

Afterword

Thomas W. Laqueur

King Lear gets it right for the ages:

And thou no breath at all? Oh, thou'lt come no more,
Never, never, never, never, never

he says holding the body of the dead Cordelia. Breath—or more precisely the possibility of future breaths—is still what matters, as it always has, in answer to the question “when is death?”

Before the widespread use of positive pressure ventilators in the last three or four decades of the twentieth century, making this sort of prognosis was, in general, not very hard. If there was no breath for a few minutes there would never—never, never—be breath in that body again. (There are only three “nevers” in the quarto text of *King Lear*; this suffices).

Of course, there were exceptional circumstances, increasingly recognised in the late eighteenth century, that might make it more difficult to say for sure that breath, after it had stopped, might not return and therefore to be sure that the condition of death—being dead—might not have

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been misdiagnosed. “When is death?” “Not now, not in this instance”, the answer might be. People who had drowned and whose bodies were chilled could be “revived” [Anglo-Norman; Middle French; Latin: made to live again, to be given fresh life] or resuscitated—revived from a moribund state. Their breath could be restored.

The same might be the case for those who had succumbed to carbon dioxide—fixed air, or carbonic acid gas as it was called back then—that had replaced oxygen in ships’ holds, fermenting vats, or other closed spaces. So too people who had stopped breathing for a few other select reasons: being struck by lightning, for example. “[T]he unfortunate objects are too often deserted, when they might every now and then be resuscitated by the various means employed”, we read in an issue of the late eighteenth century *Transactions of the Royal Humane Society*, one of scores of organisations founded to teach the ways in which breath could be restored and a mistaken prognosis set aside. But even under such special circumstances, the window between the temporary cessation of breath—that is life—and its eternal absence was narrow—measured in minutes not hours.

Other instances besides these in the general category of “apparent death” seemed to present further important difficulties for deciding whether breath was truly gone forever, or just in temporary abeyance. Comas, for example, might mimic a deep sleep in which breath, presumably still present, might be so shallow as to be difficult to detect. Thomas Willis, eponymous discoverer of the anastomotic system, the circle of arteries that sits at the base of the brain, recognised this state in the late seventeenth century. Between the middle of the eighteenth and end of the nineteenth century, meanwhile, there was, in the western world, a minor epidemic fear of being buried alive. It was fed by gothic fiction, medical papers reporting on strange cases of mistaken death diagnoses, the popular press, and, as Brian Parsons suggests, the commercial interests of those selling remedies—coffins with bells that could be rung from inside and heard above ground.

But in fact, in cases of suspected apparent death, it would have been clear relatively quickly whether breath would “never, never, never” come again. The dead body, that is, the eternally breathless body, cools to the ambient temperature at a rate of about 1.5 °C per hour. It would not take long for it to feel cold. In very hot climates, rapid onset of decomposition would give the story away. Rigor mortis of the small muscles of the face starts within hours. The blood pools and things begin to fall

apart. In short, a body whose breath is never to return comes to look dead because it is dead within a very short amount of time. Only in the modern age, when death certificates demand a precise hour of death is there a need for more precision.

In the 1960s a new, adjectivally limited, kind of death made its appearance—brain death—and with it, a new kind of answer to the “when” question. Lear’s answer, resonant since the beginning of human contemplation on the subject—never, never, never, never, never more breath—seems to have been replaced by a novel, technologically and philosophically, mediated one that to lay people can seem strangely counter intuitive: “How can a rosy breathing body, even one breathing with the help of a machine, be dead?”, a person might ask. And she has a point. But never, never, never, never, to breathe again is still what matters behind all the talk and technology.

To begin with, brain-dead people—that is, people whose whole brain, and not just its higher parts, have ceased to function—may subsist quite well in medical facilities and even private homes for decades hooked up to ventilators and sustained by enteral nutrition. The record for “chronic brain death” is now well over 20 years. Brain-dead women have carried their fetuses to term; brain-dead adolescents grow and mature sexually. No death certificate is issued in these cases of the purportedly dead who subsist among us and not in morgues or in the ground. They make ongoing claims on the resources of society if, as occasionally happens, family members insist. (Not many do; most brain-dead people actually die.) They are, in short, not dead except in some metaphorical sense—gone as we knew them perhaps—and are not treated as dead, because we have not yet determined definitively whether they will ever breathe again. (In fact, no properly diagnosed brain-dead person ever has.)¹

A death certificate with the time and date of death duly noted is not issued until the brain-dead person in question has passed—perhaps failed is the better term—the so called “apnea test:” the breathing test, the never, never, never, never, never test.² (The technical term qualification for being really dead in these circumstances is “a positive apnea test”.) The brain dead, in short, are not dead until they have demonstrated the “irreversible loss of capacity for spontaneous breathing”, which is the modern British medical way of saying what Lear said more poetically.³ In the United States, the President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research’s development of the concept of “Brain Death” puts the King Lear standard

more prolixly: permanent inability of an organism to perform its “fundamental work”, the main fundamental work being the “drive” exhibited by the whole organism to bring in air.

So-called “brain death” or “whole brain death” is therefore the status of someone who shows no cognitive functions and has taken a series of preliminary examinations that qualify for the only test that in the end matters—the apnea or breathing ever again test. They are rather in the situation of students who have to attend medical school and pass all sorts of examinations in order to gain admission to the one test, which, if passed, qualifies the candidate as a doctor. These qualifying tests for the final apnea test are themselves not new or technologically sophisticated, although some jurisdictions might add electroencephalography (EEG), or other modern procedures to create a visually enduring and rhetorically more demanding high bar for taking the test that counts. A pronouncement of brain death mobilises century old knowledge to decide whether to subject someone to the King Lear test for the only kind of death there is: never to breathe again.

This is what happens: First, doctors use clinical criteria to rule out other reasons for someone being in a deep and persistent coma rather than whole brain death: abnormally low body temperature; evidence of barbiturate poisoning, for example. Then, they administer a battery of neurological tests, dating back to the nineteenth and early twentieth century, that cumulatively show whether the lower brain, the part that controls breathing, is functional. Each test focuses on one, or several, of the cranial nerves that originate there and control particular reflexes: the oculovestibular reflex is elicited by pouring ice and/or warm (44 °C +) water into the ear and watching for the absence of eye motion which normally works via cranial nerve VIII through Scarpa’s vestibular nerve ganglion and the vestibular nuclei in the brainstem (Robert Bárány, a Hungarian Jewish physician, won the Nobel Prize for Medicine in 1914 for this discovery); the gag reflex is tested by inserting a stick into the back of throat; the corneal or blink reflex, is normally produced by touching the cornea, and is absent in those without a functioning brain stem; the photo pupillary reflex is checked by shining a light into the eye and observing whether the pupil contracts; irritating the mucous membranes with ammonia inhalants—smelling salts—would produce the inhalation reflex if the lower brain were intact. There are many more. All bear testimony to the glorious history of nineteenth-century neurology and, cumulatively, to the destruction of the place in the brain that

controls breathing as well as so much else. Only when all of these examinations indicate that the brain stem, and hence the whole brain, is indeed dead is a person eligible for the determinative test for death.

The candidate is given a big hit of pure oxygen so that her blood is fully saturated: (10 minutes pre-oxygenation). Then the ventilator is shut off. If she does not breathe within three minutes—in some jurisdictions, five or even eight minutes—she will never never never never breathe again. We know this because the part of the brain that controls breathing is, as the earlier tests had suggested, truly gone. The physiological foundations for this inference go back to the middle of the nineteenth century and were securely settled by the 1920s: in the absence of oxygen, that is, breath, the level of CO_2 in the arterial blood rises; this, in normal circumstances, would raise the acidity of the spinal fluid, which would be registered by the medulla oblongata of the brain stem, which would, in turn, trigger a reflex and produce inspiration. In the United States, a direct measurement of PCO_2 (partial pressure of CO_2) rather than how long the candidate for death has not breathed, is what counts (a value above 60% is considered definitive, but because this level is reached within minutes the two criteria are essentially the same). Now, and only now, after the would-be dead person fails the apnea test, i.e., has a positive apnea test, is it considered as certain as is possible to be—in our macro-physical natural world—that she will never never never never breathe again, and is therefore dead by a standard that was ancient when Shakespeare had King Lear use it. The time of death, to repeat, is recorded not when the patient, already suspected for some time of being brain dead, on the basis of various neurological tests, but when she failed the apnea test and was dead in the old-fashioned way.⁴

In some cases, the body will be relegated to the ordinary fate of dead. In others, it will be hooked up to a ventilator again to keep its organs alive so that they can be harvested for transplantation. Surgeons in keeping with the so-called dead donor rule cannot take a heart and a liver from someone who is alive, nor can they use tissues too long deprived of oxygen. Organ donors are not so much brain dead—they might have been that for a long time—but very recently, i.e., within minutes, really dead, and predictably without breath for ever. The answer to “when is death?” even today is simple: when breath is irrevocably gone.⁵

But of course, it is not quite so easy. Modern technology allows us to widen the scope of “never, never, never, never, never” breath to “never, never, never, never never,” something else. “Never to be fully human

again” is roughly the standard for what has been called “higher brain death,” the death of the brain where memory, reasoning, and consciousness reside. So higher brain death might mean “never to be conscious again” or “never to have what is taken to be the essence of a human being”, or “never to recover what had given someone their identity”. In these cases, there is no question that the person is dead by any historically defensible category, but rather that she is in such a state that she is already socially and culturally dead and that therefore the living are justified in stopping measures which keep her biologically alive, that is, enteral nutrition and perhaps some assistance in breathing. Of course, we often stop these treatments, assuming for a moment that we consider providing food and air treatments, along with others—antibiotics, vaso suppressors, specific therapies—when death in its old-fashioned sense is taken to be imminent and all interventions hopeless. “Pulling the plug”, that is, removing the most critical intervention—the ventilator—is the main way of allowing death to enter. But this is another matter.

The machinery of the intensive care unit has made biological death comport more closely with various conceptions of death as understood culturally even if “really dead” means what it has always meant. If the decision is taken that someone is “never to have the essence of being human again”, then the removal of technological life support can translate that decision into biological reality. But technology has done little to alter the rhythms of becoming dead in a broader cultural sense except, perhaps, to expand the lives of the dead among the living.

They speak, as they always have, before and after, at the end of Shakespeare’s plays and in many other instances, sometimes as ghosts, but often not. “He being dead yet speaketh,” St. Paul said of Abel, slain by his brother Cain. By his faith he speaks from the grave. We are about to read “the work of a dead man,” announces the nineteenth-century Brazilian narrator in the prologue of *The Posthumous Memoirs of Brás Cubas* by his compatriot, the novelist Joaquim Maria Machado de Assis. Just to clarify, he wants to make readers aware of the “radical difference between [his] book and the Pentateuch:” Moses waited until the end to speak of the circumstances of his death; our author gives it away at the start. And lest we still miss the point: “I am not exactly a writer who is dead but a dead man who is a writer, for whom the grave was a second cradle”. “I expired” he continues, “at two o’clock on Friday afternoon in the month of August, 1869, at my beautiful suburban place in

Catumbi”. (Machado de Assis, the other author, died almost four decades later in Rio de Janeiro.)

The very first of the many narrators we encounter in the Nobel prize winner Orhan Pamuk’s novel *My Name is Red* similarly begins by telling his readers that he is dead: “I am nothing but a corpse now, a body at the bottom of the well”. His head is smashed, his bones are scattered, his mouth filled with blood. He hopes that his wife and children miss him; he isn’t sure and thinks, “how dismal it is” that they may have gotten used to his absence. But he hasn’t gotten used to being dead: “here, on the other side, one gets the feeling that one’s former life persists”.

Few of us will not have heard the voices of the dead.

They also continue to work for the living in all sorts of ways. “For us they are not dead”, said Hitler of those who were killed in the 1923 Beer Hall Putsch: “this temple is no crypt but an eternal watch. Here they stand for Germany, on guard for our people.” They continued, as Caroline Sharples described earlier in this book, Nazi martyrology “to fight for Germany as part of an immortal, spiritual army”. These are very old tropes. As early as the eleventh century, King Arthur was also said not be dead at all, but waiting somewhere to return. And the same goes for the twelfth-century Holy Roman Emperor Frederick Barbarossa, who was, and perhaps still is, asleep in his cave in the Kyffhäuser mountains of Thuringia. There, in the 1890s, a gigantic tower, 81 meters high, was built on top of an ancient castle in honour of the dead Kaiser Wilhelm I who could be seen as either the reincarnation of Frederick, or as his successor who presided over the founding, in 1871, of the Second German Empire. Huge statues of both men share the mountain where the dead Barbarossa sleeps. In 1941, the great German assault on the Soviet Union was named Barbarossa. Vladimir Mayakovsky’s famous propaganda slogan: “Lenin lived, Lenin lives, Lenin shall live forever” makes the same point.

I would not want to deny that modern medicine, science, and technology have greatly altered the real and imaginative possibilities for blurring the boundaries between life and death and therefore making it more difficult to answer the question “when is death”. People who appear fine, if deeply asleep, on ventilators do not seem minutes from death; those declared dead by the old-fashioned criteria of breath still look alive as their organs are harvested. People who are “not there” by many of the criteria we think of as having made them human, and not dead, can be sustained and often breathe on their own. Science fiction, meanwhile,

dreams of downloading the whole contents of our brains and offering us a new sort of cyber immortality. Or maybe the answer to “when is death” is never, if our telomeres—the part of human cells that affect how we age—can be manipulated in just the right way.

But the essays in this volume, as well as this Afterword, suggest that little has really changed from very long ago. To be dead is still not to breathe again—ever—and this prognosis is not very hard to make accurately within minutes or hours of its coming to pass. Anyone who has lost someone they love can attest to this. The dead by this standard are gone in almost an instance. Brain death is a distraction from this very basic fact. And the dead still do a great deal for us, individually and collectively, as they have always done. “Becoming really dead,” as I wrote elsewhere “takes time”.⁶ “Never, never, never, never, never” to return to the living as voices, bodies, or ghosts can take years and years, sometimes centuries and millennia.

NOTES

1. At least 12 cases of brain-dead women carrying to term have been reported. For the clinical care of one pregnant dead person see Alan Lane et al., “Maternal Brain Death: Medical, Ethical and Legal Issues”, *Intensive Care Medicine*, 30:7 (2004), pp. 1484–1486. Seen from the perspective of transplant surgeons who want to keep brain-dead pregnant women as viable donors see Elizabeth C. Suddaby et al., “Analysis of Organ Donors in the Peripartum Period”, *Journal of Transplant Coordination*, 8:1 (1998), pp. 35–39. There are strange exceptions. In 2013 the teenager Jahi McMath suffered irreparable whole brain damage during surgery at Oakland Children’s Hospital. After some weeks, she was declared brain dead, took and failed the apnea test—see below—and was issued a death certificate. The hospital refused to keep a legally dead person in one of its beds. McMath’s parents refused to accept this verdict and managed to have the body, on a ventilator of course, moved to New Jersey, which allows a religious exemption for brain death. She remains alive there.
2. The word comes from the Greek, *apnous*, breathless (or more specifically, *an absence of*) and a form of the noun *pneúma*, spirit or breath of life; lifeless; that is, dead. See the Liddell-Scott Greek Lexicon, which notes that Galen used the term in its more general and modern sense of “without respiration”.
3. See “Criteria for the Diagnosis of Brain Stem Death,” *Journal of the Royal College of Physicians of London*, 29:5 (1995), pp. 381–382.

I take my summary of the diagnosis of death following a determination of brain death from the American Academy of Neurology's "Summary of Evidence-Based Guideline for Clinicians" (see <http://www.aan.com>). See also E.F. Wijdicks et al., "Evidence-based Guideline to Update: Determining Brain Death in Adults", *Neurology*, 74 (2010), pp. 1911–1918. The protocol for children varies slightly. The scores of jurisdictions in the world that accept the diagnosis of brain death each have slightly different protocols.

4. On the history of the physiology of breathing see the posthumous series of lectures by Hans Winterstein, M.D., who more than anyone developed our modern understanding of this subject. "Chemical Control of Pulmonary Ventilation—The Physiology of the Chemoreceptors", *The New England Journal of Medicine*, 255 (1956), pp. 216–223; 227–228; 331–337. International standards and definitions vary widely. See Sam D. Shemie et al., "International Guideline Development for the Determination of Death", *Intensive Care Medicine*, 40:6 (2014), pp. 788–797. For a brief survey of variations across borders which seem no more consistent than they were 10 years earlier see E.F. Wijdicks, "Brain Death Worldwide: Accepted Fact but no Global Consensus in Diagnostic Criteria", *Neurology*, 58:1 (2002), pp. 20–25.
5. It was the needs of organ transplantation programs that motivated the original 1968 Harvard Medical School criteria for brain death and the protocols for determining whether they had been met. See M.L. Tina Stevens, *Bioethics in America: Origins and Cultural Politics* (Baltimore, Maryland and London 2000).
6. Thomas W. Laqueur, "The Deep Time of the Dead", *Social Research*, 78 (2011), p. 802.

AUTHOR BIOGRAPHY

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