Human Cloning: Scientific, Ethical and Jewish Perspectives

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A. Factual Background

During the last decade, cloning of animals has been carried out using the following method: the egg from a cow (or other female animal) is fertilized in a test tube with a sperm cell of a bull (or other male animal). The fertilized egg is allowed to undergo a number of divisions; the daughter cells are then physically separated and each is left to divide again. In this way we obtain a number of genetically identical embryos, all of which have their source in the original fertilized egg. These embryos are implanted in the uteri of several cows, which later give birth to genetically identical calves. In effect, this is an artificial means of producing identical twins in large numbers. By means of this method we are able to generate cows or bulls with the particular characteristics which we desire – rich milk, good quality meat, etc.

On 2 February 1997, a fundamental revolution took place in the study of embryology as we know it. On that date, Dr. Ian Wilmut and his colleagues at the Roslin Institute in Scotland announced the birth of a lamb named Dolly through the cloning of a mature regular cell (not a gamete) by means of implanting its nucleus – containing the genetic material – into an egg, the nucleus of which had been removed.

In order to understand this scientific innovation let us first clarify the following information: male and female gametes (those cells responsible for reproduction, i.e., sperm and ova) each contain half of the DNA complement, which in humans consists of 23 chromosomes. They unite to create a cell containing the full DNA complement, e.g., 46 chromosomes in humans, which represent a mixture of genetic characteristics of the male and female. The DNA
is found in the part of the cell known as the nucleus. (A smaller amount of DNA is found in the mitochondria, which is outside of the nucleus. This DNA comes exclusively from the female; there is no contribution by the male.)

Classical embryology has taught us that each original embryonic cell can develop into a complete organism. In other words, each of the original embryonic cells can potentially become any of the two hundred or so types of cells which make up the body’s various organs and tissues (e.g., the heart, liver, nerves, blood, skin, etc.), Therefore the agricultural method of cloning by means of a fertilized egg did not represent a substantial innovation.

According to the same classical concept of embryology, which was prevalent until just a few months ago, we also believed that once a cell had undergone differentiation and specialization and attained its final form, it lost all the other original characteristics which would allow it to become a different type of cell. In other words, in a process which we had yet to clarify, as a cell matures most of its genetic channels are blocked and sealed off, and only those few channels which relate to its special functioning remain active. It used to be assumed that this process was final and irreversible, and that a mature cell can never assume the specialized qualities of any other type of cell but rather continues to operate exclusively within the framework of its own specific “specialization.”

For this reason the phenomenon of Dolly the Lamb represents a real revolution in this area of scientific thought. The scientists in this case succeeded in taking a mature cell, which had already attained its final differentiation, and reactivating within it the fundamental characteristics of an embryonic cell with the ability to develop into a complete organism. These scientists took a cell from the udder of a six-year-old ewe. This was not a gamete but rather a mature cell which had already become specialized. Aided by the development of a special technology the scientists halted the cell’s activity at precisely the point where all the genes are capable of accepting the appropriate command for primary development, like an embryonic cell. Thereafter they took an egg from a different ewe, extracted its nucleus, and inserted the nucleus of the udder cell. This was done with the knowledge that the special internal environment of the egg contains special proteins which activate all the potential genes towards developing into an entire organism. An
electric shock started the process of division and the creation of the embryo from the egg. Following a number of divisions under laboratory conditions, the scientists implanted the fertilized blastula into the uterus of a surrogate ewe which carried the fetus and after six months gave birth to the first lamb ever created from a mature cell rather than a gamete.

It should be noted that the success rate for this procedure was low – out of 227 eggs thus fertilized only thirty commenced the first stages of division, and out of these only nine fertilized eggs caused pregnancy in a surrogate ewe. Only one of these fetuses – Dolly – reached the stage of birth. It should further be noted that we do not yet know whether Dolly is a completely healthy lamb, without any defects, and we do not know how long she will survive. But we may assume that with time the scientists will perfect this technique and increase their success rate, thus facilitating the creation of healthy and whole animals and human beings, as is the situation today with the use of in-vitro fertilization (IVF).

At such an early stage of the debate regarding this futuristic technology we cannot predict all its positive and – especially – negative ramifications. However, for the sake of the debate, we may theoretically enumerate some of the positive and negative possibilities.

1. Potential Medical Benefits

The ability to renew the functioning of damaged cells, or the replacement of dead cells with others which have been cloned using these techniques. As an example, this could represent a breakthrough for patients suffering from Parkinson’s or Alzheimer’s disease, with damage to certain specialized brain cells. Of course, for the attainment of this goal we do not require human cloning; we require only the knowledge that this technology will provide.

The ability to halt the uncontrolled reproduction of cancerous cells, and thus to cure malignancies. Here, too, we do not require the actual cloning of human beings; we need the knowledge that is to be attained from the process.

The possibility of creating people with similar immune systems, such that they could serve as organ donors for each other, or the ability to clone animals with suitable characteristics for use as organ donors.
A solution for childless couples whose problems cannot be alleviated using other modern fertility methods.

2. Potential Drawbacks and Problems

The development of eugenic techniques to duplicate people with special characteristics (intellectual genius, exceptional strength, beauty, etc.), or the wish of evil dictators such as Hitler, Gaddafi or Saddam Hussein to replicate themselves.

The creation of large groups of people who are identical not only in their external appearance but also in their human characteristics, such that the individuality of each person is eradicated. This would lead us to lose the basic respect which we feel for people specifically because each person is different and unique. In addition, such a situation could exert a profoundly negative psychological influence on the identical cloned products.

The absence of any genetic variation between the clones, which would cause genetic weakness and could cause them to have a higher morbidity and mortality rate than organisms created through a mixture of male and female genetic material.

The use of mature cells with renewed potential to develop into a complete organism including within them the undesirable changes which the cell has undergone in the past, such that these genetic characteristics would be passed on to the next generation. This is not the case with original gametes, which have never undergone any changes.

The threat of a “black market” for fetuses created from people with “positive” characteristics – outstanding intelligence, strength, beauty, etc. – thus creating an industry of fetuses which would be sold to potential parents desiring such children.

Difficulty in defining fatherhood and motherhood, and radical changes in the social concept of parenthood.

One of the most serious worries is the potential change in the world social order, with the creation of a human being coming about without any need for an intimate relationship, without love, in a cold and mechanical manner and without identifiable parents.

It should be noted that even under cloning conditions such as in the example of Dolly the Lamb, the products are not completely identical. A person is composed of more than just his genetic material; his environment exerts a real and tangible influence on his development – particularly on his emotional development – and on
his personal characteristics, including his will, his emotions, his moral values, etc. Moreover, many years pass between the original formation of the clone and its maturity, and during this time significant changes can take place in both its own development and that of its environment. Even on the genetic-physical level, many changes take place due to environmental influences. There may be some genetic tendencies which are suppressed by the environment, while other genetic potentials may be realized only under certain environmental conditions. Thus it is the interaction between genetic characteristics and tendencies and the influence of the environment, on both the physical and the human-psychological levels, which ultimately determines the essence of the individual.

B. Basic Assumptions
1. The history of scientific development has shown that it is impossible to halt technological development in the long term. Even ethical, social, religious and other considerations have not prevented scientific-technological developments in the past. Moreover there are some very powerful lobbies with vested interests (including the scientific communities in the relevant field and, more importantly, the economic-industrial groups which develop technological and medical products) who will undoubtedly ensure that technological development goes ahead because this industry promises an economic potential of several billion dollars.

2. Our world is one global village, and any scientific discovery made in one place sooner or later spreads to every country in the world. Therefore it is useless to impose local or national prohibitions or limitations because the halting of technological development in one country will not prevent its progress elsewhere. An example of this is the development of IVF: the US placed a moratorium on research and development in this area, and the technology was simply developed in other countries, such as England and Australia.

3. Science and technology are, in themselves, morally neutral. The deciding factor from the moral and social points of view is how they are used. Indeed, almost all scientific and technological developments contain both positive and
negative possibilities. It is reasonable to assume that there may be certain benefits to cloning humans, just as it is reasonable to assume that there will be serious obstacles and problems arising from this technology. (See above in section A: Factual Background).

Conclusions
1. We must proceed from the assumption that, sooner or later, the technology for human cloning will develop.
2. We must proceed from the assumption that this technology has the potential to endanger the human social order on the same scale as uncontrolled nuclear energy or ecological destruction in the absence of proper supervision.
3. In light of the above assumptions it would seem better policy to allow this area of technology to progress in a very controlled and careful manner and to adopt strict regulations and limitations from the start than to issue a comprehensive and complete ban on any and all development.

Supervision and limitations imposed by individual countries will not achieve the desired effect unless they receive wide international support. In this area we must follow the example set by the approach towards nuclear energy and environmental problems.

C. The Ethical Approach
There are those who are strongly opposed to the idea of human cloning, perceiving it as an essentially evil and morally unjustified intrusion into human existence. They are particularly concerned about the eugenic element of the technique and exploitation of human beings by treating some of them as a means rather than as ends in themselves.

On the other hand there are others who weigh the ethical aspect against the results that this technology will bring to the individual and to society. If some positive results can be proven, then there is room for a favorable view of this process based on its positive objectives.
D. The Halachic Approach

In general, the Jewish viewpoint concerning scientific or social innovations with no clear indication of where they will lead is conservative and careful. For this reason we need to proceed with extreme caution and accept scientific and technological innovations slowly and gradually. On the other hand, in principle anything which is not prohibited is permitted. “Anything which we have no reason to prohibit is permitted without having to find a reason for its permissibility, for the Torah does not mention every permissible thing but rather only those things which are forbidden.” The question we face, with regard to the technology of human cloning, is whether the actual process or its results transgress any general philosophical principle or any specific law.

1. Does the development of human cloning techniques contradict faith in the Creator of the Universe?

There can be no doubt that the answer to this question is negative. This technique, like other modern fertility methods, simply reveals data which exists within nature, and makes use of information about what already exists. Under no circumstances can a clone be regarded as the formation of an entirely new creation. Even human cloning technology ultimately brings about the creation of human beings through natural pregnancy and birth; only the technical means of commencing the formation of the embryo is different from the natural process. In a similar way, today we are able to bring about a natural pregnancy and birth by means of other modern fertility methods such as IVF, where the beginning of the formation of the embryo is also different from the natural process. In other words, we are speaking of the creation of human beings from something which already exists, in a process which is different from the usual procedure only in technique and not in essence. Only the Creator of the Universe is capable of creation ex nihilo. Moreover, this technology holds no solution to the riddle of life and its basic essence.

2. Should the technology of human cloning be prohibited in principle on halachic-philosophical grounds because it represents undesirable interference in nature?
In principle the answer is no, although some of the details of
how this technique is carried out may give rise to situations which
we would regard as negative and undesirable interference in nature.

According to the Jewish view, we are not only permitted but in
fact obligated to build and perfect the world in every way we can for
human benefit. Actions aimed at improving the world should not be
perceived in principle as contradicting a divine decree and as
constituting negative involvement in creation. On the contrary, such
actions are considered to embody positive partnership between the
Almighty and humans.

This idea finds expression in several forms from the time of the
Talmudic Sages up until great modern Jewish thinkers. The Talmud
states, “Rabbi Yishmael taught: The words and he shall surely be
healed (Exodus 21:19) teach us that a doctor is permitted to heal.”
Rashi explains: “Our attitude should not be that God has made him
ill and the doctor is (doing the opposite and) healing him.” This
means that we shouldn’t think that it is God’s will that this person
remain ill and that it is forbidden to heal him.

The Midrash expresses this idea as follows:

Once Rabbi Yishmael and Rabbi Akiva were
walking in the streets of Jerusalem, and another person
was with them. A certain man who was ill approached
them and said, “My masters, tell me, how can I become
healed?”

They said to him, “Do such and such and you will be
healed.”

He asked, “But who struck me (with this illness)?”

They replied, “It was God.”

He said, “Then are you not involving yourselves in
something which is not your business? After all, God
struck me with this illness, and now you are healing me.
Are you not contradicting His will?”

They asked him, “What is your occupation?”

He answered, “I am a laborer of the soil. See, I am
carrying my scythe.”

They asked him, “Who created the vine?”

He answered, “God.”
They said, “Are you then not involving yourself in something which is not your business? God created it, and you cut down its fruit!”

He said to them, “Do you not see the scythe in my hand? Were it not for my ploughing and cutting down and fertilizing and weeding, nothing would grow!”

They answered, “Foolish man! By virtue of the nature of your work you should know what is written: ‘Man’s days are like the harvest’ (Psalm 103). Just as a plant in ground that is not weeded and fertilized and ploughed cannot grow, and if it grows but has no water and is not fertilized it cannot live and it will die – so it is with the body. The ‘fertilizer’ in this case is the drugs and medicines, and the ‘farmer’ here is the doctor.”

He said to them, “Please (forgive me and) do not punish me.”

The same idea is also to be found among the early commentators. Ramban, for instance, comments on the command given to Adam to “conquer (the earth)” as follows: “and conquer it – God gave man power and control on earth to do as he wishes with the animals and insects and everything which crawls on the earth, and to build, to uproot what is planted, to quarry copper from the mountains, etc.”

However, although in principle we are permitted to interfere in nature, as explained above, such permission depends on three necessary preconditions: 1) The actual act of “perfecting of the world” must not involve any halachic prohibition; 2) The act must lead to no unavoidable or irreversible result which is prohibited; 3) The act of improvement must bring benefit to human beings, or at least a measure of benefit which exceeds the damage caused.

This idea is expressed in different ways by various Jewish philosophers. Some explain the prohibition of witchcraft as being based on the fact that it brings about a change in nature: “For at the beginning of time the Holy One, Blessed be He, gave each and every creation its nature to act well and properly for the benefit of man whom He created, and He commanded each creation to act in its proper way... And in the act of interfering there are aspects which man is not permitted to make use of, for God knows that
ultimately the effect of these aspects on man will be bad, and for this reason He forbade it.”

Similarly, when it comes to the prohibition of crossbreeding animals, we find the following: “For the Holy One, Blessed be He, created His world with wisdom, with insight, with knowledge, etc. And since God knows that everything He creates is perfectly and completely suited to its purpose in the world, He commanded each species to reproduce more of its own kind, as is written in the order of creation, and that the species should not intermingle lest their perfection become lost, and His blessing would no longer be upon them.”

In each of the above examples there is a clear halachic prohibition – the first concerning witchcraft, the second concerning the crossbreeding of two different species of animals – and in both cases the resulting damage is expected to be greater than any benefit. Rabbi Avraham Yitzhak HaKohen Kook expressed this idea as follows:

Nature is highly praiseworthy in its proper place, and when artificiality takes over in place of nature it is spoiled. For this reason many Torah Sages deplore the illnesses and weaknesses which have come about in people because of their distancing themselves from nature. And although the Almighty, Blessed be He, created the world such that we should act, perfect and improve it, man must nevertheless ensure, with extreme caution, that he is truly perfecting nature, which is a gift from God... For man’s ability and conscientiousness is also a Divine gift and a natural phenomenon, but when he destroys and spoils something which nature should do alone... then he does damage to his own soul. For this reason the Torah limited man’s ability to change natural things, and said: “You shall not breed different species among your animals, you shall not sow your fields with different types of seeds together, and a garment of mixed fabric (sha’atnez) shall not be upon you”...all this in order to inculcate in man’s heart the obligation to be careful not to destroy nature where it is better left alone. And this is an important principle for man’s personal morality, for a person should train himself in order to encourage his positive natural tendencies, reminding
him of goodness and righteousness, God’s pleasantness and the love and fear of Him and the destiny which He determines, as a natural characteristic, if a person (will only) make the effort to clear his mind of the manifold vanities which he entertains in order that these positive characteristics be well absorbed in his soul...

Therefore, from the point of view of Jewish philosophy we can say that the use of human cloning technology does not theoretically represent undesirable meddling in nature. Cloning is a natural action (as opposed to witchcraft, for example), and does not give rise to a species which does not already exist, such that it cannot be included under the category of either witchcraft or interbreeding. In this sense, therefore, there is no difference between the technology of human cloning and the use of antibiotics to kill bacteria which cause illness or carrying out organ transplants for patients requiring them, since such actions would also seem to represent interference in “God’s will” – since it was God, after all, who created the illness. And so cloning needs to be evaluated according to the two limiting conditions listed above – whether it brings any form of assistance, healing or other benefit to human beings, and whether the technology itself or its results are free of any actual prohibition. So long as the response to both of these questions is positive, cloning should not be regarded as negative and prohibited interference in nature.

Moreover, even though the prohibition of interbreeding contains the idea of preserving the integrity of the various natural species and the negation of the idea of creating new ones, clearly this is not the only reason for the prohibition, because among the details of the laws involved we find certain examples which do not fit this idea: in sowing two types of seeds together we do not create a new species, and this prohibition in any case does not apply outside of the Land of Israel. Likewise, this prohibition applies only to the seeds of edible species. With regard to trees, the sowing of seeds of different types together is permissible; we are only commanded against grafting of different types. When it comes to sha’atnez – a mixture of linen and wool in our clothing – there is no creation of any new species. Indeed, the Torah commands us: you shall keep My statutes – you shall not interbreed your animals, you shall not sow your field with different types of seeds together, and a
garment of *sha’atnez* shall not be upon you, indicating that all these concepts fall under the category of “statutes” – laws which are “decrees of the King, the reasons for which we cannot understand.” In light of this, it would seem that the prohibition of interbreeding (and thereby creating new species) should not be expanded to include other situations which are halachically different – even if in such cases the possibility of creating new species arises. According to the Rambam, all the laws of interbreeding are related to distancing ourselves from idolatry, rather than being meant to serve as the basis for a prohibition against the creation of new species.

3. **Do the benefits of human cloning technology outweigh the potential damage?**

   We cannot yet provide a definite answer to this question. As is apparent from the factual background above, there are potential advantages as well as possible problems involved. Quite obviously a blanket go-ahead will cause damage that will be much greater than any potential benefit. But proper control and limits on the aims of this technology could bring about a more positive balance.

4. **Does the actual technology of human cloning involve any actual halachic prohibition?**

   From the halachic point of view we can say that there is no specific or defined prohibition involved in the actual technique of human cloning or in the creation of a human being other than by means of sexual intercourse. In reference to the natural means of reproduction the Talmudic Sages taught that there are three partners in the creation of a person: God, the father and the mother. This is clearly the most preferred reproductive method in Jewish thought, and even in a world where cloning takes place most people will still be created by means of this partnership. However, there is no proof that the Sages were stipulating an obligation to procreate in this way; they were merely indicating that this is the regular way of the world. Moreover, in essence their statement still holds true, because even a person who is cloned is formed from genetic material from a man and a woman and a human-spiritual essence bestowed by God. From the halachic point of view there is even a certain measure of leeway for the use of cloning methods for the sake of fertility in preference to other modern methods of
fertility treatment, because here there is no need to collect sperm from the male donor.

There are those who are opposed to cloning on the grounds that it falls under the category of witchcraft, particularly in light of the fact that in the Torah and in the Talmud we find references to witchcraft specifically in the context of the creation of humans and animals using methods which are not natural. We do not believe that there is any basis to this claim. There can be no doubt that according to those *Rishonim* (medieval commentators) who maintained that witchcraft has no substance and that it was forbidden by the Torah only because of the similarities and associations with idolatry, there is no connection between this prohibition and the technology of human cloning. This was the view of the *Rambam*, who believed that “they (such practices) have no existence in reality, and the intelligence cannot accept that they involve anything at all... because all witches and wizards are idolaters... and all these things are lies and falsehood... and it is not worthy that Israel, who are very wise, should follow such nonsense.” Similarly, *Rabbeinu Hananel* states: “For witchcraft has no effect; only that which is ordained by the Almighty, and the reason why one who practices witchcraft is punished is because he has transgressed what the Holy One, Blessed be He, told him not to do.” Clearly, cloning is scientifically analyzed and understood, and it is an existing fact. According to *Rambam* in his Guide for the Perplexed, any phenomenon where the connection between cause and effect can be understood according to the accepted rules of science and which is in accordance with natural logic is not an example of witchcraft. Likewise, things which have been proven by experience, even if not obvious according to natural logic, are also permitted. Even according to the opinion of those *Rishonim* (e.g., *Ramban*, *Rashba*, *Rabbeinu Be-Haye*, *Sefer ha-Hinnukh*, as well as the Vilna Gaon) who believed that witchcraft is real, it would still seem that the prohibition which they discuss does not include the issue at hand. They refer specifically to creations which are used by “angels of destruction,” whose whole purpose is to destroy and ruin. When the intentions are good they cannot be included in the category of witchcraft, as explained in the *Sefer ha-Hinnukh*: “And this is what our Sages, of blessed memory, said as a general rule: ‘Anything which brings some type of healing does not belong to the ways of the Emorite.’ In other words, it should not be forbidden on
the grounds that it constitutes witchcraft since experience has shown that it involves some type of benefit... for these things were prohibited only because of the potential danger which they contain.” Furthermore, processes which are in essence natural do not belong to the category of witchcraft or “practices of the Emorites” – even if in certain details they are carried out in an unusual way. Me’iri ruled as follows: “Anything which is done by means of a natural action is not included in the category of witchcraft. Even if we came to know how to bring about the creation of beautiful people other than by means of sexual union, as the Books of Nature indicate as a possibility, we would be permitted to do so, for anything which is natural is not considered witchcraft. Similarly, our Sages taught: ‘Anything which brings some type of healing is not to be considered as a practice of the Emorites.”’ We can certainly say that the technology of cloning fulfills these requirements, and is in accordance with Me’iri’s definition.

5. What halachic problems are associated with human cloning?

Do the results of this technology create halachically forbidden situations?

The following are a number of halachic problems arising from the use of this technology:

- Does the cloned product fall under the halachic category of a golem, which does not have the full status of a human being, such that he cannot be counted for a minyan and may even be killed without the killer being guilty of murder? The answer is definitely negative since the principal reason that a golem does not have the full status of a human and may be killed is because the Torah says: “He who spills a person’s blood (lit., the blood of a person in a person) will in turn have his blood spilled.” From here we learn that the prohibition of murder applies specifically to a person who is created within another person – i.e., someone who existed as an embryo within a mother’s womb. This is not the case with a golem, who is brought to life by mystical means – e.g., by means of Sefer ha-Yetzirah or by putting a paper with God’s full name written on it into his mouth. In the case of cloning we are dealing with the product of purely natural substances, and the child who is born is in fact first a fetus
in its mother’s womb. Therefore the product of cloning clearly has the same status as any other flesh-and-blood person, since anyone born of a woman is considered a person regardless of how he came into existence. Therefore such issues as the prohibition against murder would apply to him as well.

- Does one by means of this technique fulfill the commandment to “be fruitful and multiply”? The answer to this question depends on a dispute between halachic authorities. Some hold that the mitzvah of reproduction is fulfilled specifically through full and natural sexual relations; others maintain that the mitzvah is concerned not with how the union is carried out but rather with the result – the birth of a living child.

- How are we to define fatherhood in the framework of the cloning process? According to halacha, the person who donates the sperm is the father, whether he is the husband of the woman who carries the embryo or a stranger. However, as yet no halachic definition of fatherhood exists in a case where the male’s is not sperm but rather some other genetic material, such as the nucleus of a mature cell. How are the mother and father to be defined in this process? We may examine this question in light of three different possibilities:

  a) Let us suppose that we take a mature cell from a woman and reactivate its original ability to subdivide and eventually become a complete organism. This cell is then implanted into an ovum from the same woman, with the nucleus removed. We wait for the first subdivision and then return the fertilized egg into the same woman’s womb. In this instance it seems clear that the woman is halachically considered the mother of the embryo, since she contributes the genetic material, carries the fetus, and gives birth to it. However, the identity of the father is more problematic: perhaps this fetus is not considered to have a father at all; perhaps its maternal grandfather is also its father, since the male genetic material comes from him; perhaps the mother is also the “father” in this case, since the source of the embryo is exclusively the woman. The third possibility appears to lie outside of the boundaries of halacha – there is
no precedent for the idea of a woman representing a “father.” Likewise, it seems farfetched to attribute fatherhood to the maternal grandfather, since it was not his sperm which led directly to the creation of the embryo but rather his earlier contribution which led to the mature cell of the embryo’s mother – a cell which has already developed into a whole separate body with a separate identity. Therefore it would seem that in such a case the embryo will not be considered to have any halachic father. And it would appear that this fetus would have the same status as a shetuki (a child who does not know the identity of his father). Halachically, such a person is forbidden to marry a Jewish woman (because since his father’s identity is unknown, any woman may possibly be his half-sister). In truth, our situation is actually different from that of a shetuki because the latter Talmudic definition refers to someone whose father does in fact exist but is unknown, while in our case it seems that there is no actual father according to the halachic definition. Moreover, we could ensure that the cloned product is prohibited from marrying the offspring of anyone who could in any way be considered as one of its “parents,” which is not so in the case of the shetuki because for him any man could be his father, and therefore every potential marriage partner could possibly be his sibling. Therefore it would seem that the cloned individual in our situation would be permitted to marry a Jewish woman in light of the ruling that someone whose status is not precisely defined as a shetuki is permitted to marry a Jewish woman, even though his father’s identity is not known to him. (For example, an orphan who never knew his father is certainly permitted to marry a Jewish woman).

b) A husband contributes the mature cell and his wife contributes the egg. Here, too, it is clear that the woman is the halachic mother, but there is still some doubt as to whether the husband is halachically to be considered the father. Although genetically he certainly is the father, from a halachic point of view it will depend on whether the definition of fatherhood refers specifically to someone who contributes sperm, or whether a father can be someone who contributes any genetic material.
c) The donor of the egg is a married woman and the donor of the mature cell is a Jewish man other than her husband. In this instance we have the added halachic complication of the possibility of $mamzerut$ (a child born of a forbidden union). This question is dealt with at length with regard to artificial insemination by a Jewish man other than the woman’s husband. However, it would seem that even according to those who define the child of such a union a $mamzer$, our situation does not involve sperm from an outside donor but rather complex genetic material. Hence the question here would seem to depend on the definition of fatherhood. If the donor of a mature cell is not considered to be the father then the problem of $mamzerut$ falls away.

E. Summery

1. The technology of human cloning does not involve any diminution of faith in the Creator of the Universe. There is not – nor should there be – any special fundamental religio-ethical problem related to this technological innovation.

2. In principle, this technology does not represent a forbidden interference in nature, on condition that its use is limited specifically to those cases where there is benefit to human beings, and so long as we avoid those halachic problems which could arise from the use of this technology.

3. From the Jewish viewpoint it would be preferable to maintain the existing social order with its nuclear family consisting of an identified father and mother who live together in love and affection and bring forth children in the natural way, thereby fulfilling the commandment to “be fruitful and multiply” according to all interpretations of this law. The spirit of Judaism is not comfortable with fertility techniques which are effected via the combination of different men and women who do not themselves represent organic family nuclei, or with the technology of cloning which involves no sexual union, particularly because of the many problems which such technology can raise.

4. At the same time it should be noted that as far as we can tell from the information available to us today, the process itself does not involve any danger of $mamzerut$, and it is therefore reasonable to assume that it will be possible to find ways of avoiding the halachic obstacles or to solve problems when they
arise. It will be necessary to deal with the consequent halachic questions concerning the definition of fatherhood and motherhood of these human creations, the boundaries of adultery within the framework of this technology, situations where conversion will be necessary, etc. Assuming that in any event these techniques are eventually going to be put into practice, we have to do whatever we can to limit their use exclusively to those cases where such technology represents the only way of improving the situation. We should also ensure close and international supervision of the development and use of this technology in order to prevent the complete breakdown of the existing world social order and in order to prevent socio-halachic problems for generations to come.

5. All the above should be considered merely a collection of preliminary thoughts and suggestions concerning a new and complicated problem, and should certainly not be regarded in any way as a halachic ruling. Obviously it will be up to the Torah giants of our generation to present their opinions on all the above questions and to solve them according to the halachic tradition of which they are the bearers.

F. Practical Suggestions

- At this stage Israel should issue a complete ban on all scientific involvement in human cloning. This comprehensive ban should be limited to a two-year period, with the possibility of its extension, depending on developments during this time.
- We should petition the governments of all Western countries to impose a similar ban in their countries.
- We should petition all governments to establish an international multi-professional commission to examine all the positive and negative aspects of the subject under discussion, insofar as it may be defined and categorized at this point. Moreover, this international commission must be vested with the authority to deal with all the positive and negative aspects of futuristic genetics.
  The tasks of this commission would include the following:
- Recommendations regarding research and development methods for these technologies.
- Recommendations regarding the ways in which such technologies should be applied.
- International supervision of the application and realization of the use of these technologies – similar to the supervision of non-conventional weapons.
- Supervision of the funding for research and application of these technologies.