2. Does *natural law* thinking (2.3) play any part in your ethical reasoning about whether an infertile person should be allowed to have a child by reproductive cloning using the technique of nuclear transfer? What other arguments, if any, are important in your ethical reasoning?
3. Make a table of pros and cons of the three theories described (utilitarianism, deontology and virtue theory: 2.5–2.7) as they apply to the case of medical research involving experiments on anaesthetized rabbits to study heart disease.
4. How do you respond to the statement 'Ethics is just a matter of opinion'? (2.9) Give detailed reasons for agreeing or disagreeing with the statement.
5. Can any ethical distinctions be made between the motives and activities of people who threaten others with violence in their opposition to: (*a*) abortion (5.2.4), (*b*) proposals to ban fox-hunting (7.8.2), and (*c*) animal experiments (8.9)?

FURTHER READING

Many books on ethical theory are written for philosophers, and will make difficult reading for the non-specialist. But there are several books written for the general reader, which will be useful in amplifying points made in this chapter. Examples are:

- *Ethics: a contemporary introduction* by Harry J Gensler (1998). London, Routledge. An engaging approach to ethical theory for the non-specialist.

- *Being Good: a short introduction to ethics* by Simon Blackburn (2001) Oxford, Blackwell. Oxford, Oxford University Press. Also appears as *'Ethics'* in the 'A Very Short Introduction' series.
- *A Companion to Bioethics* edited by Helga Kuhse and Peter Singer (2001). Oxford, Blackwell. A valuable guide (with 46 articles by leading philosophers) for those who want to pursue the subject more deeply. Its emphasis is on medical bioethics.

USEFUL WEBSITES

For articles on ethical theory, applied ethical issues, and biographies of key philosophers, consult:

- **http://ethics.acusd.edu/** *Ethics Updates* (edited by Lawrence M Hinman): a useful guide to ethical theory.
- **http://www.edu/research/iep** *The Internet Encyclopedia of Philosophy* (edited by James Fieser): a handy guide to philosophers and their works.
- **http://www.earlham.edu/** *A guide to philosophy on the internet*: a large database of links to useful sites (edited by Peter Suber).

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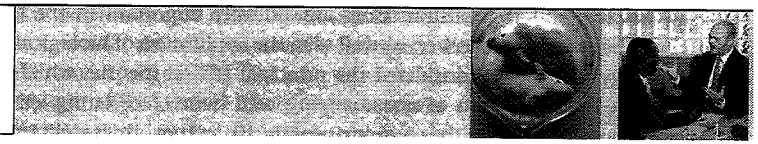

A framework for ethical analysis

OBJECTIVES

When you have read and discussed this chapter you should:

- understand how modern theories of utilitarian, deontological, and virtue ethics are reflected in the *common morality*
- understand the importance of Rawls' theory of justice to modern liberal democracies
- appreciate the theoretical basis of the framework called the *ethical matrix*
- understand how the ethical matrix can be applied to ethical reasoning in a specific example in the biosciences – the use of a hormone preparation to stimulate the milk yield of dairy cattle
- appreciate the range of ways the ethical matrix can be used and the nature of its limitations

3.1 Introduction

This chapter describes a framework for analysing bioethical issues and for helping in, but *not determining*, ethical decision-making. Such issues cover a very wide spectrum; and the people involved might range from an individual (such as a bioscience student) deciding, for example, whether to become a vegetarian or whether to apply for a job with a particular biotechnology company – to a government committee deciding whether to advise that a specific reproductive technology should be legalized. Typically, such questions take the form of dilemmas (problems that initially, at least, seem insoluble), which can sometimes be perplexing. Bioethical dilemmas are often characterized by one or more of the following features:

- good reasons are proposed both for supporting and for opposing a particular course of action
- the ethical acceptability of a course of action depends to a significant degree on scientific evidence, which may be complex and/or incomplete and/or debatable
- a decision has to be made by, and/or for, society as a whole, in which a significant number of people (sometimes the majority) may oppose the opinion held by most scientific experts.