GENETIC ENGINEERING

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It seems that with all of the technological progress that has been made there has consequently been a regression in man's desire to search for and satisfy his Creator. This fact, though upsetting is not surprising. This has been the plight of man since his genesis. Paul cautioned Christians to be aware and alert of the times in which they live in Ephesians 5:15 ***"See then that ye walk circumspectly, not as fools, but as wise."*** Passages like the aforementioned and others are necessary for Christians now, as they were in the first century. Technology has taken man to the moon, allowed him to build weaponry capable of annihilating countries, and allowed him *some* insight into the makeup (genetic) of God's most magnificent creation. It is the latter that we will consider in this treatise.

HISTORY OF GENETIC ENGINEERING

As aforementioned God has privileged us in that He has granted us the technology that allows us to know some of the intricacies of our makeup (genetic). We will consider the science in which this information is researched, beginning with fundamental definitions of some key words associated with the field. Firstly, a gene is a basic unit of heredity found in the cells of all living organisms, from bacteria to humans. Genes determine the physical characteristics that an organism inherits, such as the shape of a tree's leaves, the markings on a cats fur, and the color of a human hair. Having in mind that the gene is what determines who we are physically, let us go on to give a synopsis of

the history of genetics (the study of genes).

> In the mid-19th century a scientist and monk named Gregor Mendol conducted a series of experiments on ordinary garden peas. In his experiments Mendel observed that desirable characteristics in peas could be encouraged through cross-breeding and passed on to later generations of plants. From these experiments Mendel formulated his theory of genetics, and from this simple beginning the modern-day science of genetics has evolved.[1]

In 1902 Theodore Boveri and W.S Sutton discovered that the nucleus contains the genes. In 1928 F. Griffith, a British bacteriologist began a study of the transmission of traits in bacteria. In 1935 Erwin Chargoff, father of Molecular Biology, a biochemist discovered the composition of DNA It was in 1940 that M. Wilkins and R. Franklin used X-ray Chrystallography to produce images of DNA. In 1953 James Watson and Francis Crick discovered the double helix model of DNA. As the science was advancing and ethical issues being raised, it was from 1980-90 that President Reagan and Bush placed restrictions on the research to clone human beings. In 1990 the Genome Project began. It was a fifteen year project coordinated by the U.S. Department of Energy and the National Institutes of health to: 1) Identify all the estimated 80,000 genes in human DNA, 2) Determine the sequences of the 3 billion chemical bases that make up the human DNA, store this information in databases, and develop tools for data analysis. By 1998 four percent of the project was complete. Most of the early years of genetics was focused on the selective breeding of cattle, and other areas wherein humans were not directly impacted. As the science progressed, the betterment of human existence gained the spotlight . In particular, the are of genetic engineering has become the focus of many in science.

OVERVIEW OF GENETIC ENGINEERING

Genetic engineering by definition, is the alteration of an organism's genetic, or hereditary material to eliminate undesirable characteristics or to produce desirable ones. This definition though accurate in a lexicographical sense, does not cover the full panorama of the science. *Genetic engineering* in its broadest sense can be used to include any form of genetic manipulation, (this is how it will be used in this paper). There are two broad areas in which genetic research is being done. The first involves the modification or alteration of preexisting genetic material,(in humans or animals). The second method focuses on the manipulation or reproduction in human or animals.

GENETIC MODIFICATION

Historically, experiments intended to alter human life began in 1970 when Stanford Rogers, a physician and biochemist, attempted to introduce into his patients a gene for production of the enzyme arginase. The experiment was unsuccessful in that the patients' systems were not capable of producing the enzyme. It was Stanford's hope that in injecting the patients with a virus that produced the enzyme; it would infect their DNA. The host's immune system would destroy the virus, yet leave behind the gene for arginase production. Such was not the case. In July of 1980, a similar but more complex experiment was attempted by Martin Cline. He along with a team of Israeli medical doctors set out to treat a rare but fatal disease known as beta zero thalassaemia. Dr. Cline injected their marrow with a certain gene, in hopes that it would correct the deficiency in the patient's immune system. The experiment failed; genetic manipulation on this scale was deemed by scientist, to be to risky. After this, for some time scientist were unwilling

to endeavor into this untamed field.

Since that time many advances have been made in the field. One source has these comments:

> Gene therapy is now seen by many as having the potential to change the way medicine is practiced. Its uses are tremendously varied and publicity and public perception suggest that gene therapy will soon join the ranks of antibiotics, vaccinations, and organ transplants as the great "scientific" triumphs of Western (allopathic) medicine.

Genetic therapy techniques

Each of us carries about a half dozen defective genes. Most of us remain unaware unless we are amongst the many millions who suffer from a genetic disease. The reason for that is that we each have two copies of each gene, one from the mother and the other from the father. The only exceptions are the male sex chromosomes; males have one X and one Y (the former from the mother and the latter from the father). In most cases one gene is sufficient to avoid all the symptoms of disease unless the infected gene is dominant or if their are two recessive genes. Genetic engineers have developed an experimental treatment for the purpose of curing some 4,000 known genetic disorders, most of which have no effective therapy.

The original aim of ***Genetic therapy*** was to substitute a healthy gene for a defective one, or to repair a faulty one, thereby eliminating the disease. With the progression of technology a new feature has been added. It is an experimental medical treatment that *manipulates* a gene or genes within cells in order to produce proteins that *change* the function of those cells. There are two of genetic therapy techniques, somatic-cell therapy and germ-line therapy. ***Somatic-cell therapy*** is a technique in which

surgeons attempt to fix genetic malfunctions in somatic (body) cells, which include all the cells of the body, excluding sperm cells and egg cells.. This type of gene therapy is the only one that has been performed on humans. There has only been one truly successful trial using somatic-cell therapy-in April 2000. Scientist treated two female infants with human severe combined immunodeficiency disease (SCID), a deadly inherited disease that impairs the immune system. Genetic alterations to somatic cells are restricted to the person being treated and cannot be passed on to his or her offspring. Secondly there is ***germ-line therapy***, where genetic alterations are made to germ cells, such as sperm and eggs, in order to treat inherited disease. Germ-line therapy is highly controversial because such changes would alter the genetic endowment of the unborn and could be passed on to future generations (being that it deals with reproductive material). Consequently, it has not as of yet, been performed on humans.

Gene splicing

In humans gene splicing or recombinant DNA is the process that forms the basis of gene therapy. With it scientist directly alter genetic material. Genes consist of segments of the molecule DNA. In recombinant DNA, one or more genes of an organism are introduced to a second organism. If the second organism incorporates the new DNA into its own genetic material, recombined DNA results. Specific genes direct an organism's characteristics through the formations of proteins such as enzymes and hormones. Proteins perform vital functions-for example, enzymes initiate many of the chemical reactions that take place within an organism, and hormones regulate various

processes, such as growth, metabolism, and reproduction. The introduction of new genes into an organism using recombinant DNA technology essentially alters the characteristics of the organism by changing its protein makeup.

Recombinant DNA techniques have transformed genetic engineering in plant and animal food production, industry, and medicine. In most, cases the DNA cannot be transferred directly from its original host to the recipient. Rather, the donor DNA must be cut and recombined with a matching fragment of DNA from a vector- that is, an organism that can carry the donor DNA into the host (usually a harmless bacterium). This host or bacterium serves as a factory where the recombinant DNA can be cloned in large quantities. The proteins are removed from the host, purified, and used as a genetically engineered product in humans, other animals, plants, bacteria, or viruses. The donor can be directly introduced into an organism by techniques such as injection through cell walls of plants or into the fertilized egg of an animal. Plants and animals that develop from a cell into which DNA has been introduced are called transgenic organisms.

What the Bible says:

Genetic therapy and gene splicing, upon further research, and reduced risk factors can become a very viable means of reducing genetic disease. They are not in and of themselves evil; but can become instrumentally so depending on the motives of those in the field. On the one had they can be very beneficial to those who have genetic defects. On the other they could promote the self-god mentality that has become so prevalent in our society.

In my research it seems that the majority of scientist involved with these

techniques are involved due to a deep concern and respect for human life. This is honorable and the Bible is not in opposition to it so long as human life is respected.

Engineering in Reproductive technologies

The other type of genetic research relating to both animals and humans centers on procreation. This technology has been used successfully on animals for several years and is now offered to humans. There are four points at which genetic engineering effects reproduction and they are as follows: 1) before conception, 2)at conception, 3) prenatally, 4) postnatally.

Engineering before conception

Prior to conception, there are three main areas involved in human reproductive technology: 1) contraception; 2) sterilization; 3) genetic counseling. Of those mentioned, the first two are beyond the focus of this discussion in that they both pertain to birth control; natural or artificial. Genetic counseling falls within the purview of this paper in that it could potentially alter the hereditary makeup of an organism.

Genetic counseling is a medical specialty that helps parents and prospective parents evaluate and cope with their risk of passing hereditary disorders to their children. It is not exclusive to reproductive technologies in that it also helps individuals assess the possibility that they will get a medical condition known or suspected to have a genetic basis, such as Huntington's disease, breast canser, or Alzheimer's disease. For the purpose of this discussion it will be referred to exclusively in light of its use in the area of procreation.

It is estimated that one infant in every one hundred in the United States is born with a disorder caused by an alteration in one or more of the estimated 80,000 genes. The severity of the conditions varies from mild conditions such as color blindness to serious diseases such as Duchenne muscular dystrophy and Tay-Sachs disease. The counseling process is conducted in most cases by a team of health experts at a medical center; most of whom are genetic counselors. The team may also include nurses, social workers, and psychologists who have specialized skills in patient education and public health. Their goal is to translate up-to-date genetic knowledge into practical, useful information. For people who may be at risk, counseling can play an important factor in their family planning process.

Some diseases can be detected through ***genetic screening***. Many have been, some examples include Tay-Sachs disease (which causes babies to go blind and die); sickle-cell anemia (a fatal blood disease); phenylketonuria (a disease in newborn infants who lack the ability to break down phenylalanine); and many others. ***Genetic screening*** pinpoints specific diseases in the human genome and allows genetic engineers to determine specifically what gene or genes need to be corrected. It is done by taking a taking a sample of DNA from the individual and analyzing it for genetic defects. There are different procedures used in the screening process; amniocentesis, Chronic Villus Sampling (CVS), Periumbilical blood sampling, Fetal skin biopsy, and others, all with the common goal of detecting genetic disease before birth.

These scientific advances can potentially do a great deal of good. It could give prospective parents much needed information about their genetic disposition as they plan

their families. The Bible does not teach that we must have children. In cases where at least one in a couple has a genetic defect that could be passed on to his/her children it might be best to not have children. The Bible does teach that "*love does not seek its own*" *(ICor. 13:5).* That being so one might forego their rights to have children out of love.

Engineering at conception

Genetic engineering at conception usually includes; 1)cloning; 2) artificial insemination; and 3) *in vitro* fertilization (IVF). We will examine each of these in some detail.

Cloning

The English word "clone" derives from the Greek klon, meaning a sprout or twig, and in science refers to an asexual process of reproduction resulting in an exact duplicate of the original. Cloning occurs naturally for many of Earth's life forms. For example, when the amoeba reproduces by splitting into two parts, it is cloning itself. In essence, then, cloning is a way to grow many identical cells or organisms from a single ancestor. However, most plants and animals reproduce sexually, which means that the process requires a gene from both the male and female of the species. Therefore, any attempt to clone such organisms, including humans, must involve sophisticated technology.

In theory, the idea of cloning is simple. An unfertilized egg is removed from the female, and its nucleus is destroyed (often by radiation), leaving only the cytoplasm. The nucleus from a body cell is implanted in the egg cell. The renucleated egg, implanted in the uterus, behaves like a fertilized egg, except that all of its genetic information comes from one individual.

One might entertain the question, "Why clone?" Why interrupt nature's course? Cloning has great potentials if handled properly. There could be great agricultural advantages. If a farmer had a certain bull or bulls that produced better grades of offspring, he would be able to produce more like them by the process of cloning.

In science it could prove very helpful in that it could allow scientist more insight into cell differentiation and reproduction. Using the information gleaned from the study of the cell during cloning, scientist believe that they can learn more about why cancer cells grow out of control, or why birth defects occur. It could be used in the study of cancer and in the study of the aging process. It is readily apparent that cloning could prove tremendously valuable in the betterment of human life.

Animal (mammal) cloning

Dr. Ian Wilmut is the famous Scottish researcher and leader of the Roslyn Institute team that announced cloning Dolly the sheep in 1997. Dolly was the first cloned mammal, the animal group that includes humans. Dolly ignited the world-wide debate about cloning of people. Since her birth Dr. Wilmut, seeing all of the imperfections associated with the process of animal cloning has forsaken efforts to clone any more live animals. "We are seeing a great range of abnormalities," Dr. Wilmut told the academy workshop in a status report on animal cloning. "We should expect a similar outcome if people attempt to produce a cloned human." Instead of cloning, Dr Wilmut is now working on ways to make cloning more efficient and effective. Dr. Wilbut said that the experience with those animals shows that tremendous hurdles must be overcome before a human can be cloned for reproduction with any reasonable degree of safety.

Are humans next?

The questions now on the minds of many is, "What about human cloning?" Landrum Shettles reported in the *American Journal of Obstetrics and Gynecology* that he had personally cloned human embryos to the blastocyst stage (see Clark, 1979, p99). As one writer summarized the experiment:

> According to the report, he had removed the genetic material from a human egg cell and replaced it with the nucleus of a human spermatogonium, the precursor of the sperm cell. Because the spermatogonium contains a double set of chromosomes, it is a complete blueprint for the individual. The egg was fertilized, cell division began, and three days later the embryo was at the morula stage, its cluster cells ready for implantation. If the paper was true, then it meant that the first glimmering of a human being had already been cloned (Kahn, 1998, p. 164).

Most scientist are convinced that ***"the paper"*** was not true. Skettles never presented evidence that the egg was enucleated. Though Skettles' supposed experiment was a hoax, it does represent a certain mentality held by some, called in the scientific community, the "technological imperative"- whatever can be should be done! We do not at this time have the technological capabilities to clone human beings. But as we speak research is under way to negate that truth.

The dilemma

In Dr. Wilmut's experiment, in which he cloned "Dolly" he realized that the cons far outweighed the pros. One problem is the waste of embryos, which in animal cloning would prove very expensive. In human cloning it would prove expensive as well as sinful (to be discussed later). Dr. Wilmut in reporting on his experiment with Dolly,

stated that we should find the same problems in human cloning, as those found in animal cloning. Wilmut's report spelled out the waste of embryos and high death rates for cloned offspring. He reported that in:

> Mice, an average of 43 embryos must be transferred to produce each live birth. About 18 percent of offspring died.
>
> Cows, 10 embryos were needed for each living offspring, and 37 percent of the offspring died.
>
> Sheep, 12 embryos were transferred to get one live birth, and 27 percent of the offspring died. Dolly, by the way, was the only live birth produced with 434 nuclear transfer procedures.
>
> Goats, 27 embryos were needed for each live birth, with the death among the offspring almost 40 percent.
>
> Pigs, 127 embryo transfers were made to get a live birth, but all the offspring survived.

As mentioned earlier Dr Wilmut as well as other cloning experts say that the same defects found in animals would likely be found in human clones. One for instance, is the so-called "large offspring syndrome," which raises questions about health risks to women pregnant with a cloned fetus. In the syndrome, the cloned fetus grows to dimensions several times larger than a conventional fetus. Dr. Rudolf Jaenisch, a cloning expert at the Massachusetts Institute of Technology, thinks the overgrowth occurs because certain genes are not regulated properly in the cloned fetus. Many cloned animals also have problems with their lungs, disorders of the heart and blood vessels, immune system, bones, brain and kidneys. Also one problem that could exist in human clones is that of improperly regulated genes. This would not detected by screening, since the defect does not involve a chromosomal abnormality or mutated genes.

Aside from all of the ethical questions associated with the safety of cloning humans. It must be noted that it is unethical in that it defies God's intention for procreation. I Timothy 5:14 shows that marriage was a prerequisite to having children. Genesis 4:2 mentions that Adam "knew" his ***wife***, prior to having a child. It must be inferred from that text, (and others) that the marriage had everything to do with the childbirth in that without the marriage it would have been illegal for Adam to "know" his wife. Jack Evans correctly observed that God's

> ...spiritual law says the oneness of the flesh can be approved only by Him in the marriage of the male who are producing another part of their flesh (Heb.13:4; I Cor. 6:16; 7:1-5). Thus, the Bible teaches that the male and female producing the offspring of the one flesh, according to spiritual law, must be married to each other. ... It is obvious that the female bearing children. Thus, if the female bearing the child is not married to-is not one flesh with-the male in the reproduction process, they violate God's spiritual law.

God's plan for procreation is to be done within the family relationship. Anything that attempts to nullify His design is itself "wicked"

Artificial Insemination:

Artificial Insemination, commonly referred to by its acronym AI, is a somewhat general term with sub-processess. Couples usually opt for AI due to the infertility or subfertility of the husband. It is not a tomorrows term; but is very much today. It is, as a popular science magazine put it, "one answer to childlessness"(Stossel, 1980). As mentioned there are various types of AI.

AIH the designation given to artificial insemination performed using only the husband's sperm.

AID the designation given to artificial insemination performed using only donor

sperm.

AIDH the designation given to artificial insemination performed using sperm from both husband and donor.

It is important for one to remain open minded in this area because artificial insemination in and of itself is not sinful, being that it can be done exclusively between husband and wife. A hypothetical instance would be one in which there was a low sperm count; the sperm was collected, frozen, thawed, centrifuged, and inserted into the wife's womb. The result, if conception took place, is a child formed from the sperm and egg of his/her biological parents. Christians can support such in that all that science has done is aided in reproductive process,(not circumvented it). There are not biblical injunctions against such a process.

Contrary to the aforementioned, artificial insemination which involves the sperm of a donor exclusively or in conjunction with that of the husband cannot be endorsed by the faithful Christian. It threatens to destroy the God ordained biological basis for the human family and parenthood. Children are in many was looked upon as merchandise and not as gifts (Psalm 127:3). In Gen. 4:1, the Bible sets forth as a binding example, the mating, thus reproductive process. Adam "knew" Eve, his wife. It was Adam's semen. It was Eve's egg. The two met in intercourse, and Eve conceived. Notice her response: "I have received a man from the **Lord**." Adam and Eve repeated the process and the outcome was the same. (Gen. 4:2). Science can be helpful in assisting a husband and wife in reproduction, but it is contrary to Biblical teaching to substitute or integrate the husband's semen with that of a donor.

In Vitro fertilization:

In Vitro Fertilization (IVF)- a Latin term meaning- "in glass" is an assisted reproductive technology (ART) in which one or more eggs are fertilized outside a female's body. This technique has been used extensively in animal embryological research for decades, but only since 1978 has it been successfully applied to human reproduction. In human reproduction the process involves stimulation of the growth of multiple eggs by the daily injection of hormone medications (although possible to do it without the hormones). The eggs are recovered by one of tow methods: sonographic egg recovery, the more common of the two, which uses ultrasound guidance to retrieve the eggs, or oocytes; or laparascopic egg recovery, in which retrieval is made through a small incision in the abdomen.

Once the eggs are retrieved, they are placed in a special fluid medium, then semen that has been washed and incubated is placed with the eggs and left for approximately 18 hours. The eggs are removed, passed into a special growth medium, and the examined about 40 hours later. If the eggs have been fertilized and developed normally, the embryos are transferred to the woman's (or a surrogate's) uterus. Typically, multiple embryos are transferred to increase the likelihood of pregnancy. If more than four eggs develop into embryos, the donor may have the option of cryopreserving the remaining embryos for thawing and replacement in a later IVF cycle. (Cryopreservation is used to minimize the risk of multiple gestations [twins, triplets, etc.] if more than four embryos are replaced). Following egg transfer, progesterone injections may be administered daily to the recipient. The probability of viable pregnancy is approximately twenty percent

with one IVF cycle.

Paul says in I Cor.6:19-20 that as Christians our bodies are temples of the Holy Spirit. That being the case we cannot do things with these bodies that are against God's will. We have been bought with a price, and the price tag was high. Yet Jesus was able to pay. In the eyes of God one baby living out a possible four or five are not good odds. Being instrumental in the murder of those babies is wicked. God grants life,(Acts 17:25, Gen. 2:7) and man does not have the right to shed innocent blood, (Prov.6:16-17). This is not an easy subject in that the desire to have children for women is an emotional subject. We must not allow our emotions to have us make decisions with potential eternal consequences.

Prenatally (Abortion)

Prenatal manipulation is becoming increasingly popular. This is due to a diagnostic procedure called amniocentesis, in which a needle attached to a syringe is inserted through the abdominal wall of the pregnant woman in order to collect approximately 200 cc of amniotic fluid (the liquid surrounding the baby). The process is relatively painless, and provides fluid that can be inspected for fetal cells. Normally, however there are too few fetal cells in the fluid to examine directly, so the cells are collected and grown for approximately three weeks. Afterwards the cells can be analyzed for genetic defects. With this procedure, physicians can diagnose more than seventy disorders such as Tay-Sachs disease, Down's syndrome, Turner's syndrome, Klinefelter's syndrome, galactosemia, and others. The sex of the fetus can also be determined.

This procedure is in and of itself is neither "good" nor "bad." The usage of it will

determine its nature. For instance, parents can use this technology as a means of diagnosing or treating a defect. Perhaps knowledge of a deficiency could give the parents extra time needed to cope with a certain deficiency before the baby is brought into the world. In these cases the technology could prove very helpful.

On the other hand the parents could use this procedure in a way that would be unethical thus sinful. Parents might use this screening process to determine whether to abort the child if it is defective. Norman Gant, chairman of obstetrics and gynecology at the Health Science Center of the University of Texas, explains: "We are able to give our parents information on which to base real choices about continuing or terminating a pregnancy, and it is very reassuring to them during the remainder of their pregnancies" (1980, p.33). Dr. Gant's point is that with this procedure you can determine whether you want to allow the baby to live or not.

As mentioned, if parents desire to perform amniocentesis in order to aid them in knowing how to care for the infant when born, or to give them time to gain the proper perspective on dealing with a "defected" child the Bible is not in opposition. If they use the procedure to determine whether to abort the child or not it is unethical. God feels very strongly about the matter. Notice the words of the writer of Proverbs: "*There are six things which Jehovah hateth; Yea, seven which are an abomination unto Him; haughty eyes, a lying tongue, and hands that shed innocent blood.*" *(Prov.6:16-17).* The Psalmist captures the essence of one who would destroy the innocent; *"He sits in the lurking places of the villages; In the secret places he murders the innocent; His eyes are secretly fixed on the helpless. He lies in wait secretly, as a lion in his den; He lies in wait to catch*

the poor; He catches the poor when he draws him into his net." (Psalm 10:8-9). As the Psalm progresses the writer is confident that God will render justice to those who have oppressed the helpless: "*Lord, You have heard the desire of the humble.....To do justice to the fatherless and the oppressed, That the man of the earth may oppress no more.* There will come a time when God will render to everyone according to their deeds, to those unrepentant persons who have shed innocent blood he will recompense.

Postnatal Manipulation

There are instances in which amniocentesis was incorrect in its diagnosis, and a defected child is born. Perhaps the procedure was not used and the proverbial dice fell on snake eyes (excuse the analogy). Whatever the case, a less than perfect child was born and it is left to the parents as to what should be done. Many opt for what has been termed "passive treatment" Beyond this soft sounding appellation there is a hard and cold heart that places an innocent child in a cold, dark room on a stainless steel table, and allow it to die from exposure. Joan Hodgman, of the University of California School of Medicine, admitted: "If we have a baby that I know is malformed beyond hope, I make no attempt to preserve life" (as quoted in Lygre, 1979, p.66). There are many such cases. Cases in which man was allowed to determine the worth of human life. Richard McCormick of the Kennedy Center for the Study of Reproduction and Bioethics at Georgetown University has suggested: "Life is a value to be preserved only insofar as it contains some potentiality for human relationships" (1974).

What word should be used to describe a person who does not want to be inconvenienced by a child who is less than what society would call "perfect," even though they went through with the acts necessary to form the child. The word is "SELFISH." Many who make these decisions are cowards and hide behind the familiar "I'm doing it for the child" facade. In reality they do not want the burden.

The child of God must have a different perspective on the matter. Firstly, who has the right to judge a child worthy of death or life other than God. The Bible teaches that God made man a living soul (Gen. 2:7). Who other than God has the right to deem one fit to live, based on appearance or health. In I Sam. 16:7 the Bible says:

> But Jehovah said to Samuel, Look not on his countenance, or on the height of his stature; because I have rejected him; for Jehovah seeth not as man looketh, man looketh on the outward appearance, but Jehovah looketh on the heart.

One of the strongest commands given in New and Old Testaments is the command for those who were able to care for those who were in need and defenseless. Note passages such as James 1:27; Isaiah 1:11,23; Romans 15:1; Leviticus 19:32; Psalm 71:9. We would do well to take heed to these commands especially in areas where the very lives of infants is based upon our adherence to them.

CONCLUSION

Rarely is a science unethical in itself. It needs help to become evil. Two implications are to be drawn from the prior statements. If the science is not evil, and can only become evil with assistance, it follows that as Christians we have the responsibility to "not" assist in areas that could be potentially sinful. It would be helpful for the

Christian to remember the words of Paul as he vehemently proclaimed them from Mars Hill that: *"**He** gives to all life, breath, and all things." (Acts 17:25b).* The realization that our lives, as well as everything else are sustained by God, (Heb.1:3, Col.1:17) should ground us, and give us the perspective that we need in making ethical decisions.

Science can prove very beneficial, in curing genetic defects, producing vaccines against chronic illnesses and in many other areas. As Christians we rejoice in that. But the same science that is helpful in certain areas is sometimes used sinfully in others. The killing of innocent children, the possibility of making perfect babies through genetic alteration, to mention a few can not be upheld by faithful brethren. The words of Paul are certainly applicable in this case: *"Test all things; hold fast what is good." (I Thess. 5:21).*

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