

# Totsuka Yoji's View on Life and Death: A Natural Scientist's Objective Self-awareness

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## Abstract

Totsuka was a leading physicist and the top candidate for the Nobel Prize in Physics for his work on discovering the neutrino's mass, an elementary particle. However, he died of cancer before receiving any honor. He continued to write the blog "A Few More Months" from 11 months before his death until July 2, 2008 (8 days before his death), describing his views on life and death. The blog was primarily a record of his illness, but the blog was also a source of information for other patients with cancer. The blog was based on his recording habits as a natural scientist and his objectivism. He even considered interesting the delusion caused by his brain tumor and analyzed it as objectively as possible. He also approached religion (Christianity and Buddhism) through self-objectivity: and reached enlightenment [satori] and humor [kaigyaku]. He called this activity "disciple [shugyo]." He died expressing deep gratitude to his wife and the other people around him. We should learn about death through Totsuka because the experiences of others are the only sources of information that we can gather on death.

**Keywords:** thanatology, anticancer drug, social and spiritual pains, enlightenment [satori], humor [kaigyaku], disciple [shugyo]

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## Introduction

This article deals with thanatological issues, for instance, what people think when they confront death. Thoughts associated with death are an ancient issue in the history of theology and philosophy, and the issue still has inspired interest and study, as typified by the writing of Elisabeth Kübler-Ross and others.

From this thanatological point of view, of the four pains [physical, psychological, social, and spiritual] discussed in biomedical ethics, the social and the spiritual pains are particularly important. With regard to the former, it is necessary to consider the sense of loss when a person with a great sense of social mission dies. As for the latter, the

core question is how to overcome or learn how to accept the pain: The author asserts that social pain associated with the loss of a person with a great sense of social mission offers chances of gaining greater as "objective self-awareness [self-objectivity]," while spiritual pain offers chances to achieve "enlightenment [satori]."

TOTSUKA Yoji (1942-2008) was a world class physicist who was considered the top candidate for the Nobel Prize in Physics for his work on discovering the neutrino's mass, an elementary particle. However, he died of cancer without receiving this great honor (July 10, 2008: from now on, the year, month, and day are expressed as 8-digit Arabic numerals, 20080710).

This paper analyzes the writings published in his blog "A Few More Months," written until

8 days before his death for about 11 months, from 20070804 to 20080702. The most important narratives in this blog, mainly those regarding life and death, were edited by his friend, famous critic TACHIBANA Takashi, after Totsuka's death and first published in 2009 as *Record of a Scientist Who Fought Cancer* (Totsuka 2011 (revised version)); from now on, I will refer to it as 'the book' and references from it will only include the page numbers or the 8-digit date, depending on the need to refer to the time of writing).

The main background and treatment history are presented in Table 1, based on "Totsuka Yoji's History of Cancer Treatment" (444-445).

**Table 1. History of Totsuka**

Date	Event
19420306	Born in <i>Fuji City, Shizuoka Prefecture, Japan</i>
19720329	Completion of the Doctoral degree at the Graduate School of Science, The University of Tokyo Married while still a student Obtained a degree (Ph.D. in Physics) To write his doctoral dissertation, he devoted himself to observation and research in a mine in <i>Kamioka, Gifu Prefecture</i> , 15 years before the construction of Kamiokande
197304	Until 1981, he stayed at DESY in Hamburg, former West Germany, for a total of six and a half years, excluding a period of temporary return (until he was appointed assistant professor in 1979, he had unstable jobs and was depleted by excessive alcohol consumption and his harsh research life)
1981	"Sick both physically and mentally" (according to his wife), returned to Japan. Due to sarcoidosis, an intractable disease of the lungs, he was recommended to rest and get treatment, but while receiving steroid treatment, he rather devoted all his energy to the construction of the Kamioka underground experiment facility (in the end, there were no symptoms of deterioration due to sarcoidosis as feared)
10980723	Kamioka Observatory, ICRR [Institute for Cosmic Ray Research], The University of Tokyo (Kamioka Nuclear Decay Experiment [KAMIOKANDE]) was established (once again, he began his life in his "second hometown" of Kamioka for about 20 years)
198704	Professor, Faculty of Science, University of Tokyo (198804, Professor, ICRR)
199504	Director, Kamioka Space Particle Research Facility [newly established Super-Kamiokande: SK] (up to 200209)
20001113	Colorectal cancer surgery to remove the rectum and colon
20011112	A large-scale damage accident occurred in SK, and he declared it would be restored within a year. He sacrificed everything he had and took the spearhead the restoration
20021210	Attended the Nobel Prize in Physics ceremony for his mentor KOSHIBA Masatoshi
20030401	Director, High Energy Accelerator Research Organization [KEK]
20040421	Surgery to remove metastatic tumor (2 places) in the left lung
20041103	Received the Order of Culture [Japan's most prestigious award]
20050920	Found metastatic tumor in the right lung (multiple places); however, he prioritized work and postponed treatment
20060331	Retired as director of KEK and started anticancer drug treatment (FOLFOX therapy) at 20060406
20060526	He transferred to the National Cancer Center Hospital East ( <i>Kashiwa City, Chiba Prefecture</i> ), which was close to his home and convenient for commuting to the hospital.
20060814	Due to interstitial pneumonia, which is a side effect of anticancer drugs, the treatment was temporarily discontinued (resumed at 20060825)
20070129	Emergency hospitalization due to ileus [intestinal obstruction], anticancer drug treatment temporarily stopped (discharged at 20070209)
20070221	Change of anticancer drugs: initiation of FOLFIRI therapy
20070409	Emergency hospitalization due to interstitial pneumonia: temporary discontinuation of anticancer drug treatment (discharged at 20070507)
20070625	Change of anticancer drugs: initiation of Avastin
20070804	Start of the blog "A Few More Months"
20070902	Emergency hospitalization due to ileus
20071126	Changed anticancer drugs: started TS-1; however, discontinued 20080116 because of severe watery eyes due to side effects.
20080130	Found a metastatic tumor in the liver
20080225	Initiation of the anticancer drug cetuximab
20080305	Emergency hospitalization due to ileus; metastases to the bone were found (discharged at 20080310)
20080323	Emergency hospitalization due to unconsciousness; discovery of brain tumor (discharged at 20080409)
20080421	Termination of cetuximab [due to desire to participate (however, ultimately failed) in a peptide vaccine clinical study]
20080613	The last dialogue with Tachibana Takashi ["Record of Cancer Declaration 'Life Expectancy of 19 Months,'" <i>Bungei-Shunju</i> magazine, August 2008 issue (see <i>Bibliography</i> )]
20080625	The last interview (2 hours, with MIDORI Shin'ya and other Tachibana seminar students of the University of Tokyo: Included in Totsuka 2008B: 11-40)
20080701	The last contact between NAKAJIMA Shigehiko, the editor of <i>Nikkei Science</i> magazine, about the series of articles
20080702	Hospitalization straight from outpatient
20080710	Died (aged 66)

# 1. Totsuka's legacy: the blog

## 1A. Main themes in Totsuka's blog

"Blog" means "Web Log [Record]." According to Totsuka, natural scientists must record experiments and calculations in a log book notated by date of entry (cf. 260-261). In his last dialogue with Tachibana, two weeks before his death, Totsuka said "The cancer record I keep is a 'logbook,' so to speak, of cancer observations" (430).

On the other hand, according to his blog, "I started blogging because I wanted to keep my children, my siblings, and acquaintances up to date with me who were living far away, and because I thought that blogging would be a convenient way to store what I wanted to write down as I went along (emphasis mine)" (179; cf. 261), so "I would be grateful if my acquaintances and children could summarize it." Moreover, "[i]f these articles should be of interest to people other than my children, siblings, and acquaintances, it would be an unexpected pleasure for me" (180).

As seen above, Totsuka's blog is (1) a record using the typical style of a natural scientist and (2) thought to have started the blog freely, at random, and spontaneously. (3) Blogs are an excellent multimedia mode of expression in today's internet age.

Point (3) is most important. This is because the book is not only written as a so-called course of treatment or record of fighting disease, but the blog also contains a large number of medical materials such as CT images of his cancer, which the patient, the natural scientist Totsuka, collected and organized on his initiative at the active request to the doctors in charge: More over, Totsuka "digitized" them, "measured the size, drew growth curves, estimated the prognosis," and even "entered the period of taking anticancer drugs and measured their effects" (cf. 8-9, "Preface" by Tachibana).

Totsuka took advantage of the characteristics of the medium chosen. His blog is a medical record composed by a natural scientist who has become a terminally ill patient, saying "Since there are still too many things we don't know about cancer, we should create a database that collects a wide range of testimonials (medical history, treatment effects, side effects of anticancer drugs, etc.) of patients with a scientific mind (9, "Preface"); The blog is

also an essay written freely according to his heart, and its expression is a sign of the 2000s.

In this respect, from the viewpoint of bioethics and thanatology [view of life and death], the blog stands in the lineage of traditional "records of life and death" but the blog also occupies similar to that of MASAOKA Shiki (1867-1902) and his posthumous work *Byosho Roku-shaku* [Six-Foot Sickbed]. Although Shiki was not a natural scientist, he advocated "Sketching" in literary expression, and Shiki wrote essays in his last years as an "object of objectivity," he suffered from severe illness [See below. Cf. Ino 2019; Ino 2016B (in Japanese)]. Shiki's final compositions took the form of a series of articles in the daily newspaper where he worked, Shiki and Totsuka have in common the above: (1) professional consciousness (to put it more simply, temperament and disposition [*ethos*/ἦθος]), (2) content and (3) means of expression and media.

## 1B. Overall framework of the blog

The entire blog contains a huge volume of information that spans all four periods, listed below, and the book [Totsuka 2011] excerpts sections titled "Chronicle of Fighting Illness," "Thoughts on the Disease of Cancer," and "Reflections on Treatments," plus "mainly Thoughts on Reflecting on My Life, Life Theory, Education Theory, etc."; The "specialized science theories and science policy theories that are not topics for the general public," which made up the majority of the blog, were nearly omitted, and "only the independent "Introduction to Science" section, written for young people" was published as another book (cf. 9; Totsuka 2008B).

The content of the blog includes multiple topics: "It's not just a book about fighting the disease" and "It's a great book about fighting the disease, but more than that, the rest of the book is great. The entire book is a collection of essays on various topics as his heart dictated [徒然*tsurezure*]," and "the content is truly rich" including "theories of life," "of science," "of nature," "of medicine," "of society," "of education," "of religion," and "of the times," and "in any case, his writing freely [徒然] covers everything" (cf. 8, "Preface").

By category, "Life" is the most common, followed by "Medical" type ("Colon Cancer Treatment Progress" and "Short Note on Anticancer Drug Treatment"). In particular, Totsuka wrote

about plants to which he showed his attachment in his recollections of his Kamioka period (“Okuhida” the region Kamiokande was located) in the early parts of blogs and later, more familiar observations (“Flowers in My Garden”). His consistent and clear “reliance on nature” and “experiment first” attitudes established his ‘human nature [ethos]’ as a scientist and as a human being as a whole, Totsuka. (Tables 2 and 3, below.)

## 2. Ethos of Totsuka

### 2A. Records by a competent natural scientist

In light of Section 1 and Table 2 and 3, we can see that the most important feature of the book [Totsuka 2011] is that it is a record of life and death made by an outstanding natural scientist/world-class physicist with an “objective self-awareness” [self-objective view/self-objectification].

Tachibana said “No matter what theme the pen strokes, you can see Totsuka’s unique, cool, sharply cut, and brilliant pen wits. Reading the book, one is reminded everywhere that this man was a scientist to the bone” (8, “Preface”). In this case, “cool” and “sharp” are words that generally describe personality, but if we exaggerate a bit, they are also associated with modern scientific attitudes, these attitudes and are very easy for us moderns to understand.

In other words, the very general attitude and behavior of the person Totsuka is supported by modern natural scientism. For example, “probably you had a hard time in the worst condition” but “I admire the way you are facing cancer coolly like a scientist” (e-mail from Tachibana to Totsuka, emphasis mine), Tachibana describes both sides of the story.

The most important keywords deeply associated with modern natural scientism, is “object” [客観/客体、対象]. Even in the history of philosophy, from Ionian natural philosophy, which was oriented toward external natural objects, Socrates, the founder of Western philosophy, turned our attention to inner selves (e.g., the view of Hegel’s *Lectures on the History of Philosophy*; cf. Ino 2016A: 17-18). That is “objective self-awareness” [self-objectification] (cf. Ino 2019: 40, *passim*). Thus, objective self-awareness can be found in both modern natural science and ancient philosophies.

As mentioned above, the objective view is primarily and object view; a particularly good example is the close observation of plants to which Totsuka became attached in the latter half of his life.

Even when his awareness of mortality was not yet pronounced, Totsuka had been a keen observer of nature since his days in Kamiona: a single large tree rises, and even the locals do not know its name. Then “the task of finding out the names of the trees in the nearby mountains joins me.” “Of course, tree identification started out as a hobby, but after buying more than a dozen books on the subject and seeing Totsuka start pressing leaves, the landowner at work said, “This is not a hobby, but a study” (cf. 67). Being recognized at such an early age as a researcher of this caliber, Totsuka found the compliment gratifying.

The blog started 11 months before his death, and the scope of his activities was limited. His observations then turned to flowers in the garden planted by his wife. Observing the flowers was the greatest comfort to him in his illness. Regardless of the topic considered, the point of view taken in the blog helps to emphasize a more nearly

**Table 2. Number of times mention is made of each of nine topic categories, in all four periods**

	Life	Colorectal cancer	Anticancer drugs	Okuhida	Home	Education	Introduction to science	Science policy	Other
I (42)	15	12	2	6	0	4	1	0	2
II (29)	8	1	4	2	11	0	0	0	3
III (36)	14	13	1	0	7	0	0	2	1
IV (25)	2	9	0	0	7	5	0	0	2

Periods: I (20070804-20071102), II (20071103-20080208), III (20080209-20080501), IV (20080503-20080702)

**Table 3. Number of submissions per month for all 11 months**

200708	28	200709	26	200710	26	200711	24	200712	20	200801	26
200802	23	200803	13	200804	23	200805	13	200806	16	200807	2



objective position. Totsuka observes the self as “someone else.” He writes that, “I keep records as if they were other people’s affairs, which is the sad nature<sup>2</sup> of those who have lived their lives as researchers” (83, emphasis mine). Totsuka applied objectification to the disease in his body and the interiority of the self as an ailing subject [objective self-awareness]. He even considered interesting the delusions caused by his brain tumor and analyzed them as objectively as possible, and painted them as well (cf. 20080410).

## 2B. Optimism among natural scientists

Thus, Totsuka’s writing style is “objective” but simultaneously “simple” and “humanistic.” His charm of simplicity and human richness, along with objectivism, is due to his optimism, which he claims is necessary for a natural scientist. Totsuka asserts that natural scientists must be optimists. Even in the case of informed consent [IC] situations with physicians, “scientists must always be optimistic. In my opinion, a pessimistic attitude occurs when one tries to force the use of science that is not understood in dialogue or reports. It is a sign of lack of confidence” (333-334), he said harshly.

Furthermore, Totsuka, who does not believe in God or the afterlife, is the ultimate optimist as a natural scientist: “Is there really no Heaven? When we all die, everyone will experience firsthand whether or not this is true” and “I, too, will be able to observe this as my last scientific task.” Moreover, he says, “It is pity that, it’s impossible for me to share my observation with you” (cf. 94: 20070825, emphasis mine). For Totsuka, even without Heaven, there is a scientific perspective [of the self] from which to observe the world: it is truly the ultimate *cogito*.

Totsuka tried to remain an optimist, even in his final days. As 2007 drew to a close (20071228), he looked back on a year that was “the worst year of my life” (235) in terms of health. Hot topics included the Science Council of Japan, climate change (which he was very concerned about, and the biased media coverage of the latter. However, “researchers in the field of experimental physics,” especially “group leaders” such as Totsuka “have to bring their optimist side to the surface in every situation,” and “this habit has become so ingrained in me that I dare to see the good side even in rather dire situations” (cf. 232), he recalls.

Still, he said “but people have to be optimists: and I hope 2008 will be a year where I can find good signs and activity develop them. My New Year’s resolution is to build on the experience of 2007 and somehow experience the New Year of 2009” (235). However, that resolution never came true; approximately 6 months later, he died.

## 2C. Experimental physicist

Totsuka’s objectivism and optimism, which are essential to natural scientists, are further characterized by the fact that he was an experimental physicist. He is an admitted “experimenter” of physics, which is distinct from the image of ‘theoretical’ physicist that the public at first associates with, especially in Japan, which was defeated in WW II and regained some of its national prestige with the first Nobel Prize by YUKAWA Hideki in 1949.

Totsuka, began his observations for his doctoral dissertation in the ruins of a mine 1000 meters underground in Kamioka and later worked hard at Kamiokande and Super Kamiokande, which were constructed there. Wearing the work clothes and helmet that made him look like a real worker, one would not have guessed that he was a brilliant physicist. However, he told his wife with great affection that the helmet was his alter ego.

Totsuka’s experimental orientation is more fully realized in his physical activities and in his heart-felt “ethos,” or, more precisely, his view of science. He argues that “Facts revealed by experiments must be accepted,” “If there are experimental facts, we start from where we can accept them,” and “The reason why experimental physics is interesting comes from that point” (51, “Preface”).

In “Creativity Cultivation School” website, Totsuka quotes the words of the school’s president of this school, ARIMA Akito, a prominent theoretical physicist and former president of the University of Tokyo (Totsuka once studied in Arima’s lesson in his student years), “Look at nature honestly” (a plaque written by Arima in the office of the director of the Institute for Cosmic Ray Research at the University of Tokyo, where Totsuka once served in this capacity): This motto is exemplified by Totsuka in his last days. This consistent, clear-cut, “reliance on nature” and “experiment first” attitude was established by scientists and such ideas underscored the ethos of Totsuka as a

human being.

### 3. Interest in religion and his unique "*Shugyo*"[discipline]

#### 3A. Criticism against transcendental God from an atheist

Totsuka always said that, "the spirit resides in the body" and that "I should live my life with the awareness of "putting energy into my heart and putting our strength into my belly," which I cultivated during my time at the university's athletic (*Karate*) club" (cf. 181, 20071103).

By chance, while confronting death, he met Buddhist scholar SASAKI Nodoka, and Totsuka was deeply moved and greatly influenced by Sasaki's view of life and death.

Totsuka described himself as "an atheist to the bone" but he showed a keen interest in religion, especially Buddhism. However, it was by no means that he was trying to turn to religion as his death approached; for the rest of his short life, his naive, simple, and voracious intellectual curiosity worked.

On the other hand, as for Christianity, which formed the greatest basis of Western culture and, of course, had a decisive influence on the natural sciences, Totsuka, who stayed in Germany for a long time and had a very deep relationship with Western culture, was skeptical of it throughout his life, and he was concerned about the so-called ancient problem of "belief and/or knowledge": thus, Mother Teresa's confession that she had doubts about the existence of Christ (cf. 20070825; 0917, 91-94; 123-125) surprised Totsuka greatly, and he wrote that he was "somewhat relieved."

"Nature continues to show itself in a way that is different from what God has told us to do." "The question is how should religion respond in these times" (cf. 193, 20071115). On the other hand, "When I witnessed the devout faith of some respected and eminent scientists (including the deceased) who were Christians but devoted to logic," they "believed in God as a transcendent being, with the revelation that God had given to the prophets [author's supplement: I cannot help but think]. How did top-down teaching and the science of logic maintain consistency in their mind?" wonders Totsuka. Since he did not ask them directly, he says "I still have questions": One of them, for example, maybe John Polkinghorne,

who also served as director of CERN during Totsuka's West German period of research. The decisive difference between the two researchers lies in their subjective or independent styles of pursuit of scientific truth (cf. Polkinghorne 2001; and see below).

Here is a semi-ultimate question: "What is the peculiarity of our universe?" It asks why "our only universe" was born in the multi-universe (according to the Multiverse theory: 10 to the power of 100 [note: also to the power of 500] at the beginning of the universe. On the other hand, Totsuka said that he does not like and also rejects the "anthropic principle" that thinks "by chance" that "our universe is a universe with just the right parameters that we can live in" and that "there are just the right parameters" (cf. 238; 282-283). Totsuka wrote that "there is a risk that [the anthropic principle] will lead to defeatism [leading to the belief] that there is no need to do science anymore." Therefore, the subjectivity of science must be firmly maintained.

#### 3B. An encounter with a Buddhist scholar: Multiverse, Buddha, Nietzsche

This subjectivity/independence is also related to Totsuka's ailing self. In the process of understanding Buddhism, Totsuka was "convinced" by the primitive Buddhist doctrine of "the path to attain true peace in the world while being bound by the laws" as "the only way to overcome suffering through one's efforts" (cf. 274, 2008215). Sasaki taught Totsuka the essence of primitive Buddhism during the Buddha's [*Shakyamuni*]'s time. "Buddhism understands the world by the law of cause and effect, does not recognize the existence of the transcendent, and explains the phenomenal world by law. The events of the world are not caused by God's top-down, but by cause-based laws." This is "exactly the same principle as modern science" and "interesting" (cf. 228).

Totsuka's view of Buddhism, which he learned through Sasaki, offered him a helpful clue to the compelling question of what happens after death. First of all, Buddhism has an affinity with the theory of multiverse, which is the established theory of modern astrophysics [Note by author: Even in Mahayana Buddhism] Guidance from the Buddha in other universe is essential to attain *Satori* [enlightenment/epiphany], and the multiverse theory plays a major role. However, the

main difference between the two is that the multiverse theory of physics is completely impossible to negotiate with other parts of the multi-universe. In the “many-worlds interpretation” of the multiverse theory, once the worlds have branched off, they are physically isolated and unable to visit or communicate with each other. Therefore, Totsuka maintained his stance of trying to find, within himself, not others, the elements that made it possible to accept death.

In addition, Nietzsche, in whom Totsuka had taken a renewed interest, in his later years, was brought up as a topic by Totsuka in his last dialogue with Tachibana (cf. 433-435, “Dialogue”). In Nietzsche’s famous idea of “eternal return,” there is no such thing as the immortality of the soul, the soul dies with the death of the body, and human life comes to nothing, but eventually everything returns to eternity, and life repeats in exactly the same way. On the other hand, in Buddhism, at the time of Shakyamuni [Buddha], departing from reincarnation was liberation, that is, *satori* [enlightenment]. After liberation, it is a world of complete zero or nothingness; in that respect, it is completely different from that of Nietzsche (cf. 435).

Totsuka is deeply interested in the Buddhist theory that the world after liberation is nothing, although reincarnation is impossible to consider in the worldview of the natural sciences. The universe always ends when it is born; it is a world of complete nothingness, without no time or space. In this sense, Buddhism’s perspective is closer to the natural sciences than Nietzsche’s. However, the world of nothingness after *satori* is a world in which consciousness transcends the real phenomenal world, and there is nothing but consciousness: however, it does not mean that the physical world of existence becomes zero (cf. 435).<sup>3</sup>

When Tachibana wonders if the Big Bang will occur again, the universe ends, and the world of physical phenomena will be repeated, Totsuka immediately emphasizes, “That’s exactly the problem.” In the theory of multiverse physics, there are countless universe[s] with completely different spaces-times, and we just happen to live in one universe. The Buddhist worldview is close to this multiverse theory, and therefore it is very familiar with Totsuka’s idea, as described: “I feel very relieved that what Buddha [*Shakyamuni*] thought so hard about is similar to the multiverse theory that we natural scientists are also studying

so hard.” “The idea of such great religious figures and thinkers were similar to what we came up with, so there is no need to be so rattled: I do not care if I die like that” (435).

Whether sorry or not, when we die, everything comes to nothing; however, the universe is born and continues to exist infinitely in space and dimensions, and all things are produced one after another. Reflecting, Totsuka wrote, “Blessed are those who believe in God; my life devoted to science was also not bad” (283, 20080219). Regardless of whether there is a transcendent God, Totsuka is convinced that what he had pursued in science is never wrong.

### 3C. *Shugyo* for himself, and those around him

Totsuka said that his wife always cared for him. Nevertheless he could not say just a single word “*Arigato*” [Thanks] to her. His last dialogue with Tachibana also ended with these words: “I still do not have enough *shugyo* [discipline] (laughs)” with a wry smile. For Totsuka, his gratitude to the people around him, especially his wife, were so great that he could not express it in his own words; however, it seems that he was not good at expressing his gratitude given his attitude as an old-fashioned [*Showa*-era] Japanese man.

Buddhist Sasaki was impressed by Totsuka’s appearance as a “*Shugyo-sha*” [person of discipline] and praised him: “Totsuka, rest in peace.”

“The subsequent life of a person who has been sentenced to death is spectacular. The fact that every moment of life is painful comes to us for the first time when death suddenly stands in front of us. So, what should we do when we feel suffering? Shakyamuni told us to observe our minds: Observe and accurately read their structures and movements. And we cut off the evil elements of the mind that cause suffering; Of course, it is impossible for ordinary people. [...] However, even if one can not them to be realize such thoughts, he/she may at least find it possible to end life proudly and toward-looking.”

“Dr. Totsuka wrote a blog until shortly before his death. In it, the days before his death are recorded in detail. The way he calmly analyzed himself in the face of death and tried to somehow eliminate the cause of suffering from his mind, was exactly the way of a

*shugyo-sha*.”

“Everyone knows that Dr. Totsuka is a top-notch physicist, but for me, he is the embodiment of Shakyamuni’s teaching, which Totsuka has shown me through practicing the Buddha’s *shugyo*.”

(Cf. Sasaki 2009: 140-142, “How to die at his best,” emphasis mine)

The proclamation of life expectancy, for instance, *shugyo*, are all elements that the author is trying to describe, and they are completely depicted in this memorial by Sasaki.

## 4. Last duty and the days left

### 4A. The last duty

In his last dialogue with Tachibana, Totsuka said, “Unfortunately, unlike you, Mr. Tachibana, my cancer has spread throughout my body and has already [reached] the final state, but because of my profession as a researcher, I can’t help but observe my own condition” (410).

For Totsuka, who confronts death by striving for objective self-awareness, analysis, and reporting, what was decisive was, first, the metastasis to the bone and brain, and second, his decision to participate in a clinical study of peptide vaccine therapy, ending with his last anticancer drug, cetuximab, before all those were used up (cf. 200804; the date was not specified).

The latter clinical study was no longer for his treatment but out of a desire to serve future generations [Please remember that I qualify Totsuka as “a person with great sense of social mission,” in “Introduction”]. More than four weeks prior, he had to stop other cancer treatments: stopped taking decadron (a steroid) to treat his brain tumor, and suffered from loss of appetite and other considerable adverse effects, but he still had the necessary tests to participate. However, he was unable to participate in the treatment study because the size of his brain tumor was beyond the scope of the vaccine treatment study. How disappointed must he have been when even the hope for his last service was cut off!

Subsequently, no anticancer drugs were administered, and steroid administration was resumed (cf. 20080523).

Moreover, as if he had made up his mind, he intensively compiled a “Report of A Certain Colorectal Cancer” (1)-(7) from a few days later (cf.

20080611; 0612; 0616; 0617; 0618; 0619; 0621). Regarding the writing style, the text is written in a report tone, not in the conventional conversational one, which is consistently adopted throughout his blog. This is the best example of Totsuka, a terminal cancer patient, demonstrating his natural scientific temperament [*ethos*]. I will show only the main points of content that can be seen from the subheadings:

1. Cause, history of discovery, course of treatment, and side effects (four illustrations; same applies below)
2. Side effects
3. Changes in tumor (metastasis) size over time (one illustration)
4. Time change in tumor marker test (one illustration)
5. Comments from patient on anticancer drug treatment/comments on standard and dormant therapy (two illustrations)
6. Oxygen deficiency and metastasis at the tumor center
7. Any changes observed in the doubling time/growth rate of liver tumors/bone tumors and brain tumors/examinations should be included in the standard treatment (two illustrations)

Totsuka spent his last days writing this report (approximately 20 days).

### 4B. Acceptance of death (the real meaning of *satori*)

Earlier, in a blog (20080527) that referred to blog reader Mr. A (a stage-4 colon cancer patient, a young father with a little son; he was consulting Totsuka personally), the following words were quoted from June 2, 1902 [*Meiji* 35] in Shiki’s *Byosho Roku-shaku* [Six-Foot Sickbed]:

“It was a mistake to think that *satori* meant to die with no regret at any moment; however, *satori* meant to live nonchalant[ly] at any moment.”

In fact, this was introduced by Totsuka’s daughter on the youth support facility blog where she works so that Totsuka could learn about it. “[The youth support facility blog] was also words for my father.” According to Totsuka’s wife, when he saw this passage, he was excited, saying “Yes, this is it” (cf. 43).

These words seem to have been deeply engraved in Totsuka’s mind as he lived through his



last days, and they are also mentioned in his last dialogue with Tachibana, "I am most perplexed when everyone is worried about me and says, "Please spend the best of each day." There is no way I can do that (laughs)." Quoting Shiki's words, he said, "They seem to be very famous words, but I didn't know them until recently. It's amazing to die with a nonchalant face, but it still amazing to be 'living nonchalant[ly]': But in the end, I think that's the only way" (cf. 432-433).

Like Totsuka, Shiki, who was a non-religious, had a state of "*satori*" that was imbued with the objectivity of his interpretation and view of life and death. Also Totsuka, who was familiar with various religious and philosophic views, maintained, however, the objectivity [of a natural scientist] and finally reached the state of enlightenment: He must have grasped Shiki's words of *Satori* and felt that he had gained Shiki's intentions.

#### 4C. The last "Few" "Days"

After Totsuka's passing (20080710), the last blog update was made by his son (20080715), and as a family member who was with him until the end, he said that he would have liked to write about his father's spectacular days after his hospitalization; however, because he and his family supposed that Totsuka would have disliked that, he did not write about Totsuka's last days.

However, the state of affairs in the days after hospitalization was revealed in the widow's memoir "40 years of Running Together" (cf. Totsuka 2009A: 158-159).

In his early blog, Totsuka stated that "the timescale for my future is 2 or 3 months," so there can be no "A Few More Hours" because he will have a mental breakdown before that and he will somehow keep track of it until "A Few More Days" (cf. 20070806). As it turned out, the last blog update by himself was 20080702, eight days before his death, and he endured "A Few More Days." However, the day after he was admitted to the hospital, he told his wife, "I can't do my best anymore, can no longer see my emails, I can no longer write replies." He had sent the last email the night before. In the past, even after surgery, he had instructed her to "take out my laptop" first, but for the first time, he asked her to put it away.

After hospitalization, the patient received a blood transfusion the next day (this was the only

time because his hemoglobin level returned to normal), and he had been short of breath for a long time; the blood transfusion did not improve his condition, so an oxygen mask was administered the next day. Even though it was difficult to speak, he was still conscious, instructing his family to do this and that, and instructing his wife to record his oxygen level; however, the family was informed by the doctor that he might only have 1 or 2 days left to live. He always ordered not to hide anything; however, as expected, they could not tell him all this (although he may have been vaguely aware of it).

On the third day, he was offered a ventilator, and as expected, Totsuka was surprised, saying "Is it already that serious?" After that, respiratory difficulties gradually increased, and he was unable to fall asleep. He complained "I was to fall asleep," but the medicine did not work as expected, and he and his family had a challenging time. He passed away peacefully in his sleep. For the last 10 hours or so, these were Totsuka's "A Few More 'Hours.'"

## Conclusion

Totsuka always tried to provide a social contribution, as mentioned in the Introduction. He was concerned with science and the destruction of the global environment, especially climate change. Even after becoming a cancer patient, he not only worried about his condition but also strongly advocated for the establishment and effective operation of a database of numerous cases, such as cancer symptoms and side effects of anticancer drugs, and, again, strongly desired a society in which patients and their families could share the benefits of information.

Because he thought that he had so much to do and appealed to society, he deeply lamented his inadequacy because he had developed cancer. In this sense, in the view of the "4 pains" in biomedical ethics, he continued to suffer not only from physical pain, such as aggravation and side effects, and from mental pain, such as depression, but also from social pain, until just before his death. The opening of the blog and the enormous numbers of entries were also manifestations of his desire to compensate for these pains. His vision of blogging evolved into a practice of healing spiritual pain through science, philosophy, and religion.

We can learn very much from his books,

essays, and blogs, which are considered Totsuka's legacy, including answers to the questions "What is optimism as a personality trait [*ethos*], and as a characteristic of scientist? What is 'objective self-awareness'? What is *satori*? What is *shugyo*?"

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## Endnotes

- 1 Objectivism: Self-objectivity: Self-objective view: Self-objectification.
- 2 I believe that "nature" here might refer to the philosophical notion of 'ethos [ἔθος],' one of the most important keywords in Aristotle's *Nicomachean Ethics*. Ethos [in English 'personality'] is the root of the word "ethics" [episteme ethike//ἐπιστήμη ἠθική]. Ethos refers to the values, beliefs, and behaviors of members or groups of an era or society distinct from those of other eras or societies.  
 Ethos was used in the 20<sup>th</sup> century by German sociologist Max Weber as a central concept in his major work, *The Ethics of Protestantism and the Spirit of Capitalism* (1904/1905). The discussion of the "ethos of science" aborted after Weber's sudden death, was subsequently developed and recognized for its importance by Robert K. Merton, another great American sociologist (cf. Ino 2022).
- 3 Supplement by author: Is this "consciousness" analogous to the 'ad-perceptio/Apperzeption' or 'cogito' in the history of Western philosophy in the lineage of Augustine (of Hippo), Descartes, Leibniz, and Kant? (cf. Ino 2024: 135, 283 note ("Literature: YAMAUCHI Shiro1990"), passim).  
 On the hand, the "vacuum" in quantum theory is also not the so-called nothingness or vacuum in the general sense, but the quantum fluctuation: our universe was born from it.