PSYCHOLOGY, HALAKHAH, AND ORGAN TRANSPLANTATION

The first surgical procedure, as is well known, was that performed by God on Adam. According to the Torah, God “caused unconsciousness to fall upon Adam and he slept”,¹ that is, God administered an anesthetic to Adam, and then performed an operation somewhat akin to a Siamese section. The result of this was the formation of the first male and the first female.

Rashi, consistent with the Talmud, explains that it was necessary for Adam to be asleep during the operation, although God could have undoubtedly formed the male and female of the species painlessly, even with Adam being fully awake. The anesthetic was necessary, says Rashi, so that the new, autonomous reality effected by the surgery—Eve—not be abhorred by Adam.²

It is assumed that had Adam been awake and witnessed the operation, he would have found it distasteful and would have probably rejected Eve. The medical component of the surgery would have been successful, but the psychological component disastrous. To assure the psychological viability of the reality effected by the surgery, Adam was put to sleep.

The first surgery was, in a sense, a unique form of transplantation. It was unique in that Adam was both donor and recipient. This is so irrespective of the divergent views on whether it was a rib-tail or a side that was taken from Adam.³ Either way, a part of original Adam was removed, and that part, or an improved variation thereon, was presented to Adam as his partner in life.

The Torah speaks of God searching for a partner for Adam, with no success; only after this was the surgery performed. The message, perhaps, is that no surgical intervention should be undertaken unless there is no alternative. Without the surgery, Adam’s life was wanting; he had no partner meaningfully to share his life, and no
hope for a posterity. Hence the extraordinary intervention. Additionally, the transplant model of God's surgery teaches the need to protect the psychological well-being of both donor and recipient. Psychological considerations should be taken into account to assure, as much as possible, the viability of the transplant procedure.

There are a significant number of psychological considerations involving the donor, recipient, and family. What follows is a cursory examination of these problems, and possible halakhic implications of and some approaches to them.

I. THE DONOR

Perhaps the most primary issue affecting an organ donor is the halakhic question, “Should I or should I not?” Halakhah, while increasingly more positive to organ transplantation, consistent with the fact that it is becoming more viable, nevertheless has not given it carte blanche. Theoretically there is a positive attitude to organ transplantation, but rabbis do not encourage this, nor is there allowance to sign away organs indiscriminately.

There is an obvious gap between theory and practice, which invests transplantation with a sense of ambivalence. It is not halakhically clear that to give an organ is the proper thing. Thus, the potential donor is plagued with doubts. It is crucial to resolve this halakhic and hence psychological uncertainty through a clear directive. This is not to suggest that Halakhah must acquiesce for the sake of psychology, yet we should not lose sight of the need for specific guidelines in order to avoid unnecessary and often nagging doubts about whether one is behaving properly. Here the dictum, “Acquire a teacher, and remove yourself from doubt,” becomes imperative.

Closely associated with doubts of a halakhic nature are those concerning the donor, and the donated organ following transplantation. It has been suggested that the donation of an organ may be painful for the soul of the donor. The expiation process which starts to unfold after death is delayed, or, at the least, the finalization of that process is delayed, as long as the donated organ functions in another person. In simple terms, because of organ donation, the individual's atonement is postponed. Is an individual obliged to subject himself to what is obviously painful, albeit pain after death, in order to save someone else's life? More important, can we in good conscience recommend transplantation when we know that it involves this type of pain?

Additionally, there are those who claim that the donor of an organ will rise in the world-to-come without that organ. When a
Reuven P. Bulka

limb is lost by accident or by abuse from some cruel despot, the individual will rise in the world-to-come without being disadvantaged—but an organ donor does not get off so easily. One can conceive of a person who has donated his eyes still rising, but it is hard to conceive of an individual rising without any heart. This statement, once having been made (although there is no exact source for it), must create nagging doubts for an individual contemplating organ donation. Halakhah must address this nagging issue, which also could have an impact on an individual contemplating this very complicated decision.

There is room to argue that the opinion that an organ donor will rise in the world-to-come without that organ, is based on the assumption that organ donation is halakhically impermissible, such that one who donates an organ is punished in the future for the breach. However, if the halakhic consensus should be that organ donation is permitted, not to mention mandatory in a life-saving situation, then it would stand to reason that an individual who performs a mitzvah will not be disadvantaged, here or in the future.

Rabbi Eliezer Waldenberg raises the point that organ transplantation, as any other halakhic issue, must be based on a system of equality. It is wrong to suggest that organ donation is good for the general population, but that great sages and scholars are exempt. He then asks which sage would be willing to donate organs, or would even be expected to do so. Since no sage will do it, argues Rabbi Waldenberg, it is unfair to expect anyone else to do so.7

It would seem, therefore, that ultimately the issue will be resolved only when the lead is taken by a highly respected rabbinic sage, who either donates an organ or publicly states that he will do so, somewhat akin to the example set by Rabban Gamaliel with regard to burial in simple shrouds.8 Once Rabban Gamaliel ordered this for himself, burial in simple shrouds became an accepted norm. Perhaps only the act of a respected scholar will remove organ transplantation from the category of the problematic and become a halakhically acceptable, even desirable act.

There are two types of donation. A person can will organs for after death. Such procedures as donation of the eyes, the liver, or the heart are normally associated with after death. Here, there would be an insistence that no such procedure take place unless the death of the donor is absolutely certain. We may neither hasten death nor pronounce a person dead when that person is still alive in order to justify donation of an organ.

There is another type of organ transplantation. A person contributes a body part which does not diminish health, or which can
replenish itself. Donation of pancreas tissue, skin, marrow, or a kidney is in this category.

The recipient, as a general rule, prefers donation from a cadaver. This is critical primarily in the case of kidneys. The human being is blessed with two and can donate one, if he is healthy. Still there is a preference for a cadaver kidney, based on the assumption that the recipient will not feel that his health benefitted at the expense of another's. Most people find this difficult to cope with—and would prefer to avoid it. When the donation comes from a cadaver, however, there is gratitude to the donor without a feeling of guilt for having deprived someone of health or life.9

On the other hand, statistics indicate that an organ from a living donor, especially a kidney, works appreciably better; the success rate being 74% from a living donor and 43% from a cadaver.10 Fundamental to the transplantation procedure is not only the patient's physical welfare, but also the associated psychological problems. If they cannot be avoided, they should at least be confronted and mediated. Specifically with regard to the question of receiving an organ from a living donor or from a cadaver, it is important to address the concerns of the recipient.

Another question that arises in organ donation, specifically concerning a kidney, is the donor's sanity. If we assume that an organ donor must be unbalanced in order to donate, then the entire process is placed in jeopardy. It would be ridiculous to suggest that a procedure is normative when it is based on an ill-conceived choice, not rooted in sanity. Surveys of the population reveal that those who are more educated are more likely to donate.11 This does not mean that the more educated are more likely to be unbalanced! On the contrary, one assumes that the more educated are more likely to reach a reasoned, enlightened decision. There is an ambivalence in the population which is reflected in the halakhic attitude. Seventy percent favor the willing of organs, yet doctors constantly report a shortage of organs available.12 It seems as if the jump from theory to practice is a problem not only in the halakhic context, but in society as well.

Nevertheless, when the theoretical predilection is translated into a positive decision, there is very little evidence to suggest that the decision lacks sanity. Usually, the decision of a donor is made instantaneously. There is a gut reaction to crisis; the individual rises to the occasion. The individual who makes such a decision makes it in a balanced way and sticks to it. Also, there is long-range satisfaction with the decision and relatively little second-guessing even long after the decision has been made.13
The question of family pressure has also been raised. Some suggest that a family member never be allowed to donate, since there is implicit pressure on a parent for a child or on a sibling for a sibling—pressure which does not allow for free choice. The supposition here is rooted less in reality, more in speculation. One can remain confident about the soberness and integrity with which the decision is made.\(^\text{14}\)

Whether or not the donor is balanced—and we have reason enough to believe that he is—it seems that others think he is not.\(^\text{15}\) This means that while the donor might have altruistic motives, others question whether human altruism can go so far. This is an unfortunate reflection of the lack of society's confidence in the good will that many possess. Not given proper acknowledgement for their good will, they are looked upon with suspicion instead of admiration.

Another issue that has been raised is whether future trauma or psychological upset can be the basis for a decision now. For example, can a parent decide that a minor donate one of his organs to his sibling, on the grounds that the minor might later learn that he could have saved his sibling's life, but did not—and then feel guilty? The general feeling is that parents should not make decisions for their children in this regard.\(^\text{16}\) Such a policy is probably in the best interests of all, since there are too many abuses that could occur if parents were allowed to make this type of decision.

Generally, the donation of an organ by an individual during his lifetime greatly boosts self-esteem. The donor feels good about being instrumental in saving someone else's life. Understandably, ties between donor and recipient, whether the donation is from within or without the family, are invariably strengthened.

Because organ donation is a great boost to self-esteem, an interesting halakhic question arises. It relates to the suggestion that a person contemplating suicide may be well advised to contemplate donating an organ to save someone else.\(^\text{17}\) If we assume that the suicidal individual has very low self-esteem, and that donating an organ is a boost to self-esteem, it is possible that if the potential suicide donates an organ, he will feel a great sense of self-worth. This might prevent the suicide, and may even inspire the would be suicide to live an affirmative, productive life.

Taking this one step further: If an individual is suicidal, may we suggest to him that instead of destroying his vital organs, he donate them to another while he is still alive? May we propose that instead of wasteful self-destruction, he agree to productive self-destruction, through giving vital organs to others?

Within the literature, this possibility is discounted as being fraught with too many moral and ethical difficulties.\(^\text{18}\) However, it is
still useful to explore the halakhic possibilities in this regard. At first glance, the question seems absurd. On what basis can we permit an individual who is alive to give away vital, life-sustaining organs? Since we do not permit either premature pronouncement of death or hastening of death to expedite the transplantation, how can donation that will cause death be permitted?

One opinion in Sefer Ḥasidim says that if two people are sitting and others want to kill one of them, if one of the two is a talmudic scholar and the other a simpleton, it is a mitzvah for the simpleton to say, “kill me, but not my friend.” On the basis of this and other related opinions, Rabbi Waldenberg suggests that it is permissible for an individual to donate an organ for a sage who is needed by the community. Even if that organ will end the donor’s life, it is considered a mitzvah for the donor. We do not permit an individual in excruciating pain to hasten his death in order to donate an organ, yet we would permit an individual in the prime of health to give away life in order to maintain the life of someone crucial to the community.

This is a very sensitive issue. I am not suggesting that Rabbi Waldenberg’s pronouncement become an operative norm. Much debate is still needed on this very delicate matter. However, in the debate, one can incorporate the issue presently under discussion—suicide. Specifically, if an individual is suicidal; and assuming that he has a good chance of carrying out his threat; and also taking into account that he is usually withdrawn from society, hardly functioning; would it be permissible to allow him to donate a vital organ to a person making an obvious contribution to society and yearning to live? If Rabbi Waldenberg would permit the simpleton to give up life for a talmudic sage, can the suicidal individual, who has withdrawn from society, give organs to save one who, while not a talmudic scholar, is nevertheless making a positive contribution to society?

This is a very delicate issue but, in the process of developing halakhic guidelines for transplantation, deserves serious consideration.

II. THE RECIPIENT

We move now from psychological matters related to the donor, and concentrate on psychological issues related to the recipient. The recipient goes through a period of depression following a transplantation. This depression may relate to the awareness of how ill he was and how close to death he may have been, as well as the fact that it took the donation of someone else’s organ for him to regain his hold on life. Additionally, low resistance and medication may contribute
to erratic behavior. However, all this is temporary, and resolved over time, especially with a supportive family and a well-intentioned transplant team.\textsuperscript{22}

There are reports of individuals who have expressed difficulty with incorporating the new organ into the self. One member of the KKK who received a heart transplant from a black donor became active in the NAACP.\textsuperscript{23}

It is facile to assert that a transplant should not have an impact on self-identity, that a person with a new heart is the same as before. But the obligation is to be sensitive to what a transplant recipient goes through, and evidence indicates that he goes through nagging crises of self-identity.\textsuperscript{24} There may be additional problems with a male receiving a female organ or vice-versa, and one should not discount problems that a Jew may have in receiving the heart of a non-Jew. One individual decided on a new birthday: the day of transplant surgery.\textsuperscript{25} This is a tangible expression of the born-again syndrome—probably not an irrational way of accepting the transplant. The problems of organ integration are not necessarily serious, but they should be addressed. They usually are in pretransplantation screening and interviews.

Subsequent to the transplantation, the rate of suicide goes up significantly.\textsuperscript{26} Most vulnerable to suicide are teenagers, who are greatly affected (even in kidney transplantation) by the distorted look they take on from medication. They feel odd and may thus do irreparable violence to themselves. It is therefore vital for the parents of teenage transplant recipients to be sensitive to their children’s situation. If parents themselves cannot help, they should arrange for outside help to tide their children over the difficulties.

Sexual problems are reported in the period following transplantation, but generally there is an improvement within one year.\textsuperscript{27} This comes with the improved health of the recipient, blessed with a new lease on life. This is consistent with the finding that the post-transplant period, with all its attendant difficulties, eventually brings happiness to the recipient, such that rehabilitation is nothing short of extraordinary.\textsuperscript{28}

As a rule, transplant recipients do not seek contact with other recipients. They do not want to hear the bad news that a fellow recipient has not made it, or is having difficulties, for fear that this may adversely affect their own recovery.\textsuperscript{29} On the other hand, transplant recipients often pledge themselves to higher levels of altruism and sharing, since they have been beneficiaries of the ultimate in sharing.\textsuperscript{30} On balance, the psychological impact on the recipient is quite positive. This is further enhanced if transplantation
is approached with an awareness of the problems it may entail, and if effective measures to avoid them are taken.

A debate has arisen about whether a psychologically disturbed individual should become a transplant recipient. On the one hand, one does not want to put someone at a disadvantage because of psychological difficulties. On the other hand, realistic decisions on who is more likely to survive transplantation surgery are necessary.31

A study conducted with coronary bypass patients showed that it is possible, through specific tests, to predict who will survive the surgery. Generally, better adjusted individuals, who are also better at tasks which demand concentration, are the better candidates for bypass surgery. Those who do not make it may be suffering from mild organic brain syndrome.32 Prediction is a very important clinical tool in deciding who is the better candidate not only for bypass surgery, but also for transplantation surgery. The recovery period following transplantation demands attentiveness to a program vital for rehabilitation. A person who has shown difficulties with regulations in the past may destroy all the good that doctors achieve with transplantation.

There is a halakhic precedent that when confronted with the choice of saving a healthy or a dangerously ill individual, we must save the healthy individual first. We do not remove support systems from the dangerously ill in order to save the healthy, but when there is a choice as to who should receive the benefits of medical intervention, we are certainly within Halakhah to choose the healthy individual.33 The question is whether this applies to organ transplantation, specifically, to a person in a better state of psychological readiness: does he take precedence over a person with psychological problems? There is halakhic precedent indicating room to argue for the healthy individual having first call, but again this is a matter that should be spelled out in halakhic guidelines for transplantation.

Another question of psychological import is timing. When does transplantation become a legitimate possibility? If, without transplantation, an individual lives but is not totally functional, and with transplantation he is more functional, at what point is the surgical risk permitted? For example, for someone managing on dialysis, kidney transplantation involves a certain risk; but, at the same time, a dialysis-linked existence does not afford full freedom. If the potential recipient desires to live a less restricted life, can transplantation be sanctioned?

Some suggest that when the potential recipient is "climbing walls" because of dialysis-related restrictions, then the transplantation, with its attendant risks, is permitted.34 Of course, it is difficult to quantify what is meant by "climbing walls." Perhaps we simply
reduce this to a subjective decision. When the patient says that dialysis is psychologically debilitating, and when transplantation offers the prospect of a more vibrant existence, the psychological consideration should halakhically justify transplantation. Again, this matter needs to be seriously addressed.

Regarding organ rejection, the use of immuno-suppressants such as cyclosporin has significantly increased the success rate of organ transplantation. At the same time, because of resistance-related problems associated with reducing rejection, the transplant recipient has a 30 to 100 times greater chance of contracting cancer, a fact which is hardly known. Obviously, this does not mean that transplant recipients will contract cancer, only that the risk is greater. Does the awareness of this risk influence not only the psychology of transplantation but also the halakhic judgment regarding the desirability of transplantation? This too is a question that needs to be addressed.

III. THE DONOR FAMILY

Psychological considerations relating to the donor family must be properly integrated into the transplantation process.

In most cases, the donor organ must be healthy. In heart transplantation, for example, the general procedure is to require the organ of someone 35 years or younger. For the organ to be eligible, it must come from a previously healthy individual who presumably died a sudden death, through either an accident or a shooting. Thus, in transplants from a cadaver donor, the family is already suffering from severe trauma. The family is mourning the loss of a close one who was healthy but died suddenly.

There is enough pressure on the family without it having to be concerned with the difficulties that others may be going through. This is so, even though the literature seems to indicate that families agonizing over the traumatic death of a loved one in the prime of life are helped by the donation of an organ to someone else, who is then brought back to vigorous life. The family sees some meaning in its loss, and its grief is somewhat assuaged. There is a flipside to this. When the recipient of the cadaver organ dies, the family of the donor usually experiences a delayed grief, and cries over what it feels is now the final death of its beloved. This is the psychological counterpoint of the argument, previously cited, that one's atonement is not totally effectuated until all of the organs of the individual are buried.

Since in most cases the donor family is in a precarious emotional state, it would seem that there is a sacred obligation to insist that
requests for an organ be made by someone close to the family. Very often the rabbi best fits this role. A doctor who is peripheral to the family will probably meet with most resistance; understandably so, since the family is in no mood to make new acquaintances and confront problematic situations.39

Another difficulty concerning the donor family is procedural. Apparently, once a person has died, the orientation of the medical team is to cater to the recipient. To a certain extent that is understandable. However, it involves three problems for the donor family that could be avoided. First, the officially dead donor is kept artificially alive to ensure maximal usefulness of the organs to be donated. Second, there may be a delay in burial until the recipient is brought to the hospital to receive the organ, which often comes from many miles away.40 Third, the entire insides of the donor may be taken. Adequate provision for the burial of those parts not used for the transplant has not been integrated into the process. Concern for the recipient can cause many unnecessary psychological difficulties, stemming from unnecessary abuse of the donor body and delay of the funeral, which are always halakhic and, at the same time, emotional difficulties.

It is therefore necessary to incorporate in halakhic guidelines specific suggestions to minimize delay in burial, to ensure proper burial of all non-used body parts, and to insist on a delicate and respectful approach to the donor family.

IV. THE RECIPIENT’S FAMILY

Not only is the recipient emotionally vulnerable in the pre- and post-transplant stages; the family of the recipient is likewise susceptible to emotional problems.

Prior to transplant, the potential recipient must go through a screening process. If he is pronounced eligible for transplant, he is usually elated, at least temporarily, at the prospect of gaining a new hold on life.41 However, transplantation does not always follow immediately after the assessment. There can be a long wait. The longer it is, the more likely that the prospective recipient and spouse will become depressed, and despair of ever being blessed with an organ. It has been reported that, on occasion, a husband is taken to the hospital after a long wait, finally to receive a transplanted heart, while his wife recovers in the psychiatric ward.42 This is a situation which needs to be addressed, for if we are concerned about health—and obviously the entire transplant syndrome is an affirmation of our commitment to health—then we must be concerned about health in all its dimensions.
Another difficulty is the mind-set that can evolve when an organ is not immediately available. One spouse reported a sense of guilt for looking in the daily newspaper to see whether there had been any motor vehicle accidents or shootings.\textsuperscript{43} This person was honest enough to confront his thought process, but how many think this way without even being aware of it? Transplantation is unique in that it involves not only the beneficiary patient, but a third party, an outsider. How much benefit is there if all candidates for transplants subconsciously begin to will the death of others, so that their own lives may be saved? This would be setting into motion a Darwinian ethic contrary to the most sacred tradition of the inviolability of life—our own lives and the lives of others.

Another issue concerning the family of the recipient is support. Transplant teams prefer, if not insist, that one family member care uncompromisingly for the patient immediately following transplantation.\textsuperscript{44} This is obviously a crucial time; caring and nurturing is absolutely essential. Individuals who are happily married are more likely to survive the transplantation and the post-transplant recovery.\textsuperscript{45} Thus, a spouse is the most likely candidate to help a transplant recipient through the crisis. Talking through potential problems in advance should be mandatory for the recipient and the family member (spouse) who will care for the recipient.

Balance is also essential. Sometimes the family overprotects the patient, which is not good for the recipient. At other times the family, possibly self-servingly, may argue for the premature release of the transplant recipient from the hospital.\textsuperscript{46} Premature release or over protectiveness are both undesirable and must be avoided.

\textbf{V. CONCLUSION}

This article has sought to spell out some of the difficulties to be expected during the course of an organ transplant. Psychological matters, especially in this time of precarious health, can often play a significant role in how the patient recovers. Since Halakhah is concerned with the viability of the transplant procedure, the halakhic guidelines that will be spelled out for transplantation must incorporate the psychological concerns raised here.

Transplantation, as has been noted by many, has graduated from an experimental procedure to a therapeutic process. This is so with heart, kidney, and cornea transplants. The success rate for the heart is approximately 50\% for a five-year survival period.\textsuperscript{47} Conversely, the death rate of candidates for any organ who do not receive one approaches 100 percent within a year following admission to the
transplant program. Medical ingenuity might ultimately obviate the need for transplantation through preventive measures—maintaining the heart—and through perfection of the artificial heart. The artificial heart involves fewer halakhic problems since it is not dependent on the death of a donor. Also, there may be fewer psychological problems. However, high-level prevention and the artificial heart are not realistic possibilities at the moment (though they may be in a decade or two). Until then, transplantation is a procedure that will be with us. It could reach into tens of thousands per year. It is therefore imperative that Halakhah develop all encompassing guidelines.

During the time when the Temple was the epicenter of Jewish religious life, a person who came in contact with a corpse was ritually reconnected to the community by being sprinkled with the ashes of the red heifer; they purified the person who had contacted the corpse. On the other hand, these same ashes, if touched by a ritually pure individual, rendered that person impure. To this paradox the rabbis applied King Solomon’s statement, “I thought I would become wise, but it is distant from me.”

While I do not propose to give logical explanations for that which King Solomon could not fathom, it is possible to understand the incomprehensibility of the red heifer legislation. It projects the paradox of death: confronting death honestly, one enhances life; enhancing life to the extreme, one can become defiled in the overindulgence.

The implication for transplantation is instructive. Modern medicine has embarked on a frontal attack on diseased organs, attempting to erase malfunction by replacement when necessary. This is an affirmation of life. However, doctors as well as society can become defiled in a blind embrace of life which tramples on one segment of the population in order to help another. There should be no compromise of the psychological well-being of the donor, the family of the donor, the recipient, or the recipient’s family, in the pursuit of health. This can be defiling. In the affirmation of life that is transplantation, all dimensions of health must be incorporated in establishing guidelines for whom and how to transplant.

NOTES

7. Ibid., section 5.
8. Moed Katan 27b.
11. Ibid., p. 32.
12. Ibid., pp. 32-34.
13. Ibid., p. 197.
15. Ibid., p. 201.
17. Katz and Capron, Catastrophic Diseases, pp. 204-205.
18. Ibid.
19. Sefer Hasidim, no. 698.
20. Tzitz Eliezer, vol. 10, no. 25, chapter 7. The language of the Tzitz Eliezer, in his summation at the end of chapter 7, note 4, is as follows: If the one in need of the transplant is a talmudic scholar, there are those who opine that it is permissible for someone who is not a talmudic scholar to sacrifice his life to save the talmudic scholar. Relative to our issue, it is permissible to donate to the talmudic scholar even an organ on which life depends, such that with its removal from the donor the donor will die. This is considered a great deed (mitzvah), even if there is no legal obligation concerning this. Much deliberation is needed to determine whether such permission can be granted in actual practice. It is easier (to permit) if the person to be saved is a talmudic scholar needed by the multitude.
21. This is an extremely sensitive issue. I am not suggesting that permissive avenues be opened, but that the issue be confronted seriously since the view espoused by Rabbi Waldenberg creates a host of previously unfathomable scenarios.
24. Ibid., pp. 67-68.
29. Ibid.
31. Ibid., pp. 11, 20.
33. See Tzitz Eliezer, vol. 9, section 17, chapter 10, no. 5.
34. Tendler, “Rabbinic Comment,” p. 56.
35. Duncan, C., “De Novo Cancer in Transplant Recipients,” Transplantation Today, vol. 2, February 1985, pp. 32-38. While this should not cause panic, it is a serious matter with many repercussions. There may be some positive elements to this. Perhaps, careful monitoring of the patient for cancer will be part of the treatment package, and insight into the cause of cancer may be provided.
42. *Ibid*.
49. See Katz and Capron, *Catastrophic Diseases*, p. 10, for some interesting projections.