

FAITH AND THOUGHT

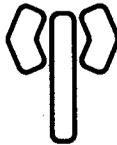
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Genes and the Nature of Man

Introduction

In 1953 Watson and Crick published their views on the structure of deoxyribonucleic acid (DNA), a discovery for which they were later awarded a Nobel prize. Since then the structure of genes and chromosomes has been steadily unravelled so that our underlying genetic make-up, instead of being secret, hidden and unapproachable, is being exposed to inquisitive scientific eyes.

Some of us feel inherently that such knowledge is best kept as a mysterious secret, known only to God, and that genes, like atoms, should be left undisturbed. Christians however have tended to see scientific discovery as a means of learning more of God and His creative power, and have endeavoured to apply new knowledge to the alleviation of human problems. Genesis 2: 15 states that, before the Fall, God put man in the Garden of Eden 'to work it and take care of it'. Christians need to examine the implications of the advances in DNA technology and work out how Christian principles can be applied in this as in any other scientific field.

The basis of our genetic make-up

Watson and Crick proposed that the DNA molecule was constructed as a double helix with the two strands held together by the chemical bonds between complementary base pairs. There are four fundamental bases: adenine, thymine, guanine and cytosine, and the first always pairs with the second and guanine with cytosine. The double-stranded molecule replicates itself by separation of the two strands and by the use of each strand as a template on which to build a new complementary strand. The varying sequences of the bases code for different amino acids which can then be assembled to give the different proteins and enzymes of which living cells are made. We now know much more about this genetic code and that there are not only sequences which initiate amino acid synthesis but others, perhaps more important, which provide information on when coding should stop and start and which sequences should be deleted. In higher organisms there are long sequences that are apparently non-functional, perhaps evolutionary relics, but whose variation is now of

utmost importance in the application of molecular genetics to medical problems.

One of the most fascinating aspects of DNA biology is that the same sequence system operates throughout the living world, in both plant and animal kingdoms. Human DNA can be inserted into that of a bacterium so that the bacteria produce the human gene product in harvestable quantities. Such a technique is now used in the production of human growth hormone for the treatment of children unable to produce their own.

Some of the most simple of organisms, the viruses, have now been sequenced in their entirety and are known to have about 200,000 base pairs in all. Thus a print-out of the order in which the 200,000 bases appear will be unique for each viral type and, once known, gives the entire specificity of that particular virus. Only small sections of the human genome have as yet been sequenced. In all there are about 3.10^9 bases so that it will be an enormous task to determine their correct order throughout. Even the print-out would occupy half a million sheets of paper. However, if it did become possible to quote the order of the four primary bases giving the DNA code for any particular individual would this alter our concept of the person?

What is man?

It would theoretically be possible to determine the full genetic code for a particular person. If we have the genetic transcript of that person, do we have a person? What we do have is the plan or blueprint for that person. It would tell us his or her sex, blood group, eye, hair and skin colour, perhaps some clues as to facial features and stature, possibly even some personality factors. But is this a person? Is Man more than just his DNA sequence, more than just the sum of his genes? A child receives half its genetic input from the mother, half from the father. At conception we have the 'blue print' for that particular child. Are our children simply the means by which we ensure that our genes participate in the twenty-first century?

Although the genetic endowment provides the building blocks for the person we know that we are more complex than that. There are the nine months in the womb during which time the blue print is transcribed and built upon to produce an individual human baby, but if conditions are unsatisfactory the programme may be altered or spoiled so that the child is born with some imperfection, perhaps mild, perhaps disastrous. After birth a host of interacting factors influence the developing infant who gradually unfolds his or her individual characteristics, some entirely genetically pre-determined, others

learnt from those around, and yet others from a combination of the two. If we believe that individuals are simply the sum of their genes, then we are programmed and pre-determined slaves to our programmes and incapable of withstanding our inbuilt tendencies. Some sociobiological teaching¹ leads in this direction, but the essence of Christian understanding of Man is that people have freedom to make choices, even when, for some, the opportunity for choice is limited.

Man in the image of God

The story of the creation in Genesis 1 describes how God made the plants, the animals and finally man. We have seen that we share our DNA with the plant and animal kingdom. God made man a special creation, in His own image.

Gen. 1:27 states:

'So God created man in his own image, in the image of God he created him; male and female he created them.'

The image of God is not a DNA sequence; the specific DNA sequence is a vehicle for the Image of God in that particular person. God is spirit, so we would not expect His image to be simply a biological phenomenon. Human beings have a set of human genes, but that is not the essence of their humanity.

What then is the 'image of God' which makes humankind different from the animals? Philosophers and theologians still grapple with this concept. All that can be done here is to offer some of their words as they struggle to express the inexpressible.

Brunner 1939² 'Man's meaning and His intrinsic worth do not reside in himself, but in the One who stands 'over against' him . . . Man's distinctiveness is not based upon the power of his muscles or the acuteness of his sense organs, but upon the fact that he participates in the life of God . . .'

Anderson 1982³ 'What is unique and distinctive to human beings is not an absolute physical, or even psychological differentiation between humans and animal creatures. The distinction must be found elsewhere . . . Non-human creatures do not participate in the fellowship and relation with God designated by the Seventh Day . . . The human may be differentiated from all that is of the Sixth Day, even its

1. Wilson E.: *Sociobiology: The New Synthesis* Harvard Univ. Press, 1975.
 2. Brunner H. E.: *Man in Revolt* 1939.
 3. Anderson R. S.: *On Being Human* William B Eerdmans 23, 1982.

own creaturely nature, by the Creator's summons to participate in the Seventh Day.'

Blocher 1984⁴ 'God created Man as a sort of earthly son, who represents Him and responds to Him.'

Each draws out the importance of Man's unique relationship with God. They met and spoke together in the Garden before the Fall. After the Fall, Jesus stresses that eternal life comes from knowledge and belief in Himself (John 3:14–16).

At the Fall it was the relationship between God and Man that was broken. Man did not immediately die physically, his body remained apparently unchanged and his DNA continued as before. If the Fall had affected Man at the level of his genes then there would be the potential for correcting this effect by manipulation of the DNA—clearly an entirely heretical concept. After the Fall, man has to have guidelines to instruct him how to behave as a human, and in the Ten Commandments again the focus is on relationships, first with the Creator and secondly with fellow human beings.

The beginnings of 'personhood'

If Man is more than just a DNA sequence, when does the DNA blue-print, laid down at the moment of conception, become a person in the image of God, one for whom Christ died and one whom I must love as my brother?

Here is another conundrum over which theologians and philosophers continue to wrestle, particularly now that with the new developments in reproductive technology there are important practical implications to the answer.

Some (see below) believe that once the blue-print is specified at the point of conception then the building blocks are prescribed and the person is there. This is however incompatible with the ideas just put forward. At the other end of the spectrum is the newborn babe who cannot relate consciously to God but who most definitely relates to his or her parents who could be considered God's proxies. On the other hand God is able, by His immanence, to relate to the infant from the time of conception, if He so wishes. But is a two-way exchange important for the essence of relationship and 'image'?

Conception seems too early, while birth seems too late a time for this transition. Is it a single event or a gradual development? We are still searching and feeling our way. What can we learn from our increasing knowledge of early embryology?

4. Blocher H.: *In the Beginning* IVP, 89, 1984.

The developing embryo

The history of the developing embryo has been well studied from the biological aspect. After conception cell divisions occur, and after about 5 days the round ball of cells that has now developed starts to embed itself into the wall of the uterus. At this stage every cell has the capacity to form any organ and tissue, and in fact the majority of the cells will give rise to the 'support system' of the placenta and membranes. At this stage it can divide into two to give identical twins. Soon after a dark area appears (the primitive streak) which will give rise to the embryo itself, and gradually particular cell layers become committed to the formation of only one organ or tissue which now gradually start to develop. The appearance of the primitive streak occurs at around 14 days, the limit proposed for embryo experimentation by the Warnock committee (see below). During these early stages there appears to be a high rate of loss of the fertilised eggs, with perhaps only half successfully implanting; even after this many are rejected and miscarried. A high proportion of these have 'genetic blue-prints' which would give rise to seriously malformed individuals.

After implantation the mother becomes aware that she is pregnant and the embryo develops rapidly so that six weeks after it appears outwardly-human, with beating heart and moving limbs. The next weeks and months allow growth and maturation of, in particular, the nervous system, and increasing awareness from the mother of the life within.

Christian teaching

There is very little teaching in Scripture on the value of the individual embryo or fetus (Exodus 21:22 is a possible exception but even there the interpretation is not straightforward). The concept of 'the sanctity of life' is not taught as such. Man is instructed to exercise lordship (in the sense of responsible care) over God's creation (Genesis 1:28). In relation to his fellow human beings the emphasis is on the importance of each individual, and both old and New Testaments abound in stories illustrating the worth of each person, however lowly, in the eyes of God. We are also taught that there is a continuity between the person as we know him or her, and that person as seen by God in the womb. Jeremiah (Je. 1:5) and Isaiah's 'Servant' (Isaiah 49:5) are called from the womb to their respective tasks, as was Paul (Galatians 1:15). David describes in Psalm 139 how God saw and formed him during his embryonic development. These passages show us God's immanence, knowledge and care for us throughout our lives but do not

necessarily thereby imply that every embryo is precious in His sight. He would know the ones which would fail as well as those which continue to birth.

Christ was known and named from the time of His conception, and Luke's gospel (Ch. 1) gives us the beautiful story of John the Baptist leaping in his mother's womb with excitement when Mary arrived to visit his mother. By then Elizabeth was 6 months into her pregnancy and would be well aware of his movements. Today he would be considered a 'viable' baby if born prematurely. Christians disagree on the matter of when and how the biologically human embryo becomes made in the image of God, warranting the care and protection of our brother. Stott,⁵ Schaffer,⁶ Cameron⁷ and O'Donovan⁸ all believe conception is the crucial time. MacKay,⁹ Vere and the present author all believe the event to occur later. MacKay uses the analogy of a mixture of pre-existent gases bursting into flame when the crucial temperature is reached. Vere (personal communication) suggests the embryo can be likened to a preformed microchip vitalised by electrical charges which in themselves are unable to fulfil the role of the microchip. I prefer the idea of a continuity with steadily increasing value, and 'image-hood' as the relationship with the mother and others develops. All these are only ideas and suggestions. We need wisdom and patience to discover the mind of God.

Applications today

Already we are having to apply our beliefs as we view the advances in reproductive technology. Contraception allows us to choose which people will enter the world and separates the relational and procreational aspects of marriage. Difficult decisions with regard to abortion have been with us for years. Artificial insemination by donor again separates the relational and procreative aspects of marriage and allows gene donation without the responsibilities of fatherhood. Should the two be separated? 'Test-tube baby' (*in vitro* fertilisation) techniques make use of gametes (sperm and ova) from husband and wife but may well give rise to more fertilised eggs than are required. What should be done with the 'spares'?

5. Stott J. R. W.: *Issues Facing Christians Today* Ch. 15 Marshall Morgan & Stott, 1984.

6. Schaffer F. A., Koop C. E.: *Whatever Happened to the Human Race?* Marshall Morgan & Scott, 1980.

7. Cameron N. M. de S. & Sims P. F.: *Abortion: The Crisis in Morals & Medicine* IVP, 1986.

8. O'Donovan O.: *Begotten or Made?* Clarendon Press, 1984.

9. MacKay D. M.: *The Beginnings of Personal Life* In the Service of Medicine, 1984, 30, 2, 9-13.

They may be returned to the uterus where they may jeopardise a successful outcome by giving rise to multiple (5 or 6) very small babies. They may be discarded, as seems to occur so frequently in the natural world. They can be deep-frozen for future use by the parents, but with the potential for future problems over ownership and disposal. A final possibility is to use the spare embryos for research purposes. Again Christians are divided on the acceptability of this, depending on whether they view such early embryos as bearing God's image or not. The Warnock committee (a secular government-initiated body) supported embryo research provided that less than 14 days had elapsed since fertilisation.¹⁰

Such very early pre-embryos could be used for the development of improved contraceptive measures and *in vitro* techniques, and also to increase understanding on the origin of some congenital abnormalities such as chromosome disorders. Looking into the future, tests might be developed which could indicate whether or not a genetically-determined disease was present, so that only embryos without the disease could be returned to the mother's womb. There is no prospect of parents choosing for themselves blue-eyed, musically-gifted children, or of any other genetic 'tailoring', but clearly the whole field is one which could be developed for both good or ill. Christians need to be aware and involved. Should fear of misuse mean that all such work should be banned, or can appropriate guidelines and an ethical framework be drawn up?

These questions are not easily answered, and we need to explore not only our attitude to the embryo but also the basic tenets of marriage and parenthood. I hope the discussion outlined here shows that the matter of the status of the embryo is not a simple one. Scripture however does not leave us bereft. We have several consistent guidelines to use as fixed points in our discussions:

Three fundamental ones are:

- The importance of the Truth
- The value of the individual
- The value of marriage and the family

These are Christian principles on which we all agree. It is the working out of how to apply these to the specific problems we face today which calls for wisdom and tolerance when we find ourselves in disagreement. We have to maintain the tension between our awe and reverence for God's created order, and our obedience to His command to be good stewards of that creation.

10. Report of the Committee of Inquiry into Human Fertilization and Embryology. HMSO, London, 1984.