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OF CEREBRAL, RESPIRATORY AND CARDIAC DEATH

The conflict between authentic Jewish teaching and societal espousal of so-called "brain death" criteria involves no scientific or factual controversy whatsoever. It does involve disparate views regarding the sanctity of human life, regardless of its quality, and conflicting perceptions of duties owed to the moribund patient.

Judaism regards every life as being endowed with infinite value; Judaism also regards every moment of life, regardless of its quality, as endowed with infinite value. Until all vital forces ebb from the body, as evidenced by total cessation of both respiratory and cardiac activity, human life must be treasured as a sacred gift. The adamancy of halakhic authorities in their refusal to accept "brain death" criteria is not at all an instance of other-worldly patriarchal figures refusing to acknowledge demonstrable scientific verities; it is entirely a matter of insistence upon the sanctity of every moment of human life.

Definitions, by their very nature, are tautologies. A definition of death cannot be derived from medical facts or scientific investigations alone. The physician is eminently qualified to describe the physiological state which he observes. But he can do no more than report his clinical observations. The physician may be called upon to determine whether medical science can, or cannot, be of further aid in maintaining or restoring vital functions. But, when such measures are potentially efficacious in any clinical sense, the question of whether a medical remedy or life-support system should actually be employed on behalf of any given patient involves a value judgment rather than a scientific decision. Similarly, the question of whether a human organism in any particular physiological state is to be regarded as a living person, and hence a deserving beneficiary of medical ministrations, or as a corpse which may be medically abandoned with moral equanimity, is an ethical, religious and legal

question, not a medical one. Accordingly, advances in medical diagnostic techniques, extremely valuable as they certainly are in determining the precise physiological state of the patient and in formulating a prognosis for cure or the absence thereof, can have no bearing upon Jewish teaching with regard to the duties owed a patient in any given physiological state.

The term "death" is descriptive rather than prescriptive; hence its use is entirely a matter of convention. Were there a common consensus to that effect, the term might be withheld until the onset of *rigor mortis*, or it might be extended to include a patient in a terminal coma or swoon.¹ Nevertheless, descriptive application of the term has come to portend extinction of duties of care and preservation of any remaining vital functions. Accordingly, for emotional and associative reasons, ascription of death to a human organism is, in common parlance, not simply description of a particular physical state but also a principled judgment regarding how the organism is to be treated. Pronouncement of death signals, *inter alia*, a call to the *hevra kaddisha* or undertaker, imminent commencement of mourning, notice to heirs that they may succeed to the decedent's estate and a declaration of spousal capacity to contract a new marriage. Those matters are moral, legal and halakhic in nature, not medical. It is perfectly possible to conceive of moral or legal systems in which such matters must abide decomposition of the body, the onset of putrefaction, or *rigor mortis*. Rastafararians do demand the presence of such criteria before permitting interment of the corpse. The requirement imposed by statute in many European jurisdictions as recently as a century ago for the lapse of a seventy-two hour waiting period before burial effectively served to incorporate putrefaction among the criteria required for treating a person as a corpse. Common law, paralleling precisely the provisions of Halakhah, defined death as "total stoppage of the circulation of the blood and a cessation of the animal and vital functions consequent thereupon, such as respiration, pulsation, etc."² Absence of evidence of neurological activity in the brain is now the legal definition of death in a significant majority of states. Many physicians and ethicists advocate further reformation of the definition of death so that a nonsapient patient in a permanent vegetative state may be pronounced dead. These conflicting positions involve no factual dispute whatsoever; the controversy is entirely with regard to value judgments and/or received traditions.

A person unfamiliar with the extensive rabbinic literature concerning this topic may well ask whether Judaism cannot accommodate a neurological definition of death. Support for such a position might be adduced from a superficial reading of the Mishnah, *Oholot* 1:6: "And likewise cattle and wild beasts . . . if their heads

have been severed, they are unclean [as carrion] even if they move convulsively like the tail of a newt (or lizard) that twitches spasmodically [after being severed from the body].³ Destruction of tissue as the result of liquefaction, it may be argued, is tantamount to severance or excision of such tissue. Consequently, there is indeed a measure of cogency in the argument that total liquefaction of brain tissue is tantamount to physiological decapitation.⁴

Decapitation, however, involves physical severance of the entire brain from the body. Physiological decapitation, then, must also be defined as physiological destruction of the entire brain. That phenomenon has simply never been observed. To be sure, autopsies performed on patients pronounced dead on the basis of neurological criteria reveal that the brain has become a spongy, liquidy mass. In colloquial medical parlance this phenomenon is categorized as “respirator brain” because the condition is found in patients sustained on a respirator for a lengthy period of time and is the result of lysis or liquefaction of the brain. However, total lysis apparently does not occur in such patients; only a portion of the brain turns to liquid. It is indeed the case that tissue degeneration resulting in lysis is progressive in nature and consequently it might be assumed that at some point the entire brain will liquify. Nevertheless, that phenomenon is not present at the time “brain death” criteria become manifest. There is no diagnostic method for determining when total lysis has occurred, nor has total lysis ever been observed upon autopsy. Although the neurological causes are obscure, there is strong reason to believe that cardiac activity ceases long before total lysis could possibly occur. Systemic death, including cardiac arrest, virtually always follows no later than two to ten days subsequent to manifestation of brain death criteria.⁵ For reasons not fully understood by medical science, life, as conventionally defined, cannot long continue after brain function has been so seriously compromised.⁶ Thus, “brain death,” although not synonymous with death itself, is a harbinger of impending death.

The foregoing description of the physical state of the brain at the time of “brain death” is freely conceded by medical advocates of adoption of brain death criteria. Research scientists who support acceptance of neurological criteria for pronouncement of death argue, not that those neurological criteria establish that brain tissue has been destroyed, but that those criteria serve to establish that the brain has ceased to function and hence, although physically the brain remains intact, irreversible lack of functionality should be equated with excision or “death” of that organ. Thus it is not physical destruction of the brain but the physiological dysfunction of the organ that is equated with decapitation.

For halakhic purposes, dysfunction of an organ is not the equivalent of its destruction or excision. A male whose testes have been removed is forbidden to cohabit with a Jewess of legitimate birth; a person whose testes remain intact but have been rendered dysfunctional suffers no such liability. Similarly, an animal whose liver has been removed is a *treifah* and its meat is forbidden; the meat of an animal whose liver performs no physiological function is permissible. Excision is defined as removal, either as a result of trauma or surgical procedure. Alternatively, it is defined as degeneration of tissue either through necrosis to the degree that it becomes either “tissue which crumbles in the finger” (*basar she-nifrahk be-tsiporen*)⁷ or through “decay” to the degree that it becomes “tissue which a physician scrapes away” (*basar she-ha-rofeh gorero*),⁸ e.g., gangrenous tissue.⁹ The brain tissue of a patient pronounced dead on the basis of neurological criteria does not match, or even approximate, these levels of degeneration.¹⁰

Moreover, as a rejection of currently accepted criteria of “brain death,” the foregoing is superfluous, indeed a form of “overkill.” Currently accepted neurological criteria of death, singly or in combination, demonstrate only that specific neurological activities have ceased. For example, absence of elicitable reflexes confirms just that phenomenon and nothing more; absence of reflex activity does not demonstrate that all electrical activity has ceased. Even a flat EEG—which is not regarded as an absolute requirement for establishing brain death—demonstrates only the absence of elicitable brain waves; it does not rule out the possible presence of electrical activity below the sensitivity threshold of the apparatus. A British physician has candidly stated that “in the usual clinical context of brain death there is no certain way of ascertaining (other than by angiographic inference) that major areas of the brain such as the cerebellum, the basal ganglia, or the thalami, have irreversibly ceased to function.”¹¹ Other medical researchers report that hypothalamic-pituitary function is maintained after the diagnosis of “brain stem death.”¹² “Brain Death” criteria do not suffice for the diagnosis of permanent and irreversible cessation of all function of the brain stem. But most significantly, total neurological dysfunction is entirely compatible with continued cellular metabolism; unless metabolism has ceased the tissue perforce remains alive.

Theoretically, blood flow studies and radioisotope scanning might be employed to show that perfusion of the brain has ceased. Cellular decay of the neural tissue of the brain does indeed commence upon cessation of blood flow. Nevertheless, such techniques are inadequate for determining death in a manner consistent with halakhic requirements for a number of reasons:

1. Although cellular decay of the brain does commence upon cessation of circulation of the blood, an indeterminate period of time is required for decay of the brain to become complete. Cessation of the flow of blood to the brain cannot in itself be equated with total cellular destruction of the brain. At present, there is no scientific method that serves to establish how much time must elapse following cessation of perfusion for total cellular decay to result. Moreover, as earlier indicated, it is entirely likely that, physiologically, cardiac activity must cease well before this phenomenon could possibly occur.

2. These techniques, in their current state of refinement, simply do not demonstrate that even perfusion of the brain has totally ceased. Investigators responsible for the development of these techniques claim only that such methods may be used to indicate cessation of circulation to the cerebrum, which is the seat of the so-called "higher functions" of the human organism. They are careful to describe the phenomena which they report as "cerebral death" rather than as "brain death."¹³ These phenomena are entirely compatible with some degree of continued circulation and perfusion of the medulla and the brain stem. In fact, in the original studies, radioisotope techniques did not demonstrate total cessation of circulation to the cerebrum, but only that affected circulation had decreased below the level necessary to retain its integrity. The scanning methods employed in those studies did not indicate that all circulation to even a part of the brain, i.e., the cerebrum, had been interrupted, but only that the rate of flow is below that necessary to maintain functional integrity. Thus, in a summary of findings which form part of one of such studies, these techniques are described as "indicative of significant circulatory *deficit* to the cerebrum."¹⁴ Those studies indicated the presence of up to approximately 24% of normal predicated flood flow.¹⁵ More recently another researcher has claimed that the isotope angiography which he employed is capable of showing termination of carotid circulation at the base of the skull,¹⁶ but at the same time he frankly concedes that posterior circulation may continue with the result that "persistent perfusion and survival of the brain stem" remains a distinct possibility.¹⁷ Another study involving a small number of pediatric patients utilized both the isotope bolus technique and cerebral angiography and somewhat surprisingly demonstrated persistent EEG activity despite negative blood flow studies.¹⁸ The authors of that study candidly acknowledge that some circulation, either supplied by the external carotid system or in the form of limited cerebral perfusion, must have been present albeit undetected by blood flow studies.¹⁹ Yet another recent study reports that spontaneous respiration was observed in

two patients in whom cerebral blood flow studies demonstrated no cerebral perfusion.²⁰ That finding is truly remarkable and demonstrates the inherent compatibility of negative blood flow studies with even the classic indicator of life.²¹

Moreover, it must be emphasized that blood flow studies are neither a legal requirement for pronouncing a patient dead on the basis of neurological standards nor are they routinely performed as a matter of medical practice.²² Other neurological criteria are even less satisfactory than blood flow tests as halakhic criteria for establishing that cellular decay of the brain has occurred. Those criteria serve to establish only irreversible cessation of neurological function in the lower regions of the brain; they do not constitute evidence that even a portion of the brain has been destroyed. *Oholot* 1:6 can, at most, be cited only to substantiate an argument that destruction of the entire brain is tantamount to death. Since radioisotope scanning techniques, even if employed, *do not* show termination of blood flow to the brain stem any discussion of the validity of "brain death" in Jewish law is rendered entirely theoretical by virtue of the fact that, at present, the requisite criteria demanded by the advocates of that position are simply not demonstrable in a clinical setting.

3. The performance of radioisotope scanning is of no therapeutic benefit to the patient. In light of the halakhic prohibition against moving even the limb of a *gosses* lest the patient's death be hastened thereby it would be difficult, to say the least, to perform such procedures upon a moribund patient without violating applicable halakhic strictures. The identical objection applies to at least some, if not most, of the various other neurological diagnostic procedures employed in pronouncing "brain death."

The term "brain death" carries with it a certain emotional cachet and appeal. In point of fact, "brain death" is a misnomer: "Brain death" criteria establish irreversible neurological dysfunction, not cessation of metabolic functions; "brain death," when confirmed by blood flow studies, represents the onset of metabolic dysfunction, not necessarily "death" of the neural tissue; "brain death," even when supported by blood flow studies, represents confirmed metabolic dysfunction of only a portion of the brain, not of the brain in its entirety. "Brain death" criteria are not designed, properly speaking, to serve as clinical criteria of death but as proposed criteria for withholding further treatment and for withdrawing life-support systems. This is recognized and acknowledged by physicians who are sensitive to the ethical issues contingent upon this distinction. In a submission to the Working Party on Donor Organs of the Royal College of Physicians, dated January 23, 1987, two British physicians, Drs. D. Wainwright Evans and David J. Hill, correctly urge

that a term such as “mortal brain damage” be substituted for “brain stem death.”

None of this is at all novel. The chairman of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death candidly acknowledged, “I was chairman of a recent *ad hoc* committee at Harvard composed of members of five faculties in the university who tried to define irreversible coma. We felt we could not define death, I suppose you will say that by implication we have defined it as brain death, but we do not make a point of that.”²³ Consistent with that view the Harvard Committee’s report setting forth clinical criteria of “brain death” was published under the title “A Definition of Irreversible Coma.”²⁴ Similarly, the statement concerning brain death issued in Great Britain by the Conference of Royal Medical Colleges in 1976 indicated that “brain stem death” is indicative of a hopeless outcome for the patient and recommended utilization of such criteria for the purpose of removing the patient from a respirator in order to allow the patient to die.²⁵ Only in 1979 did that body declare that “brain stem death” may be equated with the death of a person. In a Supplementary Statement for the R.C.P. Working Party on Donor Organs, dated January 23, 1987, Dr. David J. Hill writes, “The motives for this change are ethically questionable, as is the logic upon which it is based—[viz.,] the assumption that ‘all functions of the brain have permanently and irreversibly ceased.’ This statement is, to say the least, doubtful. . . .”

Medical scientists employ the term “brain death” even though it is a misnomer because it is a term laymen can comprehend as denoting a physiological state in which any further treatment is not only contraindicated but would be regarded as ludicrous. Introduction of the term “brain death” is a thinly veiled attempt to justify withholding of treatment under the guise of redefinition of terms. The purpose of this lexicographical exercise is to secure moral and emotional approbation for a policy that would otherwise be greeted with repugnance and even indignation. Withholding of treatment has the effect of snuffing out human life. Any *ad hoc* decision to withhold treatment from a dying relative involves a great deal of soul-searching and frequently engenders feelings of guilt. On the other hand, no one advocates medical treatment or continuation of life-support systems for a corpse. Pronouncing a person dead has the emotional effect of removing any aura of further moral responsibility. In a less than fully informed world, semantic sleight of hand may affect popular perception, but it should not be permitted to affect the universe of moral discourse.

So-called “brain death” criteria simply have no basis in Hala-khah both because the clinical conditions ostensibly posited by

employment of the term simply do not exist and because, even were those conditions to exist, they would not satisfy the halakhic criteria of death. In response to a question concerning one of the ramifications of employment of “brain death” criteria Rabbi Aaron Soloveitchik has aptly and accurately stated, “In order to answer this question I have to have recourse to my imagination. Without recourse to imagination it is impossible for me to assume even for a moment for argument’s sake that the Harvard criteria conform to the halachah. . . .”²⁶

II

Although the halakhic inadmissibility of brain death criteria is obvious, there are alternative criteria, even more liberal in nature, for which a much stronger *prima facie* case can be made. A detailed analysis of those criteria is in order because of the erroneous perception, perhaps even in the eyes of some of their advocates, that those criteria are synonymous with a brain death standard without which such procedures could not be successfully performed. Those criteria were formulated in conjunction with a decision of the Chief Rabbinate Council of the State of Israel endorsing liver transplants. In the fall of 1987 the Ministry of Health, after prolonged deliberations, granted permission to the Rambam Medical Center in Haifa to perform liver transplants. One of the issues given careful consideration in the course of those deliberations was acceptance of a brain death standard. Despite phenomenal advances in recent years in both medical science and technology, it is still not possible to perform liver or heart transplants if removal of the donor’s organ is delayed until death has been pronounced on the basis of conventional criteria. Delay in removal of these organs results in tissue degeneration that renders the organ useless for transplantation purposes. In the course of those deliberations the Minister of Health turned to the Chief Rabbinate Council in order to ascertain the position of Jewish law with regard to this question. The Chief Rabbinate Council pondered the issue for a matter of months but failed to arrive at a conclusion. In the interim a new Minister of Health was appointed and permission for proceeding with the liver transplant was granted. On 1 Heshvan 5747, after the liver transplant had already been performed, the Chief Rabbinate Council announced its endorsement of so-called “brain death” criteria but stipulated a number of conditions to be followed in pronouncement of death and removal of the organs. That position was formulated in response to a request by Hadassah Hospital in Jerusalem for permission to perform a heart transplant

procedure. The decision of the Chief Rabbinate Council was published in *Tehumin*, VII (5746), 187–192. Pursuant to the announcement of that decision, many prominent and renowned rabbinic decisors issued pronouncements declaring that reliance upon brain death criteria contravenes Jewish law. Rabbinic authorities who publicly announced their opposition to adoption of brain death criteria include R. Eleazar Shach, Rosh Yeshivah of the Yeshivah of Ponevez in Bnei Brak (*Yated Ne'eman*, 12 Kislev 5747); R. Yitzchak Ya'akov Weisz, head of the *Bet Din* of Jerusalem's *Edah ha-Haredit* (*Ha-Modi'a*, 4 Heshvan 5747; *Le-Hoshevei Shemo*, Heshvan 5747; *Ha-Pardes*, Sivan 5747);²⁷ R. Yitzchak Kulitz, Chief Rabbi of Jerusalem (*Yated Ne'eman*, 23 Adar 5747); R. Eliezer Waldenberg, a retired member of the Supreme Rabbinical Court of Appeals (*Ha-Modi'a*, 4 Heshvan 5747 and 12 Heshvan 5747; *Ha-Pardes*, Kislev, Adar and Sivan 5747);²⁸ R. Nisim Karelitz, Chief Rabbi of Ramat Aharon (*Ha-Modi'a*, 22 Heshvan 5747); R. Samuel ha-Levi Wosner, Chief Rabbi of Zichron Me'ir (*Ha-Modi'a*, 22 Heshvan 5747); and R. Nathan Gestetner, author of *Teshuvot Me'orot Natan* and *Natan Piryo* (*Ha-Modi'a*, Heshvan 5747).

In addition to the decision of the Chief Rabbinate Council, dated 1 Heshvan 5747, that appeared in *Tehumin*, a further letter, dated 23 Adar 5747, together with appended clarificatory comments was subsequently circulated to rabbis in various communities. That letter has been published in *Or ha-Mizrah*, Tishri 5748. A paper prepared at the request of the Chief Rabbinate Council for use in their deliberations that addresses both the medical and halakhic aspects of this issue was prepared by Dr. Abraham Steinberg and was published in the same issue of *Or ha-Mizrah*.

Although reports in the media indicated that the Chief Rabbinate Council had endorsed brain death, a careful reading of the published materials reveals that the term “brain death” is not at all mentioned either in the original decision or in the subsequent explanatory comments drafted by that body. The reference in those documents is to “a person whose independent respiration has manifestly ceased and there is no anticipation whatsoever for its return” who, under such circumstances, is described as dead since “there is no life, nor is there a criterion of life.” In their clarificatory comments the Chief Rabbinate Council declared even more explicitly, “. . . death is determined by cessation of respiration and not by destruction of the brain, destruction of the brain demonstrates that there is no independent respiration.” In his article, Dr. Steinberg seeks to demonstrate that determination of death as formulated by the sages of the Talmud is dependent solely upon lack of respiration but “since there are many situations in which it is possible to restore

normal respiration it is necessary to support the determination of the sages with proof that respiration has indeed ceased forever. . . . This can be accomplished by means of demonstration of . . . destruction of the brainstem.” The clear implication of that statement is that the determining factor in establishing that death has occurred is cessation of respiration. However, cessation of respiration as an absolute indicator of death must be total and irreversible. Accordingly, since as a result of contemporary advances in medical science there are clinical conditions in which respiration may be restored it is therefore necessary to regard the patient as “possibly alive” until it has been demonstrated that the brain stem has been destroyed. Only then, according to Dr. Steinberg, is it absolutely certain that respiration cannot be restored. Thus, death is intrinsically defined as cessation of spontaneous respiration; neurological criteria serve only to substantiate and confirm the fact that respiratory death has indeed occurred. Accordingly, at the conclusion of his article, Dr. Steinberg entirely negates the opinion that “brain death” is itself an intrinsic criterion of death. Those who erroneously maintain that “brain death” constitutes a valid definition of death for purposes of Jewish law require blood flow studies in order to demonstrate that circulation to the brain has ceased because they equate absence of blood circulation to the brain with physiological decapitation. This requirement is dismissed by Dr. Steinberg as superfluous because, he asserts, it is irreversible cessation of spontaneous respiratory activity that is the determining factor and that phenomenon can be established beyond doubt on the basis of other neurological criteria.

There is little question that if irreversible cessation of respiration were regarded as the sole criterion establishing that death has occurred, the theoretical possibilities that, in some rare instances, respiration might be restored would be disregarded. The clinical symptoms of death delineated by the sages of the Talmud were known by them not to be error-proof. *Masekhet Semahot*, chapter 8, reports that at a time when interment was carried out in hollow crypts in the side of a mountain it was customary to visit the burial site intermittently for a period of days after interment lest per chance some sign of life might be evident. It is reported that on one occasion a person was found to be alive and that the individual discovered to be alive survived for a period of twenty-five years. *Teshuvot Hatam Sofer, Yoreh De'ah*, no. 338, dismisses that narrative as describing a highly improbable event that may occur “once in thousand years.” Cessation of respiration, declares *Hatam Sofer*, must be determined by “experts” and it is not only permissible but obligatory to rely upon such expert determination in order not to delay burial of the deceased. To be sure, when there is a cogent medical possibility

that respiratory arrest is reversible, e.g., when cardio-pulmonary resuscitation is medically indicated, mere absence of respiration cannot be assumed to be dispositive; otherwise no further confirmatory indicators are required.

In many clinical situations, brain death criteria are no more necessary to determine that respiratory activity has irreversibly ceased than are blood flow studies. There are many end-stage illnesses in which an absolute determination that spontaneous respiration has irreversibly ceased can be made without benefit of neurological confirmation of "death" of the brainstem. The best examples of such medical conditions are amyotrophic lateral sclerosis (Lou Gehrig's disease) and anencephalus in newborns.

The position that irreversible cessation of respiration is the sole determining factor in pronouncing death leads to a conclusion that would be dismissed by everyone as absurd. Polio, fortunately, is not the scourge that it was some years ago. But the memories of polio victims who were forced to live in iron lung machines for their survival are very vivid. If respiratory activity is regarded as the sole determining criterion of the presence of life it would follow that a polio victim who is entirely dependent upon an iron lung machine or a similar device in order to live would be regarded as dead despite the fact that such an individual is fully conscious and is indeed capable of engaging in intellectual activities requiring a high degree of cognition. Even if the polio victim's loss of respiratory activity cannot be positively diagnosed as irreversible, were respiratory activity to be accepted as the sole indicator of life, his subsequent demise would retroactively establish that death actually occurred upon loss of spontaneous respiration. The response, as might be anticipated, is that irreversible cessation of respiration is designed to be applied as the determining criterion of death only in cases in which the patient is no longer conscious. The problem, however, is not resolved thereby. Nowhere in rabbinic literature is there the slightest hint that consciousness is an indicator of life or that its absence is an indication that death has occurred. Moreover, even if that caveat is accepted, this position yields the conclusion that any nonsapient patient who has suffered irreversible respiratory arrest is dead regardless of the presence of other vital signs including cardiac activity and neurological functions as evidenced by a positive electroencephalogram.

III

It therefore becomes necessary to examine the talmudic sources that serve as the basis for establishing a definition of death and to

examine the criteria that are delineated for use in making that determination. The primary source of this definition is found in the Gemara, *Yoma* 85a, in connection with suspension of Sabbath regulations for the sake of preservation of human life. The case in point concerns an individual trapped under the debris of a fallen building. Since desecration of the Sabbath is mandated even on the mere chance that human life may be preserved, the rubble must be cleared away even if it is doubtful that a person might have survived under the debris. However, once it has been determined with certainty that the accident victim has expired, no further violation of Sabbath regulations may be sanctioned. The question which then arises is how much of the body must be uncovered in order to ascertain conclusively that death has in fact occurred. Two opinions are recorded. The first opinion cited by the Gemara maintains that the nose must be uncovered and the victim is to be pronounced dead only if, upon examination of the nostrils, no sign of respiration is detected. The second opinion maintains that death may be determined by examination of the chest for the absence of a heartbeat. Thereupon follows a statement of Rav Papa to the effect that there is no disagreement in instances in which the body is uncovered "from the top down." In such cases, absence of respiration is regarded by all as conclusive. The dispute, declares R. Papa, is limited to a situation in which the body is uncovered "from the bottom up" and thus the heart is uncovered first.

It is quite possible to read this statement of the Gemara as indicating that the controversy reflected in these two opinions is with regard to whether absence of a heartbeat is itself to be accepted as a sufficient condition in establishing that death has occurred. Accordingly, the first opinion insists upon examination of the nostrils in order to determine that respiration has ceased because respiration is the sole criterion of life. The second opinion maintains that, while if examination "from the top down" reveals that there is no respiration that in itself may be taken as a sufficient indication that death has occurred, nevertheless when the body is uncovered from "the bottom up" absence of cardiac activity is equally regarded as a sufficient indication that death has occurred. Since both Rambam, *Hilkhot Shabbat* 2:19, and *Shulhan Arukh, Orach Hayyim* 329:4, rule in accordance with the first opinion it might be concluded that respiration is indeed the sole determining factor and therefore irreversible cessation of respiration is both a necessary and sufficient criterion of death.

This analysis, attractive as it may be as a literal reading of the Gemara, is contradicted by Rashi in two separate comments. Rashi introduces the discussion in *Yoma* 85a with the remark that the

controversy concerning examination of the nostrils or of the heart is limited to situations in which the victim is “comparable to a corpse in that he does not move his limbs.” In those words, Rashi clearly negates any interpretation of the Gemara that would regard respiratory activity as the sole criterion of life. According to Rashi, the presence of any vital force, as evidenced by movement of an organ or limb is, by definition, a conclusive indication that death has not occurred.²⁹ The connotation of the term “*ever*” employed by Rashi is not limited to a limb but connotes any organ of the body.³⁰ Accordingly, ongoing cardiac activity is, in and of itself, an absolute criterion of life even in patients incapable of spontaneous respiration.

Moreover, Rashi adds a further comment indicating that the dispute recorded in the Gemara is not all a dispute with regard to whether death can be pronounced disjunctively by determining the absence of either cardiac function or respiratory activity or whether it can be determined solely by the absence of respiration. Rather, declares Rashi, the controversy is with regard to the diagnostic reliability of external examination of the chest. Insistence upon examination of the nostrils, stresses Rashi, is not because presence or absence of cardiac symptoms is irrelevant but because “at times life is not recognizable at the heart but is recognizable at the nose.” Rashi does not at all intend to suggest that spontaneous respiration may continue after cardiac arrest. He states simply that, for diagnostic purposes, it is necessary to examine the nostrils because inability to detect a heartbeat is inconclusive, as indeed it assuredly is, particularly in the case of a debilitated accident victim who may also be obese and, in addition, the examination is performed without the aid of a stethoscope. In explaining the basis of the talmudic opinion that regards examination of the area surrounding the heart as sufficient, Rashi comments, “for it is there that the soul beats,” i.e., the crucial indicator of life is the presence of a heartbeat. Rashi does *not* suggest that the opposing view rejects this fundamental verity; the opposing view rejects reliance upon examination of the heart, asserts Rashi, only because of a possible error in diagnosing the absence of a heartbeat. Rashi clearly understood that both opinions recognize cardiac activity as the primary indicator of the presence of life. Rashi’s analysis leads inevitably to the finding that if, for whatever reason, cardiac activity persists after respiration has ceased the patient must be regarded as yet alive.

This analysis of Rashi’s comments is expressly formulated by R. Zevi Ashakenazi, *Teshuvot Hakham Tsevi*, no. 77. *Hakham Tsevi* states explicitly that in a situation in which “life” is not evident at the nose for whatever reason but *is* evident at the heart, the presence of cardiac activity is itself sufficient to negate any other presumptive

evidence of death.³¹ *Hakham Tsevi* notes that in some cases a heartbeat may be imperceptible even though the individual is still alive. A weak beat may not be audible or otherwise perceivable since the rib cage and layers of muscle intervene between the heart itself and the outer skin. Respiration is more readily detectable and hence the insistence upon the examination of the nostrils. However, concludes *Hakham Tsevi*, "It is most clear that there can be no respiration unless there is life in the heart, for respiration is from the heart and for its benefit." According to *Hakham Tsevi*, cessation of respiration constitutes the operative definition of death solely because lack of respiration, in usual circumstances, is also indicative of cessation of cardiac activity.³² Similarly, R. Moses Sofer, *Teshuvot Hatam Sofer, Yoreh De'ah*, no. 338, rules that absence of respiration is conclusive only if the patient "lies as an inanimate stone and there is no pulse whatsoever." In the same vein R. Joseph Saul Nathanson, *Yad Sha'ul, Yoreh De'ah* 394, declares, "It is clear as the sun that the indicator of life is the beating of the heart or breathing of the nose." These sources indicate clearly that death occurs only upon cessation of both cardiac and respiratory functions.³³ Rabbenu Bahya, in his commentary on Deuteronomy 6:5, describes the heart as the last of the organs of the body to die and remarks that the phrase "with all your heart" indicates that love of God must persist until the last moment of life, i.e., when death becomes complete upon cessation of the beating of the heart. The absence of other vital signs is not, insofar as Halakhah is concerned, sufficient to establish that death has occurred.

There is clear talmudic evidence establishing that cessation of respiration is itself not an absolute criterion of death. The Gemara, *Gittin* 70b, states that a person whose esophagus and trachea have been severed continues to enjoy legal capacity to execute a bill of divorce on behalf of his wife. Such an individual is described as "alive," albeit facing imminent death. The individual in question is regarded as living despite his obvious inability to breathe. Similarly, the Mishna, *Hullin* 42a, enumerates perforation of the trachea as one of the forms of trauma that renders an animal a *terefah* and hence impermissible as food. It is noteworthy that apparently even perforation of the trachea in a manner that results in termination of respiration renders the animal a *terefah* but not a *nevelah*, i.e., the animal is forbidden because it has suffered a trauma that will result in death but is not yet regarded as dead and hence is not forbidden as carrion. Certainly the individual described in *Gittin* 70b remains in full possession of his cognitive faculties, otherwise he could not signal his desire to execute a divorce; similarly, the condition of the animal described in *Hullin* 42a is compatible with a state of consciousness.

However, as has been earlier noted, consciousness, while assuredly absent in an organism meeting halachic criteria of death, is nowhere posited as a condition negating otherwise dispositive criteria of death.

The position reflected in Rashi's comments does serve to eliminate any objection raised on the basis of the statements found in *Gittin* 70b and *Hullin* 42a. Rashi stipulates that the criteria enumerated in *Yoma* 85a presuppose absence of any movement.³⁴ Hence movement of any nature serves to negate any other indication of death. In an unpublished letter to the editor of *Or ha-Mizrah*, R. Saul Israeli, a member of the Chief Rabbinate Council, indicates that the Chief Rabbinate Council endorsed cessation of respiration, when confirmed by brain death criteria, as an absolute indicator of death only because, in such situations, muscular movement is absent. This qualification goes beyond the position formulated in the statements issued by the Chief Rabbinate Council, neither of which stipulates any such condition. Quite apart from the fact that Rashi clearly states that it is irreversible cessation of *both* respiratory and cardiac activities that is required in order to establish that death has occurred, this modification of the notion of respiratory death is unsatisfactory for a number of reasons:

1. Movement of extremities is not incompatible with cessation of respiration or with so-called "brain death" criteria. There are cases reported in the medical literature of patients manifesting accepted neurological criteria of brain death in whom movement has been observed.³⁵ There is no obvious reason to presume that this movement is a form of non-vital spasmodic movement or *pirkus* described in *Oholot* 1:6 since the movement both appears to be indistinguishable from ordinary muscular movement and can continue over a comparatively long period of time.

2. A person afflicted by an illness or illnesses causing irreversible cessation of respiration plus total paralysis, e.g., a patient suffering from a severe form of polio, would perforce be regarded as dead on the basis of the criteria set forth by the Chief Rabbinate Council and Rabbi Israeli. It must again be emphasized that absence of consciousness is not posited in talmudic sources as a necessary criterion of death.

3. If it is granted that movement of a limb is incompatible with death and hence serves in itself to establish that the patient is alive, presence of a heartbeat serves, *mutatis mutandis*, to establish that the patient is yet alive. Surely, the motion of the cardiac muscle is no less the manifestation of a vital force than is muscular movement in an extremity.

It must be emphasized that the heartbeat of a patient sustained on a respirator is in no sense artificial. A patient in such a state is incapable of spontaneous respiration and will certainly die if removed from the respirator. The reason is very simple: a normally functioning heart cannot sustain life if the blood it pumps is deprived of oxygen. A perfectly health person cannot survive in a vacuum chamber for more than a matter of minutes. A respirator assists only in the delivery of oxygen; it does not artificially pump blood through the body as is the case when a patient is placed on a heart-lung machine. Typically, the heart of a “brain dead” patient is entirely healthy and performs all cardiac functions in a normal and spontaneous manner. Were this not the case the heart would be useless for transplantation purposes since it would not be capable of sustaining life in a recipient.

R. Moses Feinstein, *Iggerot Mosheh, Yoreh De'ah*, II, no. 146, explicitly and unequivocally rejects brain death criteria as incompatible with Halakhah “since it is not mentioned in the Gemara or the Codes that there is an indicator of life in the brain.” It is precisely for this reason that Rabbi Feinstein, *Iggerot Mosheh, Yoreh De'ah*, II, no. 174, categorizes excision of the heart from a donor for transplantation purposes as an act of homicide.

Nevertheless the Chief Rabbinate Council reports in its statement that in later years Rabbi Feinstein reversed his earlier position and accepted neurological criteria of death as valid for purposes of Jewish law. Any such report is entirely contrafactual.³⁶ Rabbi Feinstein’s opposition to heart transplantation because of the fact that it entails murder of the donor is reiterated in *Iggerot Mosheh, Hoshen Mishpat*, II, no. 72. That volume was published in late 5745, some eight months before Rabbi Feinstein’s death. It is inconceivable that Rabbi Feinstein would have sanctioned publication of a halakhic opinion to which he no longer subscribed, particularly a halakhic opinion literally pertaining to matters of life and death. Moreover, his son, R. David Feinstein, is quoted in the Tishri 5748 issue of *Ha-Pardes* as declaring that at no time did his father retract his earlier opinion in opposition to acceptance of brain death criteria.

Some confusion appears to have arisen as a result of a comment included in *Iggerot Mosheh, Yoreh De'ah*, III, no. 132, dated 5 Iyar 5736, in which in at least some instances, Rabbi Feinstein requires blood flow studies in order to confirm that death has occurred. Were this to constitute a change in his position it would stand in stark contradiction to his later responsum, *Iggerot Mosheh, Hoshen Mishpat*, II, no. 72, dated 1 Adar II 5738, in which he reiterates his earlier ruling to the effect that removal of a heart from a donor

pronounced dead on the basis of brain death criteria constitutes an act of homicide. In that latter responsum, the last in the series of responsa addressing this issue, Rabbi Feinstein clearly adheres to the position enunciated in his earliest responsa regarding this subject. A careful reading of *Iggerot Mosheh, Yoreh De'ah*, III, no. 132—the responsum which is cited in support of acceptance of brain death criteria—reveals that Rabbi Feinstein did not in any way rely upon neurological criteria or blood flow studies in order to establish the occurrence of death. Rather, on the basis of information presented to him, he ruled that accident victims should not be pronounced dead on the basis of respiratory criteria alone. Since it is possible that, in such circumstances, cessation of respiration is not irreversible, he requires that further confirmatory tests be performed. In such cases, blood flow studies are required as an added stringency, not as in themselves definitive criteria of death.³⁷ This is entirely compatible with the concluding remarks in his earlier published responsum, *Iggerot Mosheh, Yoreh De'ah*, II, no. 146, in which Rabbi Feinstein declares that there is talmudic evidence indicating that a person can survive for several days without breathing.³⁸ In that responsum Rabbi Feinstein further states, “However it is certain and elementary that the nose is not the organ which gives life to men. . . . Rather the brain and the heart are those [organs] which give life to men. . . . We have the indicator of life only through the nose even though [the nose] does not cause respiration because we cannot properly recognize [life] in the heart or in the navel and certainly we cannot recognize [life] in the brain. The connotation of the verse “. . . all in whose nostrils is the breath of the spirit of life “ (Genesis 7:22) does not [refer to] the intrinsic spirit of life for that is certainly not in the nose; rather, the spirit of life which we see is [perceived] in the nostrils even though it is not seen in the large limbs, the limbs of motion, and [it is perceived in the nostrils] even after it is no longer perceived either in the beating of the heart or the navel.”³⁹ Those comments certainly reflect a clear recognition that the primary vital force in the human organism is the beating of the heart. Other criteria must be sought and their absence is accepted as evidence of cessation of life only because, in some circumstances, absence of a detectable heartbeat is an unreliable indicator that death has actually occurred. Clearly, the presence of a spontaneous heartbeat is itself an absolute indication of the presence of life in the organism.⁴⁰ The matter is perhaps best summed up in the words of R. Eliezer Waldenberg, *Tsits Eli'ezer*, X, no. 25, chap. 4, sec. 7:

There are those who err in thinking that examination of the nose is indicative of cessation of brain activity and, on the basis of this, wish to establish that life is contingent upon the brain In truth this is an absolute error and

contradicts that which our Sages, of blessed memory, have established on our behalf . . .”And there is nothing new under the sun” (Ecclesiastes 1:9). There have already been many among those who are great in wisdom who were inclined to think that way, i.e., that life is contingent upon the brain, but greater persons came and disproved these notions as is recorded in *Teshuvot Hakham Tsevi* . . .

NOTES

1. See Rambam, *Guide of the Perplexed*, Book I, chap. 42, who does indeed assert that, in biblical usage, the word “*mavet*” is a homonym having precisely such connotations.
2. *Black’s Law Dictionary* (rev. 4th ed. 1968).
3. See, however, the commentary of Rosh, *ad locum*, who differs from other commentators in asserting that, according to both Rashi and *Tosafot*, the definition of death recorded in the Mishnah is limited to death of animals but does not constitute a definition of death for human beings. Cf., *infra*, note 4, and R. Moses Feinstein, *Iggerot Mosheh, Yoreh De’ah*, II, no. 174, sec. 1, who expresses doubt with regard to whether Rosh intends to exclude only the various other forms of “severance” of the head described *infra*, note 4, or actual decapitation as well.
4. However, the argument, in this writer’s opinion, is not conclusive. The Gemara, *Hullin* 21a, records three conflicting opinions regarding the connotation of the phrase “whose heads have been severed”: 1) decapitation; 2) severance of the spinal column in the thoracic area together with severance of the trachea and the esophagus in their entirety; 3) severance of the spinal column in the thoracic area coupled with perforation of the major portion of both the trachea and the esophagus. *Tosafot* asserts that there is a fourth opinion, viz., severance of the spinal column and of the major portion of the muscle tissue surrounding the thoracic cavity. In a responsum written by the brother of *Taz*, appended to the commentary of *Taz, Yoreh De’ah* 26, the author asserts that severance of the spinal column in this context includes severance of the spinal cord as well. If “severance” of the head is to be understood as synonymous with death because of resultant dysfunction of the brain—or, more precisely, if dysfunction of the brain is tantamount to destruction of the brain and destruction of the brain is synonymous with death—the additional requirement for severance of the trachea and esophagus in whole or in part or severance of muscle tissue is incomprehensible: severance of the spinal cord in the thoracic area effectively renders the brain dysfunctional. The requirement for severance of additional organs or tissue leaves no basis for a conclusion that even pithing of the brain is, in itself, synonymous with death. Death, then appears to be defined, not as dysfunction or even destruction of the brain, but as removal or separation of the brain together with additional tissue from the body. Thus, even total lysis would not be categorized halakhically as decapitation because the trachea, esophagus and muscle tissue remain intact. Elsewhere, this author has argued that severance of the head, as described in *Oholot* and defined in *Hullin*, is not a novel definition of death in terms of decapitation in the sense of destruction of the brain, but rather that the severe loss of blood as a result of decapitation renders all residual motion or movement of limbs or organs, including the heart, spasmodic in nature. Thus, the essential and intrinsic criterion of life is motion that is vital in nature; cardiac activity which, as will be shown, is the primary indicator of life, is simply one form, and indeed the primary example, of vital motion. Thus, *Oholot* 1:6 and *Yoma* 85a do not represent two disjunctive definitions of death but reflect one unitary definition, viz., vital motion in any organ or limb. *Yoma* 85a defines death as the total absence of motion in any organ of the body as manifested by cessation of both respiratory and cardiac activity; *Oholot* 1:6 defines death as the cessation of integrated, vital motion that attends the copious loss of blood accompanying decapitation. See this writer’s articles in *Ha-Pardes*, Tevet 5737, pp. 15–18; *Torah she-be-al Peh*, XXV (5744), 158–161; and *Or ha-Mizrah*, Tishri 5748, p. 84.
5. See President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Biochemical Research, *Defining Death: A Report on the Medical, Legal and Ethical*

Issues in the Determination of Death (July, 1981), p. 17. The earliest study of the interval between manifestation of brain death criteria and systemic death reports that the heart can continue to function without any cerebral influence for one to seven days; see the discussion in "Colloque sur les états frontières entre la vie et la mort," ed. by Robert P. Vigorney, *Marseille Chirurgical*, vol. 18, no. 1 (January-February 1966), pp. 1-194. Others have reported continued cardiac activity in brain-dead patients for a period of between one and seven days with an average of 2.5 days; see G.E. Ouakine, "Cardiac and Metabolic Alterations in Brain Death: Discussion Paper," *Brain Death: Interrelated Medical and Social Issues, Annals of the New York Academy of Sciences*, vol. 315 (1978), p. 252. Yet other early studies report that patients who manifest the Harvard Criteria will suffer somatic death within two to four weeks; see P.M. Black, "Brain Death" *New England Journal of Medicine*, vol. 299, (August 17, 1978), pp. 338-344 and vol. 299, no. 8 (August 24), pp. 393-401; and J. L. Bernot "On the Definition and Criterion of Death," *Annals of Internal Medicine*, vol. 94, no. 3 (March, 1981), pp. 389-394. A report of other studies conducted in three separate medical institutions during that period reveals that the median time between these two events was between 3.5 and 4.5 days; see Bryan Jennett *et al.*, "Brain Death in Three Neurological Units," *British Medical Journal*, vol. 282 (January 14, 1981), pp. 533-539. The same principal investigator reports that in none of those cases did cardiac activity persist longer than 14 days; see Bryan Jennett and Catherine Hessel, "Brain Death in Britain as Reflected in Renal Donors," *British Medical Journal*, vol. 281 (August 1, 1981), p. 359. A more recent study reveals that, in the patients studied, spontaneous cardiac death occurred between eight hours and 10.4 days following brain death with a mean of approximately 2.5 days; see Madeleine M. Grigg, *et al.*, "Electroencephalographic Activity After Brain Death," *Archives of Neurology*, vol. 44, no. 9 (September, 1987), p. 949. Another recent report concerning brain death in children reveals that the interval between clinical recognition of brain death and spontaneous cardiac death ranged between six hours and twelve days with a mean of 3.7 days; see L. A. Alvarez *et al.*, "EEG and Brain Death Determination in Children," *Neurology*, vol. 38, no. 2 (February, 1988), p. 228. For reports of isolated instances of survival for longer periods see Joseph E. Parise *et al.*, "Brain Death with Prolonged Somatic Survival," *The New England Journal of Medicine*, vol. 306, no. 1 (January 7, 1982), pp. 14-16 and subsequent letters to the editor published in vol. 306, no. 22 (June 3, 1982), pp. 1361-63. The longest reported period of survival subsequent to brain death occurred in a pregnant woman who delivered a baby by Caesarian section at 31 weeks' gestation, 63 days after a diagnosis of death was made on the basis of the Harvard criteria; see David F. Field, "Maternal Death During Pregnancy," *Journal of the American Medical Association*, vol. 260, no. 6 (August 12, 1988), pp. 816-822.

6. Respiration is controlled by the vagus nerve whose nucleus is located in the medulla; hence respiratory activity cannot continue after destruction of the brain stem or cessation of brain stem activity. The beating of the heart is autonomous, although the rate of the heartbeat is controlled by the sympathetic nervous system. Hence, in theory, cardiac activity may continue indefinitely even subsequent to destruction of the brain. Nevertheless, survival of the sympathetic nervous system is probably dependent upon cerebral influences. Hypothermia, which serves to counteract the stimulatory effect of the central system, has been reported in brain dead patients prior to cardiac arrest. Body temperature is regulated by the hypothalamus within the brain. It has been shown that hypothalamic activity persists, at least for a time, even in patients in whom "brain death" has been diagnosed. See *infra*, note 11. Thus it is quite possible that *total* cessation of all brain function, including hypothalamic functions, rapidly leads to cardiac death and, conversely, cardiac activity may persist for a relatively short period in brain dead patients only because the patients are as yet not truly "brain dead," i.e., some residual brain functions have not ceased. Cf., David Field, *loc. cit.*, p. 818.

7. See *Hullin* 46b.

8. See *Hullin* 53b.

9. That Mishnah, *Bekhorot* 37a, and the Gemara, *Hullin* 46b, describe a "dry" (*yavesh*) or withered ear in a manner which suggests that a limb or organ in the state described is regarded as non-existent. The category of *yavesh* is defined by the Gemara, *Hullin* 46b, as the absence of even a "drop of blood" when the flesh is pierced. That level of degeneration is contrasted with that of *basar she-nifrah be-tsiporen* with the ensuing explanation that

tissue of an internal organ that has not totally degenerated may possibly heal, but the tissue of an ear, once it has become "dry," can never heal because the ear is constantly exposed to the wind. Therefore, insofar as external organs are concerned, a lesser level of tissue degeneration is equated with destruction of the organ. Cf., *Iggerot Mosheh, Orah Hayyim*, I, nos. 8 and 9.

10. It must be stressed that mere cessation of blood flow to the brain is not the halakhic equivalent of decapitation. Total curtailment of blood flow to an organ is not tantamount to excision of that organ for purposes of rendering the animal a *treifah*; only subsequent necrosis has that effect. Similarly, severance of the head from the body is not equated with death because of the absence of an integrated blood flow between the brain and the body but because of the physical severance of the brain from the body—or, arguably, its physiological equivalent in the form of total necrosis or total lysis of the brain—which is equated with disintegration of the organism and hence with death.
11. Christopher Pallis, *British Medical Journal*, vol. 291 (September 7, 1985), p. 666.
12. G. M. Hall *et al.*, "Hypothalamic Pituitary Functions in the 'Brain-Dead' Patient," *Lancet*, December 6, 1980, p. 1259. See *supra*, note 6.
13. See P. Braunstein *et al.*, "A Simple Bedside Evaluation For Cerebral Blood Flow in the Study of Cerebral Death," *The American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, vol. 118, no. 4 (August, 1973), pp. 757–767, and Julius Korein *et al.*, "Radioisotopic Bolus Technique As A Test To Detect Circulatory Deficits Associated with Cerebral Death," *Circulation*, vol. 51, no. 5 (May, 1975), pp. 924–939.
14. Korein, "Radioisotopic Bolus Technique," p. 924.
15. See J. Korein, P. Braunstein *et al.*, "Brain Death: I. Angiographic Correlation with a Radioisotope Bolus Technique for Evaluation of a Critical Deficit of Cerebral Blood Flow," *Annals of Neurology*, vol. 2, no. 3 (September, 1977), pp. 1505–1510.
16. Julius M. Goodman *et al.*, "Confirmation of Brain Death with Portable Isotope Angiography: A Review of 204 Consecutive Cases," *Neurosurgery*, vol. 16 (April, 1985), no. 4., p. 492.
17. *Loc. cit.*, p. 496.
18. See Stephen Ashwal and Sanford Schneider, "Failure of Electroencephalography to Diagnose Brain Death in Comatose Children," *Annals of Neurology*, vol. 6, no. 6 (December, 1979), pp. 512–517.
19. *Loc. cit.*, p. 517.
20. See Madeleine Grigg *et al.*, "Electroencephalographic Activity After Brain Death," pp. 948 f.
21. There have been at least two reported cases of the birth of live babies subsequent to brain death resulting from natural causes. See William P. Dillon *et al.*, "Life Support and Maternal Death During Pregnancy," *Journal of the American Medical Association*, vol. 248, no. 9 (September 3, 1982), pp. 1089–91 and David R. Field, *supra*, note 5. In a third case the patient satisfied generally accepted criteria of brain death although electroencephalograms showed some slight, unspecific intermittent activity. However, the extensive brain damage evident upon post-mortem examination was compatible with clinical findings showing no detectable brain stem functions; see J. E. Heikkinen *et al.*, "Life Support for 10 Weeks with Successful Fetal Outcome after Fatal Maternal Brain Damage," *British Medical Journal*, vol. 290 (April 7, 1985), pp. 1237–38. *Tosafot, Hullin* 38b, *Baba Batra* 142b and *Niddah* 44a, maintain that, other than in cases of trauma, the fetus cannot survive the demise of its mother. Cf., *Magen Avraham, Orah Hayyim* 330:10. Were "brain death" to be regarded by Halakhah as death, the reported phenomenon would constitute a post-mortem birth. This is, however, hardly a conclusive argument for rejecting neurological criteria since the principle that biological and physiological phenomena have undergone changes over a period of centuries (*nishaneh ha-tevah*) is well established; see *Tiferet Yisra'el, Bekhorot* 3:1. Nevertheless, the spectre of a cadaver producing offspring does induce a measure of intuitive skepticism and should certainly give pause in accepting any novel theory that defines the mother as a cadaver.
22. It should also be noted that, at least as applied by many physicians in clinical practice, recovery has occurred subsequent to manifestation of "brain death" criteria upon which the physician was prepared to rely. See William D. Goldie and Robert H. Price, "Recovery from 'Brain Death' with Absent Evoked Potentials," *Journal of Clinical Neurophysiology*, vol. 5 (1988), no. 4, p. 354; and A. Ogunyemi *et al.*, "Generalized Convulsive Seizure in a

- Patient with Clinical Features of Brain Death," *Epilepsia*, vol. 29, no. 5 (September-October, 1988), p. 673. Amar S.N. Al-Din *et al.*, "Coma and Brain Stem Areflexia in Brain Stem Encephalitis (Fisher's Syndrome)," *British Medical Journal*, vol. 291 (August 24, 1985), pp. 535-536, report that three patients recovered from apneic coma accompanied by absent brain stem reflexes. The authors attribute the neurological phenomena manifested in those patients to brain stem encephalitis.
23. Henry K. Beecher, "Definitions of 'Life' and 'Death' for Medical Science and Practice," *Annals of the New York Academy of Science*, vol. 169, part. 2 (January 21, 1971), p. 471.
 24. *Journal of the American Medical Association*, vol. 205, no. 6 (August 5, 1968), pp. 337-340. Criticism on the grounds that use of this term "perpetuates confusion in the medical field between the state of being permanently unconscious, as are patients in a persistent vegetative state, and that of being dead" is unwarranted. See the report of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Deciding to Forego Life-Sustaining Treatment, A Report on the Ethical, Medical and Legal Issues in Treatment Decisions* (March, 1983), p. 173. The distinction between irreversible coma and systemic death is clear and precise. Moreover, the persistent vegetative state is readily distinguishable from irreversible coma.
 25. This is the purpose for which neurological criteria are recognized in Sweden and Poland. In those countries manifestation of brain death criteria is not unequivocally equated with death but is accepted as warranting withdrawal of ventilating support. Consequently, in those countries, organs may not be removed for purposes of transplantation while the heart is still beating. See Christopher Pallis, "ABC of Brain Stem Death," *British Medical Journal*, vol. 286 (January 15, 1983), p. 210.
 26. See *Journal of Halacha and Contemporary Society*, No. XVII (Spring, 1989), p. 44.
 27. See also *idem*, *Teshuvot Minhat Yitshak*, V, no. 7, sec. 5.
 28. See also *idem*, *Tsits Eli'ezer*, X, no. 25, chap. 4, sec. 7.
 29. The problem, however, is that there is no hint in the discussion recorded in *Yoma* 85a that absence of movement is a necessary criterion of death. It seems to this writer that Rashi bases himself upon the language employed in *Oholot* 1:6. The Mishnah incorporates the phrase "even though they convulse spasmodically" in postulating death as the necessary and immediate result of decapitation. Inclusion of this justificatory phrase seems superfluous in light of the definition of death formulated in *Yoma* 85a. Decapitation perforce terminates respiration. Since cessation of respiratory activity is itself equated with death continued movement should be an irrelevancy undeserving of mention. Yet the Mishnah finds it necessary to take note of that phenomenon. Accordingly, deduces Rashi, the unstated underlying premise must be that movement of a limb is an indicator of life and its presence negates other criteria of death. If so, the presence of residual movement in a decapitated animal should negate its status as carrion. Confronting that objection to its equation of decapitation with death, the Mishnah distinguishes spasmodic motion, or *pirkus*, from normal, and hence vital, motion. Presence of this latter does indeed negate other criteria of death; the former is irrelevant. Hence the conclusion formulated by Rashi that other criteria of death become significant only if movement of limbs has totally ceased. For further development of this point see this writer's discussion in *Torah she-be-al Peh*, XXV (5744), 158-159.
- Recognition of the fact that the Mishnah's sole reference to a criterion of death is to movement as such a criterion leads to the concept that presence of a heartbeat or respiratory activity do not constitute independent criteria which must also be satisfied, but are simply vital forms of movement which must cease before the organism is regarded as dead. Accordingly, *Oholot* 1:6 and *Yoma* 85a do not represent two disjunctive definitions of death but reflect a single criterion, viz., absence of all vital motion. Acceptance of this analysis yields the conclusion set forth *supra*, note 4.
30. The human body is described in *Bekhorot* 45a and Rashi *ad locum* as comprised of 248 "evarim."
 31. See R. Eliezer Waldenberg *Tsits Eli'ezer*, X, no. 25, chap. 4, sec. 7. Cf. also, *Tsits Eli'ezer*, IX, no. 46, sec. 5 who cites medieval writers on physiology—among them *Sha'ar ha-Shamayim*, a work attributed to the father of Gersonides—who declare that life is dependent upon nasal respiration because warm air from the heart is expelled from the nose and cold air which cools the heart, enters through the nose. It was thus clearly recognized that respiration without cardiac activity is an impossibility.

32. *Hakham Zevi's* original ruling elicited the sharp disagreement of R. Jonathan Eybeschutz and sparked a controversy which has become classic in the annals of Halakhah. The dispute centered around a chicken which, upon evisceration, proved to have no discernible heart. The chicken was brought to *Hakham Tsevi* for a determination as to whether the fowl was to be considered *tereifah* because of the missing heart. *Hakham Tsevi* ruled that the chicken was kosher because it is empirically impossible for a chicken to lack a heart since there can be no life whatsoever without a heart. The chicken clearly lived and matured; hence it must have had a heart which somehow became separated from the other internal organs upon the opening of the chicken and was inadvertently lost. The impossibility of life without a heart, in the opinion of *Hakham Tsevi*, is so obvious a verity that he declares that even the testimony of witnesses attesting to the absence of the heart and the impossibility of error is to be dismissed as blatant perjury. R. Jonathan Eybeschutz, in a forceful contradictory opinion, agrees that such a possibility cannot be dismissed out of hand. In his commentary on *Yoreh De'ah, Kereti u-Peleti* 40:4, R. Jonathan Eybeschutz contends that the functions of the heart, including the pumping of blood, might well be performed by an organ whose external form is quite unlike that of a normal heart and which may even be located in some other part of the body. This organ might be indistinguishable from other, more usual tissue, and hence the observer might have concluded that the animal or fowl lacked a "heart."
- There is nothing in this opinion which contradicts the point made on the basis of *Hakham Tsevi's* responsum with regard to determination of the time of death. R. Jonathan Eybeschutz concedes that life cannot be sustained in the absence of some organ that performs cardiac functions. R. Jonathan Eybeschutz argues only that, in the apparent absence of a recognizable heart, cardiac functions may possibly be performed by some other organ; he does not at all assert that life may continue following cessation of the functions normally performed by the heart.
33. It must be emphasized that among both early-day and latter-day authorities there is not to be found a single commentator who contradicts Rashi's exposition in any way. Although some authorities, including *Teshuvot Radbaz*, V, no. 108, and *Bet Yosef, Orach Hayyim* 60, assert that Rashi's commentaries are not to be given the same weight as normative rulings of codifiers of the law, that principle of halakhic decision-making is not germane to the question at hand. *Hazon Ish* asserts that this principle is limited to comments that might reflect hypothetical positions or that might be construed as explaining an individual opinion recorded in the Gemara, but not to be applied to comments that are clearly intended as normative and definitive. Moreover, declares *Hazon Ish*, "All this could be discussed if there were some [authority] who disputed the matter and we would have need of deciding in accordance with the majority of opinions. But in the instant case in which we have not found a single early authority who disputes this matter, certainly the testimony of early authorities is accepted by us as that which was spoken to Moses at Sinai." See letter of *Hazon Ish* included by R. Kalman Kahane in his article on the international dateline, *Ha-Ma'ayan*, Tammuz 5714, pp. 31–38 and reprinted in R. Menachem Kasher, *Kav ha-Ta'arikh ha-Yisra'eli* (Jerusalem, 5737), p. 195. It should also be noted that the principle formulated by *Bet Yosef* and *Radbaz* is entirely negated by some authorities; see R. Chaim Joseph David Azulai, *Mahazik Berakhah, Yoreh De'ah* 12:1 and *idem, Birkei Yosef, Hoshen Mishpat* 25:31. See also this writer's comments, *Or ha-Mizrah*, Tishri 5749, pp. 86–88.
34. Hence, as indicated earlier, *Hatam Sofer* declares that death cannot be pronounced unless the patient lies "as an inanimate stone." The principle that absence of motion is a necessary condition of death is confirmed by R. Shalom Mordecai Schwadron, *Teshuvot Maharsham*, VI, no. 124.
35. See Leslie P. Ivan, "Spinal Reflexes in Cerebral Death," *Neurology*, vol. 23, no. 6 (June, 1973), pp. 650–652; S. Mandel, A. Arenas and D. Seasta, "Spinal Automatism in Cerebral Death," *New England Journal of Medicine*, 1982, vol. 307, no. 8 (August 19, 1982), p. 501; Allen H. Ropper, "Unusual Spontaneous Movements in Brain-Dead Patients," *Neurology*, vol. 34, no. 8 (August, 1984), pp. 1089–92.
36. The context of the alleged reversal is not made clear in that statement. If it is inferred from a report cited in footnote 2 of that statement to the effect that Rabbi Feinstein permitted an organ recipient to undergo transplant surgery, it is entirely unwarranted since such a ruling does not at all entail endorsement of brain death criteria in pronouncing the death of the

donor. Removal of an organ in contravention of Halakhah does not render implantation of that organ impermissible. See this writer's article in *Or ha-Mizrah*, Nisan-Tammuz 5748; R. Aaron Soloveitchik, *Journal of Halacha and Contemporary Society*, pp. 45–47; *idem*, *Or ha-Mizrah*, Nisan-Tammuz 5748, pp. 301 f; and R. Elazar Kahanow, *Ha-Metifta*, 5747, pp. 64 f.

37. For further analysis of the position set forth in this reponsum see this writer's "Neurological Criteria of Death and Time of Death Statutes," *Jewish Bioethics*, ed. Fred Rosner and J. David Bleich (New York, 1979), pp. 305–307.
38. Cf., *Jewish Bioethics*, p. 313, note 2.
39. See also *Jewish Bioethics*, p. 314, note 4.
40. The authorities cited earlier as having issued statements opposing this ruling of the Chief Rabbinical Council all concur in the position that a "brain dead" patient maintained on a respirator remains alive because of the presence of continued cardiac activity. Dr. Abraham Sofer-Abraham has publicly reported this to be the view of R. Joseph Eliashiv as well; see *Or ha-Mizrah*, Tishri 5749, p. 90. This is also the position of R. Moses Sternbuch, *Ba'ayot ha-Zman le-Or ha-Halakhah* (Jerusalem, 5729), p.11, and R. Elazer Kahanow, *Ha-Metifta*, 5747, pp. 40 f. In a presentation before the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research on July 17, 1980, this writer testified, with prior authorization, that this was also the position of R. Shlomoh Zalman Auerbach, R. Jacob Kaminetsky, R. Jacob Ruderman and R. Isaac Hutner.

For more detailed discussions of the definition of death in Jewish law see this writer's "Establishing Criteria of Death," *Contemporary Halakhic Problems*, I (New York, 1977), 372–393 (reprinted in *Jewish Bioethics*, pp. 277–295); "Neurological Criteria of Death and Time of Death Statutes," *Jewish Bioethics*, pp. 303–316; "Minority Report: Time of Death Legislation," *The Determination of Death*, report of the New York State Task Force on Life and the Law, July, 1986; "Religious Traditions and Public Policy," *Assia: Jewish Medical Ethics*, May, 1988, pp. 17–24; and "Artificial Heart Implantation," *Contemporary Halakhic Problems*, III (New York, 1989), 160–193; Hebrew-language articles addressing this issue have been published by this author in *Or ha-Mizrah*, Nisan 5732 (reprinted in *Shanah ba-Shanah*, 5736); *Ha-Pardes*, Tevet 5737; *Torah she-be-al-Peh*, vol. XXV (5744); *Or ha-Mizrah*, Tishri 5748, Nisan-Tammuz 5748 and Tishri 5749.