Article

Moral Failings and Biotechnological Advances

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Moral failings are usually construed as personal flaws, but there is another construction: where morals fail people, where our moral precepts are silent. I submit that in recent years quantum leaps have been made in biotechnology which have brought utterly novel moral questions. One forum in which the questions are faced is that of the various health care ethics committees, where the mandate of the committee is to determine the ethical acceptability of a proposal. Discussion often seems to focus on the legal aspects, with ethics reduced to comments on the adequacy of the Information Sheet. By responding to the legal issues involved, the moral questions are pre-empted. This results in answers drawn from legal categories, often with commercial perspectives, but misses the larger moral domain. I argue that this is a shortcoming in ethical theories, not a deficiency in the committees.

Setting the Scene

Suppose Jenny Gee wants a child of her own, without sex or artificial insemination, and so decides to clone herself and become her own best friend. Assuming all goes according to plan, we get a Jenny-clone, physically independent, socially differentiated but almost a monozygotic twin of an entirely different age.

I do not propose to pursue philosophical questions about the necessary and sufficient conditions for personal identity. Such questions are spurious without a normative framework within which to work, such as the accountability and responsibility of people as interacting agents, or the relations among individuals, populations and species within biological taxonomy. I give the example only to illustrate the extent to which our moral beliefs are limited when it comes to new situations which do not fit into our familiar patterns. The following questions indicate the kinds of topic I will focus on: Do Jenny's parents have moral obligations to Jenny-clone; in particular, do they have the same responsibilities to Jenny-clone as they did to Jenny, given that in the genetic sense Jenny-clone is as much their daughter as is Jenny herself? What about the more legal issues: Could Jenny's father be expected to pay child support? Who gets named on the birth certificate as the parents? Then again, what about Jenny's geneticist physicians, what standards of professional ethics ought to be applied to them? Can they just say that she was aware of the medical and genetic aspects involved, and they had her informed consent, or should they obtain Jenny's parents' consent too? Is there some further ethical model which human cloning shares with, say, novel treatment and new techniques?

I doubt many of us have answers to these questions, but few would deny that they have ethical implications. To that extent they pose moral issues. So why do we find it so hard to answer them, and why do so many of our answers sound more like legal responses, chiefly in the areas of informed consent and the ownership of genetic information as property? Is it that the ethicists on our committees are letting the side down? As an ethicist lay member myself, I hope not. I suggest that it is not a shortcoming of the committee members, but rather is an inevitable shortcoming of ethics.

My thesis is that not only is morality incomplete, but that it is necessarily so. And, as a practical implication of this moral failing, the questions are instead being approached and answered piecemeal within other social institutions, typically from legal perspectives, and from economic and political perspectives. I do not think that this is automatically wrong-headed; in fact, I think that it is appropriate to a certain extent. But one must accept that while these other institutions do and must have important roles, their answers will reflect the particular norms and principles of such institutions. This is not to say that these social institutions are devoid of moral reflection, only that it is not paramount and so moral aspects may give way to the need for a decision to be rendered in adversarial litigation, or for economic policy to be framed for national spending.

There is an asymmetry between the roles of the court and the roles of ethicists when confronted with the propriety of human action. Particular, identifiable individuals seek a ruling from the courts when there is a specific dispute or when the legality of a course of action is uncertain. The judge must be pragmatic, and must render a decision which is consistent with existing law and also resolves the issue between the parties. In particular, the job is falling to the courts to decide on issues arising in the technologically new areas, yet it is apparent that there is a reluctance among judges to render judgment on what they clearly identify as moral concerns, such as determining who can do what with genetic material and information, or with frozen embryos. It is not open to a judge either to assert that the issue is too fraught, or that all parties are in error in their submissions, unless he also imposes his own determination on the parties. But such pragmatism is not required of the ethicist; the ethicist may serve best by challenging assumptions and producing hypothetical counter-examples without the urgent need to reach any conclusion, and certainly not a conclusion for the particular individuals in their particular circumstances.

Moral Certainty, Moral Consistency and Completeness

a) Moral Certainty

Ordinarily we have very few ethical problems – we usually do know what to do and why – but when struck by a problem, we want the moral theory we espouse to indicate a resolution. We want it to be normative and prescriptive, not only descriptive.

Two classical theories of ethics have been of enormous influence. They are:

firstly, the Kantian school, which looks to rational determination of universal moral duties; and, secondly, the consequentialist utilitarian approach, which looks to causal chains and their instrumental effects relative to some ultimate, intrinsically valuable end.

In identifying oneself as a Kantian or utilitarian, one relies on the preferred theory to provide moral answers to moral problems. One is indicating how one will make future decisions, not merely reporting on how one has made decisions in the past; one is indicating a strong likelihood that one will be guided by one way of thinking rather than another, on the basis of which others are able to predict one's future conduct. The adherence to the particular ethical theory provides both rationale and relevant evidence for predicting future decisions and actions. It is as if the domain of morals and the right answers are already there, somewhere, just waiting to be called into service.

From either point of view – deontological and consequentialist – it would be a significant defect if there were things that we identify as moral issues, but where there is no moral answer. As indicated, Kant construes morals in terms of rationally necessary moral duties. These are principles under the single Categorical Imperative, *Act only on that maxim whereby thou canst at the same time will that it should become a universal law.*[1] The litmus test for an action is whether one's reason applies equally to all rational, moral agents. This is referred to as the universalisability requirement. It strips away the partiality and the personal biases and preferences and puts in their place rational principles which are oblivious to the personal traits of the agent. Kant was so persuaded by his rational agent, universalisability model that he states quite unequivocally 'Moral laws ... in contradistinction to natural laws, are only valid as laws insofar as they can be rationally established *a priori* and comprehended as necessary. In fact, conceptions and judgments regarding ... conduct have no moral significance, if they contain only what may be learned from experience ... ; one is ... misled into making a moral principle out of anything derived from this latter source.'[2] But in Kant himself and in his commentators very little attention is paid to whether the litmus test for moral correctness – universalisability – rests on universal law in a sense that goes more like this: *For every morally challenging situation, there is some moral law.*

Similarly, consequentialists need their theory to generate prescriptions. So they too must go beyond the accountant analogy, where the tallying is done on previously created records, and must establish matrices axiomatically, to generate future prescriptions, where there are no current records. This requires that the matrix for the arithmetic precede the problem. What is called for is a causal, or instrumental, axiom set, such that one can apply it and derive moral conclusions in the absence of experience and experiential data. Put this way, the utilitarians have an enormous hurdle to overcome. Usually they will argue that one extrapolates from types of experience with known outcomes and causal connections to future cases in a probabilistic manner, much like the statistician who is asked to provide a statistical analysis of the likelihood of a test generating a meaningful result given a population size n. Then, they would say, perform that action which on the basis of the statistical modelling is most likely to generate a balance of good/bad outcomes, relative to the intrinsic value(s) v. This is akin to something like this: *For every possible morally challenging situation a statistically meaningful prediction of outcomes can actually be generated.* At the heart of this approach is the thesis that the future resembles the past in predictable ways.

But, I suggest, the analogy is misplaced; it conflates and confuses causation, probability and prediction. A sceptic may well accept that no matter what, causation will hold, but still reject the possibility of current predictability in the face of new technologies. Our reliance on assumptions such as *the future will resemble the past* does not ground the presumption that *all future situations had corollaries in the past*. When viewed as an assumption, *the future resembles the past*, can function as the antecedent in a well-formed valid argument, but that does nothing for soundness. In other words, either the assumption is an empirical presumption, and hence open to refutation, or it is not empirical, in which case its status is unclear and it looks like mere dogma, which some of us may not espouse. Interestingly it might mean something like *we can only understand new things by reference to the familiar old things* (whatever *things* means), but that tells us more about us and how we seem to learn, rather than about things. Nor are those of us who reject the analytical interpretation of the assumption automatically rejecting causation and causal connections – rather we are simply adverting attention to the biological and experiential limits on our epistemic states, of our claims to knowledge, at any point in time.

But however one interprets the Kantian or utilitarian approaches to moral issues, both seem at base to imply that one ought to perform that action, or any of those actions which is consistent with moral duty (Kant) or with maximising utility (Bentham, Mill). This thesis I will call the *consistency thesis*. It is to be identified, if only because it is not that aspect in classical moral thinking that creates the problem. Sure, be consistent, but to know whether something is consistent you have to see how it fits in with the other theorems generated by the theory. That just goes back to the litmus paper test. If it didn't turn blue litmus paper red, then it is not an acid. But as every logician will tell us, the real difficulties arise in establishing completeness. Is the moral theory strong enough to generate every single consistent theorem? So then, let me consider whether ethics is, or ever can be considered as, complete – that is, whether for absolutely any and every question, there exists some appropriate moral answer.

The arguments in favour of the completeness of ethics are along the lines that any particular moral theory does in fact have answers to most moral questions, and in theory provides a decision procedure or rubric for dealing with any new situation, basically by saying, 'And so on', where the inquirer is instructed to continue to apply the method prescribed in the theory. So you either try to generate a rationally necessary moral universal law, or do more calculations about the likely consequences of whatever, as the case may be and, if you go on long enough, the answer will come out QED. The problem is that when pushed, neither theory is axiomatic; nor has either a recursive function which indicates how the procedure is to continue absent further evidence. Both have what could be called 'quality control' techniques (the 'litmus test' mentioned above in connection with Kant) which might establish a consistency test for moral standing, but neither can generate completeness and establish that the overall moral system constitutes both a consistent and complete set of moral prescrip-

tions. The quality control for the Kantian is the Categorical Imperative. For the utilitarian it is the net balance of good/bad, or at least worse/worst, depending upon one's brand of utilitarianism. The problem is that as a litmus test, it is only something that provides a confirmation, not a construction rule for moral value.

Neither as it stands can accommodate the unusual, but it is the unusual that is the morally problematic case.

b) Moral Marksmen, Mathematicians and Completeness

For the Kantian it is as though there were a great pre-existing universe of moral certainties just waiting to be identified and revealed. All we need to do is find the appropriate trajectory and we will be able to discover the right, the true answer. The appropriate trajectory, of course, will be the one that sends back the right answer, and for Kant that is the universalisability test. This will provide the moral counterpart to natural laws – it will disclose or reveal what was there all along. The moral marksman simply has to see whether her maxim falls in the circle of universal moral prescript, and if it does then she has scored a moral bull's eye. If her maxim fails the universality test, then hers is not a moral law at all and she must try again, if she is to act morally. But, the problem seems to be that the Kantian moral marksman has to perform blindfolded. She has no prior knowledge of the whereabouts of the target, only the method for determining successful shooting. But if the Kantian is like a blindfolded marksman, the consequentialist is like the accountant with an indefinite number of rows and columns to tally and no way of knowing when he has reached the end of his sums. For the consequentialist, the answer lies in refining the mathematics and checking the sums, adding more factors and variables into the calculations in deciding where the overall balance of cost/benefit lies.

There are, I suggest, at least two possible ways in which this moral certainty and moral closure are supposed to arise. First, it might be held that as an empirical fact, the moral universe is complete – there are no moral black holes. Alternatively, it might be held that moral agents are complete – we have the rational capacity to generate and demonstrate the correct moral answer to any moral question from established moral principles and axioms. The first model is the Moral Marksman approach – the truth is out there, patiently awaiting the arrival of the seeker after truth; the second model is the moralist as mathematician, where appropriate axioms will generate all the necessary moral inferences. My thesis is that both models are wrong; in fact there are the moral equivalents to black holes, where there is no settled moral truth patiently waiting nor is there a rational principled method in us as moral agents which will yield a unique answer. Both approaches fail, most especially when the moral stakes are at their highest, or when an unambiguous decision is required. Somehow, 'Do whatever it is that will maximise happiness' is hollow advice, but so is 'Do your moral duty'.

c) Virtue Ethics and Relativism – the Moral Gaps

Largely in response to the perceived inadequacies of Kantian and utilitarian approaches, virtue ethics has re-emerged from a long slumber. It has reappeared in various shapes, often insufficiently interdistinguished, but with an Aristotelian emphasis in preference to a Socratic theory. The rallying cry is that the traditional approaches outlined above have failed, but failed because they have not considered the role of character. Hence, what is to be sought is goodness of character. As Bill Shaw and Vincent Barry put it: '[T]he Aristotelian good world is not one that conforms to some preestablished principle. Rather, it is a world populated by good people.' A good person is one who is 'experienced in the ways of life' and 'a person of character, disciplined to avoid the temptations' and who 'possesses *phronesis*, or practical wisdom'. For the Aristotelian, living the good life, as it was for Socrates and Plato, is a craft or skill. Thus both depend on a teleological account; the idea that there is a *telos* for persons, some proper manner of life which is to be lived, and for which one must aim. But there is a significant difference in that for Aristotle 'there are no unambiguous answers in ethics',[3] whereas for the Socratic approach, virtue requires knowledge of the Good. Knowledge, Truth, Good and Beauty are, according to Plato, objective, perfect forms. Aristotle is most closely associated with the idea of the Mean, neither excess or want.

However, unless one is a virtue theorist in the Socratic sense, there is nothing outrageous in the suggestion that there can be moral questions which lack answers. The virtue theorists may well say that more life, more lived experience, is required before one can hope to achieve phronesis. Like Startrek's computer, the answer at any point might simply be 'Cannot compute. Insufficient data.'

The problem does not even arise for ethical relativists, who never look beyond the behaviours and conventions of population groups for moral prescriptions.

To make the empirical claim that the moral universe is complete and holeless, is surely just silly and muddle-headed. It certainly cannot be established as a truth. Alternatively, if the proposal is that moral agents are complete, it flies in the face of evolutionary biology. Things change, adaptations happen, or not, as the case may be, and while some forms of life go on, others become extinct. All we can say of ourselves at this time is that we are physically and rationally adapted to our current circumstances (including our social arrangements which lay great store in social moral conduct) by our past circumstances, but so too are sparrows and horseshoe crabs to theirs. That these same features will remain, unaltered, is open to doubt.

Morally sensitive people look to, and maybe even rely upon, a preferred ethical theory as providing a guide for the perplexed. But, I think that the gigantic steps made in biotechnology generally and in genetics in particular have identified a lacuna in ethical theory, whatever kind of theory it may be; further the lacuna is not restricted to advances in biotechnology alone, rather it is implicit in technological advances in all forms when they outstrip the commonplace. We simply do not have the familiarity, the knowledge or experience in these areas to assimilate them under our existing theories of morality. Those theories were developed in simpler times, before *in utero* surgery and genetic modifications were dreamed of, let alone practised. But now these things are here, and we cannot revert to ignorance. Indeed, talk of genetics has become part of ordinary discourse, with people being very quick to attribute just about anything to 'it's all in his genes'. Biotechnological questions, especially those about genetic engineering, are seen as raising moral issues and as being at least in part moral questions.

Sometimes a person may toss off an answer thinking that they have provided a moral response – for example, when asked 'Should anyone take a genetic sample from someone else without that person's consent?' most have not seen the question as odd. Answers are forthcoming. The usual answer seems to be 'no', with some explanation in terms either of privacy or autonomy or ownership of one's genes. This is surely surprising in relation to a subject matter which was unknown to all 50 years ago, and unknown to most ten years ago. When did we suddenly acquire beliefs about the moral status of one's genes? But, if one asks further, 'When was the last time your hairdresser asked for your permission?' the stock reply may be to treat it as a trick question. And then the previously unqualified answer gets provisos or explanations attached and the picture becomes much more complex. The further elaborations are heterogenous, and what was initially supposed to be a moral answer may emerge as something else, be it legal, political, social or cultural. It no longer has the kind of certainty and universality that a deontological or consequentialist moral theory espouses. There is a recognition of the need for an answer to these types of question, because the situation exists: someone needs to know for instance whether all the relevant parties have been consulted in a proposed drug trial involving genotyping, whether a person can 'sell' their genetic information for profit, whether they can flush the unused fertilised pre-embryos down the drain, or whether they can implant them in a non-donor (as if a form of adoption at a very early developmental stage). The questions will not disappear, nor will traditional ethics provide answers.

Some of the complexity is the search for a non-legal interpretation of a legal concept, ownership (and too often the view is that one owns one's genes just like one owns one's jeans). Some of it is about social policy-forming, (Big Brother checking up and keeping records, prospective employers, or insurance companies having a questionnaire covering an applicant's genetic state: Are you now or have you ever been genetically identified as a haemophiliac/dyslexic/alcoholic/kleptomaniac?). Some of it is about commercial economic power, biomedical research and clinical trials conducted on behalf of the multinational pharmaceutical companies where the parties are not on an even playing field. Rather, the pharmaceutical company has all the information, and the economic and political influence potentially to force gene-gleaning and the answer-givers do not want to see institutional invasion of one's body – they see it as a body-cavity search for drugs, where the agendas of the participants are at odds, with the company in it for profit, but the participant in it for social, often altruistic reasons. Finally others see it as a contractual question (here, more responses tend to be highly legalistic, about lack of consideration and disparity of the parties).

However, although I am focussing here on genetic sampling, the range of issues arising in biotechnology is far more expansive. One has only to consider the topics in assisted human reproduction, *in vitro* fertilisation and frozen embryos to realise that these are new subjects. Some people understand the science involved, but these topics are among the matters with which we have no pre-standing experiential familiarity. We do not know how to be Kantian or utilitarian about 'left over' frozen embryos. What maxims are at issue, and how would one decide which, if any, one could will should be a universal law? Is an embryo an 'end in itself' or something else? Similarly for the utilitarian, should the embryo figure in the equation as a potential sentient, given that it is not sentient in its present state and is not capable of becoming sentient unless further steps are taken? This latter factor certainly distinguishes the frozen embryo from the embryo *in utero*, which in the ordinary course of events will develop into foetus and ultimately will be a fully fledged member of the sentient species.

But, if indeed there are moral gaps, that does not make life easy for those looking at the questions and needing answers. And whereas ethicists can remain undecided on the issues, practitioners, judges and political policy makers cannot. Moreover, because they are making decisions, they are informing our ethical theories. The results establish new data, new empirical items as information on the basis of which to expand or amend ethical theory. In that way, they are inventing ethics. After all is said and done, the subject matter of ethics is experiential, and in particular it is about human activity, how we live and what we do. But only by assuming that experiences have been had to the fullest extent can we even begin to imagine that there is nothing new in the future.

But there is a further reason for maintaining the incompleteness of ethics, which some might think is just an empty logical reason. It is simply this: we can never be sure that there will not arise a question for which we have no answer. In the positive version: we cannot know that we have reached the end of all questions, and so that there are no unanswered questions. We cannot, as it were, get to the end of the list of questions, but unlike reciting the series of positive integers (1,2,3,4, ...), we do not know how to generate the questions series. We do not have what logicians call a 'recursive function' to give us the next question in the ethical questions series, the '+1' rule that tells us how to generate the next positive integer in the series. Some might maintain that the fact that we cannot know that we have reached the end of ethical investigation is a very good reason for claiming that as far as we are concerned, it will always be complete. But this is a mistake, in that it identifies 'decided' with 'decidable'. It presupposes the effective closure of ethical theories and, by implication, assimilates moral decision-making to legal decision-making. Whereas in legal decision-making we can identify in advance the rubric for what would count as a legal decision in any given society, by reference to the legal system and legal institutions for that society, the same does not hold true for ethics, unless one adopts a relativist view of ethics as being just an anthropologist's generalisations about the behaviours of certain ethnic, social or geographically contained groups and abandons all claim to universality. Such relativism will leave ethics as descriptive, just when we need it to be prescriptive.

But what I am maintaining is that current moral theories necessarily leave gaps. The questions may very well be answerable, but not answered by application of moral theories as they stand. We learn from our experiences. Finding or deciding on an answer is to extend, amend or rescind the existing theory. I submit there is no satisfactory principle of closure, only an arbitrary one at any given time – arbitrary but not irrational. This is what we might call 'creative ethics', and it is in this area that there is greatest interest, because the questions tend to be arising in the professional and applied fields. Moral theories are at most, best working hy-

potheses, given the nature of our knowledge and experience, about how we should act, but where at any time we can find that our moral outlook does not have the current capacity to address adequately the new situation. It is no coincidence that there is a sudden growth in medical ethics and technology ethics, the experiential raw data is too new and too different to be subsumed under existing norms and yet does not fall prey to social relativism. One example in the literature of the kind of thing I mean is John Harris's question: 'by what criteria might we decide on meeting a creature from outer space to have him for dinner in one sense rather than the other?'[4] Whereas that is fiction, modern biotechnology is beginning to give us the real questions.

Ethics is a practice but a rational practice, it grows to meet the needs and at present our classical moral theories do not meet the needs, they need to grow to help one determine how to behave to and with others. It is not going to tell you whether it is acceptable to eat the Martians for dinner (we had Danish for breakfast, and Martians for dinner). Our ethical beliefs both inform us as to conduct and also as to what is to count as an ethical object, but only by extension from the kinds of thing we already know, and accept. Then when we find ourselves in disbelief as to the moral status of something, we have found a hole in our moral theory. We have encountered a situation which does not neatly fit under any of our current recognised categories. Again, it might be replied, all I have shown, if anything, is that we do not *know* whether we have complete closure in our ethics, rather than that closure cannot be attained. But that is to overlook the obvious, *we cannot know how much we don't know,* and however much we might hope we'll get by, we are not prepared.

Many of us will tend to err on the side of caution, which might incline one against eating the things out of the spacecraft from Mars (maybe they are poisonous, maybe it is Martian detritus or excrement, maybe they are people, in a morally relevant way, but whichever, best not to be eaten). But erring on the side of caution is like Pascal's wager for the belief in God – 'I've not lost anything if there is no God at the end of my earthly days, but I might really get heck if I don't believe and it turns out I was wrong'. By parity, when the Martians disembark on your front lawn, you might decide it is inappropriate to eat them, not because they are definitely moral agents themselves, or even moral objects like your pet basset hound, but maybe because they might be. You just don't know enough to make an informed decision. If they turn out to be like the Mars Pathfinder vehicles, controlled robots, then you might assimilate them to your radio, which you would probably not be inclined to eat, or else to something more like *objet trouvé* chocolate bars, which you might eat.

Gene Warfare

'Gene transfer' has the ring of something highly unusual and technologically manipulated, but that is not invariably so. One form of gene transfer is called vertical gene transfer: that is the transfer of genetic material from parent to offspring through conception, the norm in mammalian sexual reproduction. Another form of gene transfer is called horizontal gene transfer, when the genes from one zoon enter a different life-form. It too is commonplace in some forms: we all get viral flu, and become the unknown, unconsenting and unwilling host to germs. The virus will have entered the body and will be replicating and mutating while the body's immune system strives to thwart the invader, and the inner struggle manifests itself in flu symptoms. That is not spectacular. What is spectacular, is that we understand the mechanisms. But by coming to understand the mechanisms we have gained dangerous knowledge; we – or at least, some scientists – know how to effect changes in genetic structure and how to implant those changes into existing creatures in such a way that the characteristics will be passed on to the next generation (vertical gene transfer), and to approximately 16 generations before some further mutation might appear. When the changes to genetic structure affect (or are supposed to affect) only non-inheritable characteristics, they are said to constitute *somatic gene alteration* – and where the intended single generation change is intended to benefit only the recipient, it is called *somatic gene therapy*. It is supposed to relieve the sufferer of a genetic disorder, without changing the *germ line* – inheritable traits – genes. Where the change is intended or thought to pass on to subsequent generations, it is called *germline alteration*, or *germline therapy*.

So in contrast with ordinary, gene transfer, we must be ready to ask questions when the genetic structure is deliberately altered by us for our own purposes, whether it be somatic gene therapy or germline gene therapy, precisely because those matters are in our control. For the moment they are; we can choose not to pursue genetic modification, but technology, policy and legislation are all moving rapidly to permit genetic modification. Genetic engineering is proposed for reproducing woolly mammoths by taking the fertilised ova from elephants, and replacing the existing elephantine genetic string in the nucleus with that taken from a frozen woolly mammoth. It is intended to be germline, in that the reconstructed woolly mammoth should be able to reproduce, and reproduce woolly mammoths, not elephants. Similarly, xenotransplantation and genetic modification in foodstuffs are now feasible. Xenotransplantation involves genetically altering organs in other species, typically pigs, to make the organ more suitable for transplant into a human, (and thus reduce the likelihood of organ rejection by the recipient). The thinking is that a bank of tailor-made modified animals could be bred with the germline alteration to create a plentiful supply of organs for humans. This is an extremely moot topic, not only because it involves the deliberate use of other living creatures for human ends, but also because it involves genetically modifying them first to make them better suited to human interests. Those who baulk at using animals on the grounds of sentience (utilitarians), might find themselves accepting such use where the genetically modified donor bank is modified to the extent that it is not sentient, say where the individuals are being bred headless and so have no centre of consciousness. Those who baulk at using animals on the grounds of breach of the autonomy of another species member would object to that headless modification. Genetic engineering in foodstuffs is gaining momentum, involving in some cases horizontal gene transfer from two or more non-sentient vegetables to increase disease resistance, or yield, and sometimes involving genetic transfer across the sentience/non-sentience line, such as salmon and strawberry mixing to create a cold-resistant strawberry. Self genetic replication, the Jenny Gee example, is just another case of the possible application of the new knowledge of genetics.

But, we have no past guidelines, no experience of what happens when one living thing is deliberately changed in its very essence, unless you take seriously stories about turning water into wine and we do not know what inferences to draw. We just lack the kind of broad experience which seems to underpin an ethical judgment. We are like children in this regard; and just as we do not expect toddlers to go around making complex moral judgements, but rather we foster and watch them develop moral awareness and application, we too need more experience. Currently matters are too novel and too different to fit into any of the usual categories. We are used to farmers selecting their best stock for breeding, but most of us would have dismissed as a bit unhinged the farmer who said he had selected his best tomato and his best chicken for interbreeding, even if he said that it would take a lot of trial and error, but it would give a more juicy chicken with a hint of a tomato sauce taste.

The difficulties are also compounded by our own arrogance, our willingness to act as if we had correctly characterised whatever it may be as *non-germline*, or as *non-horizontal modification*. For example, thalidomide was not thought of as a germ line-affecting drug, but now evidence suggests that the adverse effects are carried vertically by germ line, meaning that there is now a second generation of thalidomide-affected people. It seems that germline modification occurred, and presumably will be passed on as a heritable trait. By parity, Scandinavian field tests on vegetables through genetic modification, designed to produce disease resistance has apparently resulted in resistance being genetically transferred into weeds. Again, an unexpected and unprepared-for result has arisen. With the best will in the world, little credence can be put in the information fact sheets about genetic modifications and the reliability of predictions as to effects.

Legal Decisions, Policy and Morals

If the genetic modification is undertaken, then it cannot be pulled back, it is out of our control. Yet when we consider whether these processes are ethical, we have not had the experience sufficient to inform our ethical stance. Scientifically we know these things can be done and indeed are being done. Applications for New Zealand field tests on genetically modified *brassica* plants (cabbage family plants) and *pinus radiata* treestock have been publicly notified in the newspaper in the last two months in accordance with the requirements of the New Zealand *Hazardous Substances and New Organisms Act*, the *Biosecurities Act* and the *Resource Management Act*. These notices appear as nondescript entries, with no specific mention of the legislation's title, in the Public Notices Section of the Saturday paper, surrounded by notices about bars applying to renew their liquor licences and companies going into liquidation. There is a potential risk of genetic material being transferred (horizontal gene transfer) to other species, but without the pilot studies, the statistical modelling is frankly guesstimating, with an expressed margin of error of up to 100 per cent. Yet approval for such trials to go ahead may be granted if, in the words of the *Hazardous Substances and New Organisms Act, 'the organism meets the minimum standards set out in section 36 and ... the positive effects of the organism outweigh the adverse effects.'*

The *Hazardous Substances and New Organisms Act, 1996* is legislation intended to cover all types of dangerous things, other than humans or organisms derived from humans (an odd exception, surely). So it covers, for instance: fireworks, poisons and non-human, genetically modified materials as well as organisms new to New Zealand at the time of proclamation. It regulates by establishing the ERMA (Environmental Risk Management Authority) which is empowered to license testing, deployment and use of hazardous substances and new organisms. When the matter of human genetic manipulation was considered, the Final Report to the Health Research Council Ethics Committee stated:[5]

> Most human genes have homologues in other species. Use of the non-human homologue may suffice in some cases. The conclusions reached are that:
> - ...
> - ...
> - existing regulatory authority (IAG, ACNGT) is sufficient for approval of gene transfer into non-human species, and
> - IAG or ACNGT should require applicants to justify the use of a human DNA sequence as opposed to its non-human homologue.

[IAG = Genetically Modified Organisms Interim Assessment Group; ACNGT= Advisory Committee on Novel Genetic Techniques]

But commented that:

> Neither of the two advisory committees has any legislative authority. In part, to address this, the Government intends to establish an independent agency, the Environmental Risk Management Authority (ERMA).

The result is that since the new legislation expressly excludes human genetic technologies, such matters are left to local accredited Ethics Committees, established under the *Health Research Council Act, 1990*, and other general legislation on health, health care and medicines. But Ethics Committees have no mandate specifically to prohibit or prevent procedures, only to approve or decline approval. Lack of accredited Ethics Committee approval results in participants not being eligible for coverage by 'ACC' for any injuries, loss or damage which would otherwise have been eligible. However, it is not the role of ethics committees to legislate; that is the function of Parliament and of the courts in deciding cases.

Ethically, should strawberries be genetically modified, with the result that they can be grown over extended growing seasons, or in colder climates? Should we hedge our bets in the face of a possible unknown spread of promiscuous deviant brassica or unanticipated complications in modified strawberries? I think so. But if we do so, it may be prudent, but not much more. Then, again, it will be a legal decision which is made: the application will be granted or refused. The arbiter will be considering the nature of the application, the experience of the applicant in such matters, the known and perceived risks to the environment if the application were to be granted and any other matters the commissioner – or ultimately the Court – thinks fit in the circumstances. A legal decision will be made, and one which creates a precedent, a precedent which subsequent courts may ignore at their peril.

Similarly, if Genepharmicals Ltd develops a genetic modification, for instance intended for treating osteoporosis (it is now generally believed that there is an osteoporosis gene), legally they might be entitled to patent it as a process, but is it ethical? If it turns out that that modification is

based on a single individual's particular genetic difference from her osteo-afflicted sister, should Genepharmical be able to claim ownership in the unaffected sister's gene difference? Can they acquire her genetic information, either by buying it from her, or by her simply giving them it, wholly altruistically in research to find out why people like her don't have, but people like her sister do have osteoporosis? Drug companies are all racing to the patent office as quickly as they can, court battles are already in full swing between the companies as to which has ownership in a particular piece of genetic information. You have only to browse the Intellectual Property Law Reports to see how many legal decisions are being made, piecemeal, in the absence of clear-cut ethics, and indeed in the absence of policy.

Policy-makers, government agencies and professional associations are racing to come up with policies and guidelines. But both the legal decisions are being reached and the policy is being formulated in a rush, under pressure, made because they have to be made in response to this particular issue, this particular application here and now. Albeit the legal decisions are being rendered, courts do so reluctantly. *Davis* v *Davis*[6] illustrates well the quandary when the court must render judgment where 'we have no statutory authority or common law precedents to guide us'.

In their recent *Health Care Law: Texts and Materials*, the authors state 'We have three main reasons for considering ethical approaches separately from and prior to examining the law in depth. First, many of the legal principles we will consider purport to be based on ethical foundations – for example, it is claimed that our law on consent to treatment is based on respect for autonomy. Secondly, on many of the topics we will consider, law is insufficiently developed to provide guidance for health care professionals – this is true, for instance of the equitable remedy of breach of confidentiality. Thirdly, there may be ethical reasons for not attempting to extend law into certain areas – for example, some would argue that this is the case with attempts to regulate the behaviour of pregnant women ... .'[7] The second and third reasons combined seem to imply that in legally unchartered areas there will nonetheless be ethical charts. This, I maintain, is misplaced optimism when it comes to new technologies which expand beyond our established cognitive horizons. Although I have argued only the case for medical technologies, it is only one example of a kind of problem.

Moral hypothesis and skill

Here is the disparity between law, policy and ethics. Judges and policy-makers need to reach some specific single determination or prescription. That is what they are required to do. Theirs are specific roles within society. Judges adjudicate specific individuals and specific claims, and all this against a background that will have involved out-of-court negotiations. In other words, there is an artificial closure on issues decided by judges. The closure is twofold: society establishes the role, sets the mandate and the functions to be performed; the litigants set the issue to be decided. Policy-makers operate under general directives with political and economic underpinning; they must provide a policy, in keeping with the overall structure within which and in terms of which they are policy-makers. By contrast, ethics is not a social institution, with a specific function and job-description attached. Ethicists can ponder; importantly, they can entertain counterfactuals as well as hypotheticals, and consider what other facts and factors might be relevant; they can act as the gadfly in the side of the state; they can come to a tentative thesis, without being committed to it in practice; they can come to no conclusion, other than to show what is wrong with other approaches; tentative hypotheses can be reviewed, reconsidered, rehashed and the question and the subject matter remain. Ethicists can adopt different general moral theories, the consequentialist, the deontologist and the others, and each approach can generate a different and even several different possible answers without having to dismantle the theory for its failure to come up with the quick solution. Solutions are made to particular problems, ethics informs the manner of approach to types of problem. Ethics is a training, the acquisition of the skill of living the good life, where one learns by asking the question, and not by finding the answer. I am inclined to think that Plato/Socrates got it right: living the good life is a craft, but unlike Plato I think it is a craft where you can't have too many practitioners.

Pluralism accommodates a variety of ethical attitudes, but the law and policy cannot. They serve very different social functions. They are there to decide legal issues between persons, or to declare a person's rights; they are there to provide a social guideline, albeit a probative guideline which may be revised over the years. Ethics, in contrast, is supposed to help us with searching for answers to the question, and perhaps even more importantly with identifying questions concerning not whether thus-and-such is legal, not whether it is institutionally accepted, but whether it is right. But with new situations, such decisions cannot be made *ex nihilo*. So while we must put a lot of time and thought into developing our ethical outlook to deal with the utter novelty in new technology, we must be sure too that we are working to ensure that those other institutions, the judges, the policy-makers and indeed the technologists themselves are mindful of the limited scope of their roles, and that the individuals who fill those roles heed the need to strive for moral goodness, not just novelty or decisions.

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