

『広島平和科学』 26 (2004) pp. 75-99

ISSN 0386-3565

Hiroshima Peace Science 26 (2004)

**A Full-text English Database of Testimonies
of Those Exposed to Radiation
near the Semipalatinsk Nuclear Test Site, Kazakhstan**

Masatsugu MATSUO

Institute for Peace Science, Hiroshima University

Noriyuki KAWANO

**Research Institute for Radiation Biology and Medicine,
Hiroshima University**

Kyoko HIRABAYASHI

**Postgraduate Student, Graduate School of Biomedical Science,
Hiroshima University**

Yasuyuki TOOKA

Mazda Hospital

Kazbek Negamatovich APSALIKOV

Kazakh Research Institute for Radiation Medicine and Ecology

Masaharu HOSHI

**Research Institute for Radiation Biology and Medicine,
Hiroshima University**

SUMMARY

The present paper is a sequel to the initial report (Kawano et al 2003a) of the project for a full-text Japanese database of the testimonies of those exposed to radiation near the nuclear test site of Semipalatinsk, Kazakhstan. 139 testimonies were gathered in four villages near Semipalatinsk in 2002. We translated them into English from Russian and Kazakh, and created a full-text database by using a Latin script text retrieval program, TERESA.

The present paper attempts at essentially the same thing as our first report mentioned above, using the English version of the database. We attempt to show how the database can be used to understand tragic realities of the effects of exposure to radiation from nuclear tests. In the attempt, we try to demonstrate that radiation exposed residents near the test site are affected physically and mentally, by citing retrieved testimonies which complain of illness and bad health, environmental pollution, and mental disorder, resulting finally in suicide. We also try to demonstrate differences between experiences in Semipalatinsk, and those in Hiroshima and Nagasaki. Besides, we add our conceptual and methodological premises for conducting this kind of research, as well as some new findings concerning the radiation exposure in Semipalatinsk.

Introduction

At the Semipalatinsk test site near Semipalatinsk, Kazakhstan, 25 ground, 86 air, and 345 underground nuclear tests were conducted from 1949 to 1989 (Grosche 2002, The Ministry for Atomic Energy and the Ministry of Defence of the Russian Federation, 1996).¹⁾ According to the Kazakh government, 1.6 million people were subjected to radiation and 1.2 million people are still suffering from the aftereffects (Arystanbekova 1998). A research team headed by one of the co-authors, Masaharu Hoshi, has shown that the exposure to radiation due to the tests has seriously affected the health of the population in the wide areas around the test sites (Apsalikov 2004, Hoshi 2001).

In July 2002, a research team of the Research Institute for Radiation Biology and Medicine, Hiroshima University, conducted a field research in and around Semipalatinsk. The testimonies of those exposed to radiation were collected as part of the field work. It was the first serious attempt at the collection of testimonies of those people exposed to radiation in Semipalatinsk. Its objective was to record experiences, feelings and thoughts of those “hibakusha” and to better understand (or reconstruct) the realities of radiation exposure. The aims and results of the research and the testimonies have been published both in Japanese (Kawano et al 2003b) and in English (Kawano et al 2004).

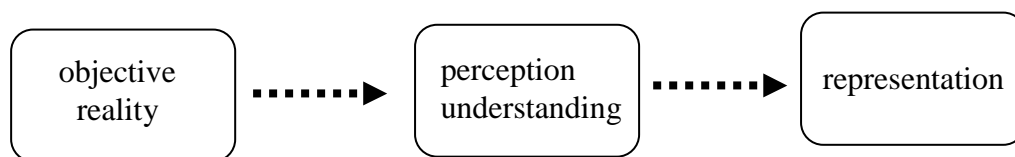
A great number of testimonies (including interviews) of survivors have already been accumulated in Hiroshima and Nagasaki. Some of them have been published, and others stored in electronic media.²⁾ The present paper is an interim report of our attempt at the creation of an English version database of the Semipalatinsk testimonies. The objective is not only to record and store the testimonies in a lasting electronic medium. The computerized data can also be easily utilized for the comparison with those in Hiroshima and Nagasaki. In addition, the data can be easily matched and checked with such information as amounts of doses and health effects. Thus, the database is expected to be of great help to the better understanding of experiences of radiation exposure in Semipalatinsk.

1 Some Methodological Considerations

In our previous research, we did not make clear our methodological premises and assumptions. Our analysis of the testimonies of those hibakusha exposed to radiation in

Semipalatinsk should be based upon some generalizable model. Therefore, we start from a very crude model consisting of three components as is given in Figure 1. Though the underlying logic of the model is in need of further elaboration and sophistication, here we assume that the real world or objective reality including, say, physical experiences and even personal emotions, cannot be known directly by our senses. What we call “reality” is nothing but our perception and understanding of the “objective reality,” that is, what we perceive to be real and objective. Moreover, our perception or understanding is not necessarily a faithful or perfect reflection of the objective world. It is often a partial and distorted map of the objective world. The first dotted arrow in Figure 1 is intended to stand for this relation between the objective world and our perception.

Figure 1 Reality, Perception and Representation



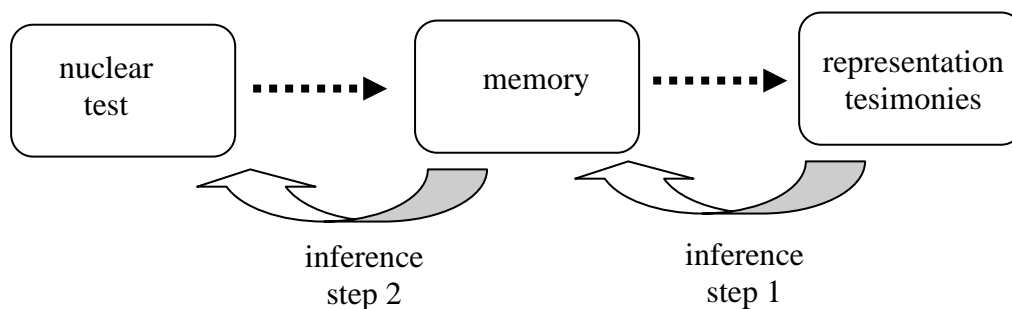
What is more (or worse), we have no way of directly knowing the perception of an individual or a collectivity. It is only by means of language or other communication media that we know the perception and understanding. In other words, we know the perception and understanding only when they are expressed or “represented” by language or other means. Thus, our model needs a third component, that is, “representation.” In the same way as the above case, the representation is not always a faithful and complete reflection of the perception. It is often an incomplete and skewed map of the perception. The second dotted arrow in the figure indicates this relationship.

Though the model leaves much to be desired, we start from this simple model. For the purpose of our research on the nuclear test experiences in Semipalatinsk,

however, we have to specify the model a little further. The specific model for the collection and analysis of the testimonies of those exposed to radiation is schematically illustrated in Figure 2 below. In the model in Figure 2, “perception” and/or “understanding” are replaced by “memory.” It is because we considered the lapse of time since the nuclear tests, especially those air and ground tests which had serious effects on the inhabitants. Perhaps, “collective memory” may be a better term in our case as, at present, we are interested rather in the totality of the memory of those affected. In this sense, the term comes close to what we Japanese call “Rekishu Ninshiki (Interpretation of History).”

In the same way, the term “representation” is replaced by “testimonies,” though we use some results of personal interviews.

Figure 2 Nuclear Tests, Memory and Representation



As is shown in the lower part of the figure, we first try to reconstruct “memory” (or perception) of those affected by the nuclear tests on the basis of their testimonies. Then, on the basis of memory, we will seek to reconstruct the objective reality, and finally to show what the nuclear test and their aftereffect were, and are, to those exposed to radiation in Semipalatinsk. We have just launched upon the first step, that is, the reconstruction of memory from the testimonies. But the task is very difficult. First, the testimonies represent memories of individual Kazakh hibakusha only incompletely and imperfectly. Secondly, the number of the testimonies which we collected is very small compared with the tens of thousands of those affected. Thirdly,

no reliable methodology is available at present which one can safely employ in reconstructing the memory from such fragments of representation. Nevertheless, we believe that this kind of research is absolutely and urgently needed. And, in this attempt, a computerized full-text database can be a valuable research tool.

2 Full-text Database

2.1 Input Data

The testimonies we processed are the replies to an open-ended question in the 2002 survey mentioned above. The question is as follows:

Please write about anything concerning the nuclear tests that cannot be forgotten, that still haunts you, that you regret, or any opinions about nuclear testing in detail in the space provided below. You may write about your experiences, or that of your family or your close neighbors. Also, if there is anything you wish to add or comment on the previous questions, please write them down here. (The original text is in Russian)

The total number of replies or testimonies is 139, and male and female percentages are roughly the same (71 males, 67 females and 1 no answer). The average age of the respondents is 61.5 years old. The majority of replies are in Russian. But some are written in Kazakh in the Cyrillic script. Most of the testimonies from Sarjal, Dolon, and Kokpekti villages are in Russian, while some 70 % of the testimonies from the Kaynar village are in Kazakh (Kawano et al 2003b: 49). The English translation of the original Russian or Kazakh testimonies is our raw data in this research.

The English data was processed and input to the program called TERESA (to be described below) to create an English full-text database. The processing of the raw data is similar to that of the Japanese version we reported before (Kawano et al 2003a: 33-36).

For the English full-text database of the Semipalatinsk testimonies, we employed TERESA, a program developed by one the co-authors of this paper. The program, TERESA, is intended for the creation of full-text database of text(s) written in Latin (Roman) alphabets and for the quick retrieval of part(s) of the texts. TERESA can output word counts, concordances and KWIC indexes for the text(s), that is, testimonies in our case.³⁾ A rank list of words used in the testimonies produced by TERESA is given

in the appendix.

A testimony by one respondent is treated as one record (or a case). A record consists of the reference items and one or more sentences. The following reference items are given to each of the testimonies in order to identify the retrieved citation, or to break down retrieved data by village, sex and age.

(1) village

The survey was conducted in the four villages, Sarjal, Dolon, Kaynar and Kokpekti, which differ in the amount of doses of radiation. Each testimony is given the name of the village where it was collected, that is, where the respondent is living at the time of the survey. According to the inference of the specialists, the amount of dose decreases in this order; Sarjal, Dolon, Kaynar, Kokpekti (Kawano 2004: 31). The number of the testimonies collected was 48 from Sarjal, 20 from Dolon, 48 from Kaynar, and 23 from Kokpekti. Though the village Kokpekti was originally selected as a control, we include testimonies from Kokpekti since there are many testimonies which describe experiences exposure and its aftereffects. But, we will mainly use and discuss citations from Sarjal, Dolon and Kaynar, for this reason.

(2) sex

We give “M” to males and “F” to females. No answer is marked by a slash “/.”

(3) year of birth

To each testimony is added the year of birth of the respondent. No answer is marked by a slash “/.”

(4) reference number

To identify the testimony uniquely, we add a reference number to each of the testimony.

In creating the database, our policy is to keep the original texts of the testimonies as much as possible. Therefore, we leave the original intact, including apparent factual errors, except for obvious misspellings and the replacement of personal

names by “xxx.” The notes added to the printed version (Kawano et al 2004: 70-106) are also deleted.

What follows is the first part of the input data. The symbols such as #V, #G, and #B followed by a specific value are reference markers to identify respondents and his or her testimony, and they also function also as a boundary marker of testimonies. The symbols #S is a sentence marker used to divide a testimony into manageable segments to facilitate retrieval.

Sample (1) Input Data

#VSarjal

#S1

#GF #B1946 #RA-1

For 25 years I worked as a nurse in Sarjal's district hospital. #S

Every year 2-3 people, sometimes 4-5 died from cancer. #S

Together with the exhausted patients I myself had a hard time. #S

In 1989 3500 people lived in the village, and the cases of suicide were also often encountered. #S

I am convinced that the test site depresses human body. #S

My grandson is a cripple from birth. #S

Although this land is contaminated, we do not want to abandon it, our homeland. #S

It is time for the state to take care of us.#S

#GM #B1932 #RA-2

In 1953 we were resettled to Taldy. #S

When we returned, we saw the bald dogs, laboratory animals. #S

Only then did we somewhat realize the harmfulness of nuclear tests.#S

#GM #B1935 #RA-3

Not suspecting any harm, we swam in the atomic artificial lake. #S

All of my present diseases are related to the nuclear tests.#S

#GM #B1946 #RA-4

When talking about the consequences of the nuclear explosions, there standing before my eyes is the image of my innocent daughter born in 1976, who became a victim of nuclear tests. #S

She graduated from teachers' training college and became a teacher. #S

Her life had just begun, yet at the age of 20 she committed suicide. #S

This is a result of nuclear tests. #S

I curse the Soviet Union, which put the test site on Semipalatinsk soil.

#S

#GM #B1931 #RA-5

We live in the epicenter of the test site. #S

Sarjal is the closest inhabited locality to Degelen and Atymtai, where the

tests were conducted. #S
Naturally, the water, the pastures and the air are contaminated by radiation.
#S

.....
.....

3 Experiences of Nuclear Tests Seen from the Testimonies

Needless to say, most of citations and findings gained from our database could be obtained without recourse to a computerized full-text database if one were to spend enough time and energy. But, the full-text database makes it much easier and faster. In what follows, let us examine some salient aspects of the Semipalatinsk testimonies, using the full-text database. As the first step, we output two kinds of list of words used in the testimonies: an alphabetical list and a rank list, of words, both with the frequency of occurrence. The edited version of the latter is given as an appendix. The lists give us some idea of what are recurrent themes of the testimonies.

In testimonies of atomic bomb experiences in Hiroshima and Nagasaki, we repeatedly come across such expressions as “*Iki Jigoku (living hell)*” and “*Hitsuzetsu ni Tsukushi gatai (beyond description or beyond words)*.” These expressions seem to be meant to convey the immediacy of the horrible destruction wrought on the people and cities by the atomic bombs. And it is this horrible scene of destruction or “the living hell beyond description” that lies at the core of the memory, or should we say trauma, of the Hiroshima and Nagasaki experiences.⁴⁾

In contrast, it is the concern and anxiety about their health that constitutes the core of the Semipalatinsk memory of the experiences of the nuclear tests. As Kawano points out (Kawano 2004: 33), the Semipalatinsk testimonies are most clearly characterized by their concern about the health effect of the nuclear tests. In fact, more than half of the testimonies complain of their (concern about) ill health. To be sure, many mention flashes of light, mushroom clouds, roaring sounds, blasts, trembling of the ground, resettlement (evacuation) (Kawano 2004: 34-36). But the significance of these experiences seems relatively small compared with that of the concern about health. In this we can see one of the differences between the experiences of the direct bombings in Hiroshima and Nagasaki on the one hand, and those of radiation exposure in

Semipalatinsk on the other.

The following citations from our database show part of this concern about health expressed by the Semipalatinsk hibakusha. What follows is a sample output from the database. It is a set of citations from the testimonies in which either the word “health” or “ill” (or both) is used. Due to the limit of space, only a part of the citations will be shown. Let us first show them in the KWIC format.⁵⁾ In all the sample outputs in this paper, so-called noises are deleted. And SR, DL and KY in the reference field stand for the villages Sarjal, Dolon and Kaynar, respectively. The slash “/” in the citations indicates the beginning of a sentence.

Sample (2) Output for “(Ill) Health”

te, does not care about the	health of the people who use the mea	SR M 1931
so much damage to people's	health. /Now I experience the conseq	SR F 1935
the ones who are alive are	ill. /The sovereign Kazakh land beca	SR M 1934
ion. /My sister is mentally	ill, she lags behind her peers, and	SR F 1940
s. /There are many mentally	ill and mentally handicapped people	SR F 1945
ite is to blame for all the	ills, related to my health. /During	SR M 1938
all the ills, related to my	health. /During the explosions the g	SR M 1938
n. /And it has affected our	health. /All of us are ill. /It is i	SR F 1945
our health. /All of us are	ill. /It is impossible to count up a	SR F 1945
thing was secret. /Now I am	ill myself, my two sons also suffer	SR M 1937
ened our lives. /All of our	ills and diseases are related to the	SR M 1930
have certainly affected our	health. /My eyesight is poor. /My pa	SR F 1939
thing was secret. /Now I am	ill myself, my son hanged himself, a	SR M 1935
site is to blame for all my	ills. /Indisputably, every inhabitan	SR M 1935
/Everybody in our family is	ill, and I am especially worried abo	SR F 1936
ter who suffers from mental	illness. /My health is gone. /Day an	SR F 1936
rs from mental illness. /My	health is gone. /Day and night, ther	SR F 1943
My children are now getting	ill with the same diseases that I ha	SR F 1943
y. /It all has affected our	health. /I have pain in the joints a	SR M 1938
ed from epilepsy, and /I am	ill myself. /In 1953 some changes in	SR M 1940
ird son suffers from mental	illness. /My husband died from heart	SR F 1941
heir bronchi and joints are	ill. /My grandchildren are on the ne	DL F 1927
ildren are born disable or	ill. /Our children are grown-up, edu	DL M 1948
d-field athlete, physically	healthy and strong. /Many people in	DL M 1948
people in this village are	ill and disabled, some people don't	DL M 1948
ng. /When he fell seriously	ill, he used to say he would recover	DL F 1949
roken out. /My son was born	ill with epilepsy in May 1957, and h	DL F 1936
cause of these tests I have	ill children, even my granddaughter	DL M 1942
/The young here are mostly	ill, we think the test site is to bl	DL M 1951
the children start to fall	ill with various diseases since earl	DL / /
le wouldn't suffer and fall	ill. /We still suffer because of the	KY F 1934
on should not face the same	health disease and problems we have	KY F 1937
As a result, all people are	ill, and there are invalids in the n	KY F 1915
and checking in details our	health, I wish that you can succeed	KY F 1915
are dying, worsening their	health, or having shorter life. /Alw	KY M 1930
ncer. /At the moment my own	health is in bad condition. /From th	KY F 1924

f Kaynar do not have a good	health due to the harm of the atomic	KY M 1947
e young people are also not	healthy. /The people of Kaynar shoul	KY M 1947
n also does not have a good	health. /Every second person has ane	KY F 1940
young people should not be	ill. /Next generations should be hea	KY F 1940
/Next generations should be	healthy. /Atomic test sites and atom	KY F 1940
she cannot recover her good	health and bring back the lost relat	KY F 1923
nnot improve the irradiated	health of her offspring. /Her only w	KY F 1923
mine too, is to restore my	health. /Please, if it's possible, h	KY F 1923
on't have enough energy and	health to create a family and bear c	KY F 1923
en. /You constantly conduct	health improvement activities, but w	KY F 1923
ge something, to restore my	health and to arrange my life. /I hea	KY F 1923
. /As a result, there is no	healthy person here, everybody is il	KY M 1942
y person here, everybody is	ill. /There is no need to write abou	KY M 1942
/I think we cannot cure our	illnesses. /Our health is broken aft	KY M 1942
ot cure our illnesses. /Our	health is broken after being living	KY M 1942
that they will be in a good	health. /Atomic test site should dis	KY M 1942
have seen. /Let us grow the	healthy generation. /I am against th	KY M 1940
think that having not good	health, and delivering the invalid c	KY M 1943
ur next generations will be	healthy. /I remember that we were fo	KY M 1943
en is poor, they often fall	ill. /All of them are nervous, irrit	KY M 1942

In the next sample, the same citations are given in the normal, concordance format. In this example again, only an initial, small part of the output is given due to the limit of space. For the same reason, we give only one sentence as a context before and after the one in which “ill” or “health” appears. The word or words in question are changed into bold and italic fonts for the ease of search.

Sample (3) Output for “(Ill) Health”

... The state does not give due attention to the epicenter of Semipalatinsk test site, does not care about the **health** of the people who use the meat and milk of those unchecked animals. It is impossible to count up all the diseases, found in our village. ...Sarjal M 1931

... 2000 people died from the cancer. The 100% of the ones who are alive are **ill**. The sovereign Kazakh land became the USSR's atomic test site. ... Sarjal M 1934

... All of my diseases are related to the radiation. My sister is mentally **ill**, she lags behind her peers, and my two grandchildren have skin diseases. This all is a result of nuclear tests. ...Sarjal F 1940

... Such fears have certainly affected our nerves. There are many mentally **ill** and mentally handicapped people in the village. Many of my fellow villagers do not have money for treatment. ... Sarjal F 1945

... God save us from seeing those explosions again. Only the nuclear test site is to blame for all the ills, related to my *health*. During the explosions the ground under our feet was shaking. ... Sarjal M 1938

... Naturally, the air and water are contaminated by radiation. And it has affected our *health*. All of us are *ill*. It is impossible to count up all the diseases, found in our village. ... Sarjal F 1945

... Nobody told us about the harmfulness and the consequences of explosions, every thing was secret. Now I am *ill* myself, my two sons also suffer from the consequences of nuclear explosions. All the families of our village have experienced the tragedies of the nuclear test site. ... Sarjal M 1937

... This test site has shortened our lives. All of our *ills* and diseases are related to the radiation. God save us from seeing those explosions again. ... Sarjal M 1930

... I worked as a cook of the haymaking parties. Contaminated air, water and food have certainly affected our *health*. My eyesight is poor. My parents died from heart diseases, I am also a hypertensive. ... Sarjal F 1939

... Nobody told us about the harmfulness of explosions, everything was secret. Now I am *ill* myself, my son hanged himself, and only the atomic test site is to blame for all my *ills*. Indisputably, every inhabitant of our village suffers from the consequences of nuclear explosions. ... Sarjal M 1935

... In those years we never suspected that atomic tests would have such consequences. Everybody in our family is *ill*, and I am especially worried about the destiny of my daughter who suffers from mental *illness*. My *health* is gone. My children are now getting *ill* with the same diseases that I have. ... Sarjal F 1936

... All my life I worked as a driver. I visited the contaminated places almost every day. It all has affected our *health*. I have pain in the joints and waist, hypertension. ... Sarjal M 1938

... Our land has also suffered from nuclear tests. My wife died from diabetes and gangrene, my daughter died from epilepsy, and I am *ill* myself. In 1953 some changes in my body occurred. My head started to ache, I began to lag behind my peers in mental development, ... Sarjal M 1940

... Two of our sons hanged themselves, when they were 14 and 20 years old. The third son suffers from mental *illness*. My husband died from heart disease. There is no doubt the nuclear test site is to blame for everything. ... Sarjal F 1941

... After this explosion the children and grandchildren have been suffering. My children and grandchildren have anemia, skin disease, heart disease, their bronchi and joints are *ill*. My grandchildren are on the neurologist's register, my children and grandchildren are gray-haired. ... Dolon F 1927

... I think the consequences of the nuclear tests remain for the rest of our lives. Children are born disable or *ill*. Our children are grown-up, educated. They have graduated from college, but they are afraid to have a family. ... Dolon M 1948

... Now I have the second degree of disablement. I used to be a track-and-field athlete, physically *healthy* and strong. Many people in this village are *ill* and disabled, some people don't have money and opportunity for treatment. Medical service costs money, there are no benefits. ... Dolon M 1948

... I think my father died in 1993 as a result of nuclear testing. When he fell seriously *ill*, he used to say he would recover because his parents lived to the age of 80-90. But the medicine was powerless, and he died from gullet and stomach cancer. ... Dolon F 1949

... After the nuclear test our house was damaged, the walls got depressed and the windowpanes were broken out. My son was born *ill* with epilepsy in May 1957, and he's been suffering from seizures all the time. Now he is no more, he died in 1980. ... Dolon F 1936

... I recall that when there was an explosion and a mushroom cloud appeared, I didn't take the explosions seriously. Because of these tests I have *ill* children, even my granddaughter suffered. After this my brother became deaf and dumb, my son suffered from meningitis. ... Dolon M 1942

(authors' emphasis)

A glance at the citations above makes it clear that this form of output can provides us with much more information than the KWIC format. Even a considerably abridged version given above can vividly tell us the tragic experiences of the Kazakh people. At the same time, this form of output sometimes produces too many noises and requires substantial post-editing.

If we add to this other testimonies which refer to “die,” “death,” “cancer,” “disease” and so on, it will sufficiently convince us that health is one of the most serious concerns of the Semipalatinsk hibakusha. So let us take “cancer” as an example and look at the citations. For many other diseases and physical disablements that are mentioned in the testimonies, we can obtain similar lists of citations either in the KWIC or concordance format.

Sample (4) Output for “Cancer”

... For 25 years I worked as a nurse in Sarjal's district hospital. Every year 2-3 people, sometimes 4-5 died from *cancer*. Together with the exhausted patients I myself had a hard time. ... Sarjal F 1946

... Now I experience the consequences of nuclear tests myself. My parents died from *cancer*, one of my grandchildren is a cripple from birth, and I myself have acute leukemia, which is a death sentence. I feel fear for the future of my children, as these consequences will never leave them. ... Sarjal F 1935

... The old people, who were born in 1910 (100%), became a victims of the atomic weapons. They died because of the gullet, liver or other kinds of *cancer*. At the moment in Sarjal there is only one person, who was born in 1922, xxx, alive. ... Sarjal M 1934

... 103 people committed suicide by hanging themselves. 2000 people died from the *cancer*. The 100% of the ones who are alive are ill. ... Sarjal M 1934

... My fellow villagers die early from various diseases. It worries me very much. My wife died from lung *cancer* at the early age of 56. ... Sarjal M 1930

... I did not know about the harmfulness of nuclear tests, but with the passage of time the life itself started me thinking. My husband died from lung *cancer*, and I have various diseases myself. I think the nuclear test site is to blame for everything. ... Sarjal F 1940

... Almost every inhabitant of the village suffers from skin diseases. Many people died from *cancer*, many are already doomed to death. The test site is to blame for everything. ... Sarjal F 1946

... Indisputably, every inhabitant of our village suffers from the consequences of nuclear explosions. People die early from heart diseases and *cancer*. My father, mother and brother died from *cancer*. The same destiny awaits us, if the state does not give us due attention and care. ... Sarjal F 1939

... They have graduated from college, but they are afraid to have a family. People die early, aged 47-50 years old, almost all from *cancer*. My wife has permanent pain in her joints, headaches, pancreas and waist pain. ... Dolon M 1948

... When he fell seriously ill, he used to say he would recover because his parents lived to the age of 80-90. But the medicine was powerless, and he died from gullet and stomach *cancer*. He used to say he had grazed cattle where the grazing was forbidden, that is in Chagan village on the other side of Irtysh River, in the steppe where the explosions had been conducted. ... Dolon F 1949

... Now I am in retirement, and the consequences of these explosions, as I think, have appeared. I had *cancer* of mammary glands and underwent 2 operations. I have liver trouble and skin disease, and now I have the second degree of disablement. ... Dolon F 1937

... I think that people's diseases are certainly related to the nuclear tests, the test site. My parents died from *cancer* when I was 12 years old. In 1957 before the nuclear explosion we were led to a ravine and forced to lie down. ... Dolon M 1950

... The atomic bomb testing has brought a lot of harm. Many of my relatives died because of the *cancer*. My children died from the heart disease. ... Kaynar F 1934

... At first I would like to talk about my family. My father, xxx, died when he was 74 from the *cancer*. My brother, xxx, also died from the *cancer* at the age of 42. My wife is also sick. ... Kaynar M 1943

(authors' emphasis)

It was pointed out long ago that in order to understand the totality of nuclear damages upon human beings, it is necessary to consider three basic components of the totality of hibakusha's experiences, or the life history of hibakusha, that is, "body," "mind" and "life" (Editorial Committee of Japan National Preparatory Committee 1978: 78). Even from the small number of samples above, it is clear that the majority of the Semipalatinsk testimonies are concerned about the issue of "body." But, though less frequently, we also observe the concern about the "mind," as can be seen from the

following citation.

All of my diseases are related to the radiation. My sister is *mentally* ill, she lags behind her peers, and my two grandchildren have skin diseases. This all is a result of nuclear tests. ... Sarjal F 1940 (authors' emphasis)

Taooka also points out a similar tendency among Semipalatinsk hibakusha (Taooka 2004: 17). Perhaps, the culmination of such mental ill health will be a case of suicide. No small number of testimonies attest to such a tragic consequence, as is seen in the following citations which refer to suicide. Suicides may be one of the characteristics of the Semipalatinsk experiences (Kawano 2004: 39-40).

Sample (5) Output for "suicide"

e village, and the cases of	suicide were also often encountered.	SR F 1946
the age of 20 she committed	suicide. /This is a result of nuclea	SR M 1946
here. 103 people committed	suicide by hanging themselves. /2000	SR M 1934
ritated, there are a lot of	suicides, and the young are deprese	SR F 1939
s is a fact. /Many cases of	suicide are encountered until today,	SR F 1928
Now I am ill myself, my son	hanged himself, and only the atomic	SR M 1935
iss my family. /My only son	hanged himself. /He was only 15. /He	SR M 1947
. /What is the cause of his	suicide? /Of course, it is the conta	SR M 1947
thinking. /Two of our sons	hanged themselves, when they were 14	SR F 1941
seen somebody who committed	suicide. /Not only people, also catt	KY M 1930
ests is, in my opinion, the	suicide (self-hanging). /The consequ	KY M 1925
re are people who committed	suicide. /Such cases are increasing	KY M 1934
young people who committed	suicide. /There were many new born b	KY F 1923

Another characteristic of the Semipalatinsk testimonies is that the environment, especially the Kazakh nature and land free from radioactive contamination, occupies an important place. It may be a reflection of the trend of the day. Anyway, it is one of the significant differences between the Semipalatinsk and Japanese testimonies. The following set of citations gives examples of "land," or "nature."

Sample (6) Output for “land” or “nature”

from birth. /Although this	land is contaminated, we do not want	SR F 1946
ill. /The sovereign Kazakh	land became the USSR's atomic test s	SR M 1934
ffering to both people and	land. /In those years we were childr	SR M 1938
idly remember the beauty of	nature at that time. /There were tre	SR M 1940
r tales about the beautiful	nature of Sarjal land. /Our land has	SR M 1940
nature of Sarjal land. /Our	land has also suffered from nuclear	SR M 1940
that we live on this cursed	land and breath the air that is soak	DL F 1944
ppear! /Let peace be on our	land. /My wish is that such loud tes	KY M 1951
ople away from their native	land and houses is still standing be	KY M 1925
y could die on their native	land. /The bright mushroom cloud tha	KY M 1925
ts had disappeared from our	land in those years. /Another conseq	KY M 1925
sappear." /We wish that our	motherland will be safe and peaceful	KY F 1940
lot of people out of their	homeland. /The rest people were take	KY M 1926
I wish peace will be on our	land. /Atomic testing should disappe	KY F 1935
nhabitants came back to the	land, contaminated by radioactive fa	KY M 1940
d not only people, but also	nature. /I wish that next generation	KY F 1923

A similar concern about the “contamination” of the environment, for example, land, air, water, plants and animals, by radioactive materials can be seen in the next sample output.

Sample (7) Output for “contamination”

rth. /Although this land is	contaminated, we do not want to aban	SR F 1946
he pastures and the air are	contaminated by radiation. /Both the	SR M 1931
le and the animals consumed	contaminated food. /Hospital No 4 co	SR M 1931
now all of them are dead. /	Contamination of plants and animals	SR M 1931
ally, the air and water are	contaminated by radiation. /And it h	SR F 1945
o naturally we breathed the	contaminated air. /Radiation suppres	SR F 1939
of the haymaking parties. /	Contaminated air, water and food hav	SR F 1939
cide? /Of course, it is the	contaminated air, water, and food. /	SR M 1947
as a driver. /I visited the	contaminated places almost every day	SR M 1938
ath the air that is soaked,	contaminated by this explosion. /For	DL F 1944
we are still living in the	contaminated place. /Our health is g	KY M 1934
ants came back to the land,	contaminated by radioactive fallout.	KY M 1940

We have already seen that, to the majority of the Semipalatinsk hibakusha, health effects of the nuclear tests are the most serious concern. From the testimonies, we

can see that they think that ill health and misery of themselves and their families are caused by the nuclear tests. The program we used, TERESA, can be employed to retrieve testimonies which show the causal relationship between the two in the following way. First, we create a set of citations which contain “health” or “ill” (or both). The set is identical with that which is shown partially in Sample 2 above.⁶⁾ Next, we create another set of citations which contain one of “test,”⁷⁾ “explosion,” or “radiation.” Then we “match” the two sets and create a new set of citations which contain both the first and second sets of words. Of course, the results do not assure us that all the citations obtained in this way assert the causal relation between the ill health and the nuclear tests. Logically at least, our final set of citations may contain testimonies which deny the causal relation between the two. Moreover, some testimonies which use different expression from the words we selected in asserting the causal relation may have escaped from our attention. There are such cases as:

Indisputably, every inhabitant of our village *suffers* from the consequences of nuclear *explosions*. Sarjal F 1939 (authors’ emphasis)

To prevent such noises and omissions, it is sufficient in our case to read through all the original testimonies. But when a great number, say thousands, of testimonies are stored in a database, such work will require vast amount of time and energy. A full-text database of TERESA provides us with an easy and quick way of achieving an approximate result with much less time and labor.

The following sample output shows testimonies which are obtained in this way and assert the causal relation between the nuclear tests and the ill health of the Semipalatinsk people. Due to the limit of space, we show only those testimonies which satisfy the condition in a *single* sentence.

Sample (8) Output for the Assertion of a Causal Relation between Nuclear Tests and Ill Helath

All my life I never suspected that the nuclear *tests* could do so much damage to people's *health*. Sarjal F 1935

Only the nuclear *test* site is to blame for all the *ills*, related to my *health*. Sarjal M 1938

Now I am *ill* myself, my two sons also suffer from the consequences of nuclear explosions. Sarjal M 1937

All of our *ills* and diseases are related to the *radiation*. Sarjal M 1930

Now I am *ill* myself, my son hanged himself, and only the atomic *test* site is to blame for all my *ills*. Sarjal M 1935

Because of these *tests* I have *ill* children, even my granddaughter suffered. Dolon M 1942

The young here are mostly *ill*, we think the *test* site is to blame for it all. Dolon M 1951

Due to the harm of the atomic *explosions* the people are dying, worsening their *health*, or having shorter life. Kaynar M 1930

What I would like to say is that the people of Kaynar do not have a good *health* due to the harm of the atomic *test* site. Kaynar M 1947

Our *health* is broken after being living close to the atomic *test* site for forty years. Kaynar M 1942

I think that having not good *health*, and delivering the invalid children, all these are due to the horrible atomic *test* site consequences. Kaynar M 1943

The *test* site was dangerous for the *health* of the people and their descendants. Kaynar F 1940

We live in the hard times, I am *ill* from childhood, it is related to the *test* site. Kaynar M 1944

I wish that those, who have been affected by atomic *testing*, and their children can receive good *health* care and support. Kaynar M 1941

That is why, for the *healthy* future of the next generation, I wish there will not be *explosions*. Kaynar F 1923

All people have seen the harm of these *explosions*; even it affected the *health* of our descendants. Kaynar M 1938

Because of those *explosions* all my relatives have different kind of *illnesses*. Kaynar F 1948

My *illness* is related to the nuclear *tests*. Kokpekti F 1948

I think that the nuclear *testing* has negative impact on the ecology and people's *health*. Kokpekti F 1958

Then we didn't think about our *health*, it was interesting to watch the moment of *explosion*.
Kokpekti M 1940

(authors' emphasis)

So far, we have attempted to show some apparently salient aspects of the Semipalatinsk testimonies. Needless to say, ours are very crude initial efforts, which should be further sophisticated and elaborated. But, even cursory examination like ours can show a few characteristics of the experiences of nuclear tests by the Semipalatinsk people, and suggest some remarkable differences between Hiroshima-Nagasaki and Semipalatinsk. Our examination in this paper was based mainly upon so-called qualitative data. It can, and should, be supplemented by quantitative data about testimonies, as well as by medical and dosimetric data.

We have also treated the Semipalatinsk people as a whole. But, as we mentioned above, the villages where the testimonies were collected differ in the estimated amount of radiation doses, and, as a consequence, probably in their experiences of nuclear tests and their health effects. In addition, there may be gender and/or age differences in the experiences and perceptions. We should clarify these possible differences.

As an initial step toward more detailed quantitative research, we can employ various word counts broken down by village or sex. The following two tables give the distribution by village and sex of those words which we employed to illustrate salient aspects of the Semipalatinsk experiences of nuclear tests.

Table 1 Frequencies of Important Words by Village

The Kokpekti data is excluded.

	Sarjal (48)*	Dolon (20)*	Kaynar (48)*
health, healthy, ill, ills, illness	21	9	50
cancer	9	4	9
suicide, hanging oneself	9	0	4
land, nature	7	1	8

* number of testimonies

Table 2 Frequencies of Important Words by Sex

The Kokpekti data is excluded.

	Male (64)*	Female (51)*	NA (1)*
health, healthy, ill, ills, illness	42	37	1
cancer	28	15	0
suicide, hang oneself	8	5	0
land, nature	10	6	0

* number of testimonies

Though we cannot observe a clear difference in sex, we can point to one or two differences in villages. First, the testimonies from Kaynar seem to be much more concerned about (ill) health⁸⁾. Secondly, references to suicide are much more frequent in the testimonies from Sarjal. The differences may be explained by our selection of words representing “ill health” or “suicide.” Our selection of words may have been partial or biased, and, if we add other terms like “disease” and “die/death,” or “kill oneself,”⁹⁾ testimonies from other villages will show the similar degree of concern about ill health or suicide.

Or there may be some causes or reasons which explain the peculiar concern of the Kaynar or Sarjal villagers.

4 Future Research

As the collection of testimonies in Semipalatinsk has just begun, so has an attempt to create a full-text dataset. There are two urgent tasks facing us. One is the collection of further testimonies. The other is sophistication of research and analysis based on the collected data.

First of all, the size of our sample is too small compared with the estimated size of the population, that is, 1.2 million people negatively affected by the nuclear tests. One or two hundred testimonies that we have collected so far are insufficient to understand the realities and perceptions of the Semipalatinsk hibakusha. They are an insufficient basis from which we can make valid inferences about the collective memory of Semipalatinsk nuclear tests and their effects. We should collect further testimonies in great numbers. In addition, full-text databases in the Russian and Kazakh languages will be in need, and of value, especially for the future cooperation between Kazakh and Japanese researchers. At present, Russian and Kazakh electronic texts in the Cyrillic script are in preparation, but we will have to develop a computer software which can deal with them in the same way as we reported here concerning the English version. As an expedient, we may transcribe the Cyrillic version into the Latin alphabet version.

The full-text database, the English text used for it, and the program are all available in principle for the purpose of research or other nonprofit purposes. But the program, TERESA, can operate only on the MS-DOS machine. The development of the WINDOWS version is urgently needed.

A full-text database enables us to immediately obtain (part of) the text we need. In addition, it also informs us of the distribution of the terms or concepts (as far as they are represented by words actually used) among various attributes of the testimonies such as village, sex, age and so on. At the next stage of research, we will have to attempt at some kind of coding for statistical purposes. As in the case of so-called content analysis, we will have to change all such terms as “ill,” “illness,” “ill health,” “health” into one category “ill health.” A full-text database will lender valuable help in such an enterprise, as well as providing us with the text of testimonies as a kind of raw data.

As to the research itself, there are two immediate agendas. The first is, as we said above, to reconstruct the collective memory of experiences of nuclear tests and

their aftereffects on the basis of the testimonies collected and processed, and then to clarify the characteristics of the Semipalatinsk experiences. The latter objective will be better achieved by the comparison with the Hiroshima and Nagasaki experiences in all the three areas of “body,” “mind,” and “life.” The second is to clarify the relationship between the amount of doses and its experienced aftereffects. At present, research on the former has advanced greatly, but research on the latter has just begun. We must begin by reconstructing (the memory of) experiences of effects of nuclear tests on the basis of a small number of testimonies and interviews.

Acknowledgements

The present research is assisted in part by the Research Grant of the Toyota Foundation in 2002 (Research on the Realities of *Hibakusha* in Semipalatinsk, Kazakhstan, representative: Noriyuki Kawano), Research Grant of Hiroshima University in 2002 (Database of the Testimonies in Semipalatinsk, Hiroshima and Nagasaki and Its analysis, representative: Noriyuki Kawano), Grant-in-Aid for Scientific Research (B)(2) (Dosimetry Study and Radiation Effects for the Residents near Semipalatinsk Nuclear Test Site, representative: Masaharu Hoshi), Research Grant of Electric Technology Research Foundation of Chugoku in 2002 (Radiation Effects for the Residents near Semipalatinsk Nuclear Test Site, representative: Masaharu Hoshi).

We would like to extend our gratitude to Hiroshima Semipalatinsk Project and Dr. Zhumadilov Zhaxybay Shaimardanovich for their kind help in collecting testimonies, Mr. Maxym Alexandrov and Ms. Sharapiya Kakimova for the translation of Russian and Kazakh original into English, and Ms. Sarara Maeda for improving our English.

Notes

- 1) Though different sources give different numbers of the tests, they usually range from 450 to 470. For example, see Stegner and Wrixon 1998: 14
- 2) Matsuo and others have created two databases: one of testimonies of hibakusha in Hiroshima and Nagasaki (Matsuo et al 1997), and the other of so-called “atomic bomb literature.” The latter work still continues. See, for example, Ikeda and Matsuo (this volume).
- 3) For the actual applications, see Blake et al (1994) etc.
- 4) For concrete examples of testimonies in Japanese, see Kawano et al 2003a, 37-36.
- 5) The KWIC (keyword in context) format was first proposed and produced by Luhn (1960).
- 6) If we add terms such as “die” or “death” to the list, we will obtain a much larger and more comprehensive set of citations. But the procedure will be essentially the same.
- 7) We used “test” rather than “nuclear test.” It is because, as can be observed in Sample 8, Kazakh hibakusha use the term “test site” (or “polygon”) in the sense of “nuclear test” or “nuclear explosion,” and the employment of “test” will cover both cases.
- 8) The number of occurrences for Kaynar (50 occurrences) exceeds that of the testimonies. It is presumably because some respondents use the terms two or more times.
- 9) Actually, no testimony uses the expression “kill himself” etc.

References

- Apsalikov, Kazbek Negamatovich (2004), "Dosimetry and Epidemiology Studies around the Semipalatinsk Nuclear Test Site," paper presented at the Ninth Hiroshima International Symposium: Radiation Exposure in Semipalatinsk and Research on Its Effect, March 10, 2004, Hiroshima
- Arystanbekova, H.E. Ms. Akmaral Kh. (Kazakh Ambassador to the United Nations) (1998), Speech made at United Nations, 19 October 1998.
http://www.un.int/kazakhstan/sa_10198.htm (accessed September 2003)
- Blake, Norman F., David Burnley, Masatsugu Matsuo and Yoshiyuki Nakao (eds.) (1994), *A New Concordance to The Canterbury Tales Based on Blake's Text Edited from the Hengwrt Manuscript*, Okayama: University Education Press
- Editorial Committee of Japan National Preparatory Committee (1978), *A Call from Hibakusha of Hiroshima and Nagasaki: Proceedings of International Symposium on the Damage and Aftereffects of the Atomic Bombing of Hiroshima and Nagasaki*, Tokyo: Asahi Evening News
- Grosche, B. (2002), "Semipalatinsk Test Site: Introduction," *Radiat Environ Biophys*, 41, 53 - 55
- Hoshi, Masaharu (2001), *Semipalatinsk Kakujikkenjo Kinko Jumin no Hibaku Senryo Suitei Hoho no Kakuritu to Kenkou Eikyou Kenkyu (Methodology of Dosimetry of the Population in the Proximity of the Semipalatinsk Nuclear Test Site and Its Health Effect*, in Japanese), report of the 1999-2000 grant in aids from JSPS
- Ikeda, Masahiko and Masatsugu Matsuo (2004), "Toge Sankichi Tokyo Shiryo: Toge Shiryo Denshika no Bunmyaku de (The Tokyo Materials of Toge Sankichi: In the Context of Its Electronic Storage, in Japanese), *Hiroshima Peace Science* 26 (This volume)
- Kawano, Noriyuki (2004), "Content Analysis of Testimonies Written by *Hibakusha* near the Nuclear Test Site of Semipalatinsk," Kawano et al (eds.) (2004), 30-42
- Kawano, Noriyuki et al (2003a), "Semipalatinsk Kakujikkenjo Kinko Hibaku Shogen no Nippongohan Zenbun Dêtabêsuka (A Full-text Japanese Database of Testimonies of Those Exposed to Radiation near the Nuclear Test Sites of Semipalatinsk, Kazakhstan)," *Hiroshima Peace Science*, 25, 31-51
- Kawano, Noiyuki et al (eds.) (2003b), *Kazafusutan Kyowakoku Semipalatinsk Hibaku Jittai Chosa Hokokusho (Report on the Actual Conditions of the Radiation Exposed Residents near the Former Semipalatinsk Nuclear Test Site*, in Japanese), Hiroshima: Research Institute for Radiation Biology and Medicine, Hiroshima University and Hiroshima Peace Science Consortium, Hiroshima University
- Kawano, Noiyuki et al (eds.) (2004), *Report on the Actual Conditions of the Radiation Exposed Residents near the Former Semipalatinsk Nuclear Test Site*, Hiroshima: Research Institute for Radiation Biology and Medicine, Hiroshima University and Hiroshima Peace Science Consortium, Hiroshima University
- Luhn, H. P. (1960), "Keyword-in-Context Index for Technical Literature: KWIC index," *American Documentation*, 11(4), 288-295
- Matsuo, Masatugu et al (1997), *Hibaku Kanrenn Bunken no Furutekusuto Detabesu no Sakusei, Kensaku, Bunseki no Kenkyu (A Study on the Creation, Retrieval, and Analysis of a Full-text Database of Atomic Bombing-related Documents*, in Japanese), report of the 1995-1996 grant in aids from MEXT.
- The Ministry for Atomic Energy and the Ministry of Defense of the Russian Federation (eds.) (1996), *USSR Nuclear Weapons Tests and Peaceful Nuclear Explosions 1949 through 1990*, Russian Federal Nuclear Center- VNIIEF
- Stegner, Peter and Tony Wrixon (1998), "Semipalatinsk Revisited: Radiological Evaluation of the Former Nuclear Test Site," *IAEA BULLETIN*, 40(4), 12-14

Taooka, Yasuyuki (2004), "Medical Information Analysis on the Radiation Exposed Residents near the Former Semipalatinsk Nuclear Test Site Using Questionnaires," Kawano et al (eds.), 15-29

Appendix: Rank List of Words

Notes: In the following list, only nouns, verbs and adjectives are listed in the descending order of their occurrences. Plural forms and inflected forms are treated separately. And all the upper cases are given in the lower case, as in the case of “semipalatinsk.”.

test 105	family 16	military 11
people 97	houses 16	mother 11
atomic 95	next 16	person 11
nuclear 83	suffer 16	related 11
site 83	became 15	resettled 11
tests 71	everything 15	result 11
children 67	old 15	semipalatinsk 11
died 60	parents 15	sick 11
explosions 58	sky 15	used 11
cancer 43	care 14	appeared 10
health 42	disease 14	blast 10
explosion 40	due 14	closed 10
years 39	grandchildren 14	die 10
ill 37	home 14	first 10
consequences 36	house 14	ground 10
saw 36	later 14	hair 10
think 36	lived 14	left 10
time 36	peace 14	live 10
wish 36	school 14	made 10
diseases 33	told 14	radiation 10
will 33	young 14	relatives 10
age 32	animals 13	retirement 10
many 32	day 13	skin 10
village 30	disappear 13	treatment 10
only 28	early 13	work 10
generation 26	earth 13	year 10
testing 26	healthy 13	course 9
mushroom 25	heart 13	district 9
affected 24	medical 13	doors 9
harm 24	sarjal 13	eyesight 9
seen 24	wave 13	fall 9
like 23	went 13	feel 9
started 23	air 12	fire 9
xxx 22	help 12	flashes 9
know 21	lot 12	good 9
bomb 20	see 12	hope 9
life 20	windows 12	suicide 9
remember 20	contaminated 11	take 9
cloud 19	epicenter 11	watched 9
land 19	fear 11	water 9
born 18	felt 11	windowpanes 9
conducted 17	forget 11	announced 8
eyes 17	future 11	big 8
living 17	go 11	blood 8
want 17	husband 11	bright 8

