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**WAR DEPARTMENT
UNITED STATES ENGINEER OFFICE
MANHATTAN DISTRICT
P. O. BOX 42
STATION F
NEW YORK, N. Y.**

IN REPLY
REFER TO

EIDM-3a

27 November 1945.

Subject: Preliminary Report - Atomic Bomb Investigation.

MEMORANDUM to Major General L. R. Groves.

1. Inclosed herewith are two copies of the preliminary report by the 1st Technical Service Detachment. These cover the investigation in Japan from 5 September 1945 until 12 October 1945.
2. The preliminary report includes basic and summarizing materials, reports of radioactivity and damage estimates which I hope will be useful to you until a future more detailed report is available.
3. Also included, are two copies of an eye-witness account translated from the German which was written by a Father Siemes in a report to the Pope. This is included for its value as background material and its narrative interest.

**Incls.
As above.**

**STAFFORD L. WARREN,
Colonel, Medical Corps.**

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PRELIMINARY REPORT OF FINDINGS OF ATOMIC BOMB INVESTIGATING
GROUPS AT HIROSHIMA AND NAGASAKI

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THIS DOCUMENT CONTAINS OF *2* PAGE(S)
NO. *2* OF *4* COPIES SERIES *A*

Introduction

This report is based upon a preliminary evaluation of the data obtained by the atomic bomb investigating groups at Hiroshima and Nagasaki and upon impressions gained while doing the work. It contains some preliminary tables and some general conclusions which may be altered when a detailed analysis of the data is completed.

The data obtained fall generally into three distinct categories, which are, however, interdependent, and these are reported in three sections.

Section I. Medical report. A description of the effects of the bombings on the inhabitants of the two cities is given with a discussion of what caused the various effects insofar as this could be determined from the findings of this group.

Section II. Radioactivity measurements. Measurements of the intensity of radioactivity at the time of the investigation with delineation of the areas showing activity are shown on plots and the methods of counting and the significance of the findings related to the effects on patients are discussed.

Section III. Damage estimates. Estimates of the various degrees of structural damage in the two cities is shown on zone maps and the relation of these findings to physical injuries of patients is discussed.

CLASSIFICATION CANCELLED
DATE *7-18-52*
FOR THE Atomic Energy Commission
W. A. J. [Signature]
Chief, Declassification Branch

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SUMMARY

The primary purposes of the atomic bomb investigating group sent to Japan by the Manhattan Engineer District were:

- 1.) To protect occupation forces from exposure to radiation if any significant quantities of radioactivity persisted after the atomic bombings of Hiroshima & Nagasaki;
- 2.) To investigate the Japanese reports that people were being harmed by "lasting effects" of the bombings; and
- 3.) To gather information and data on:
 - a.) The existence, if any, of persistent radioactivity;
 - b.) The biological effects of the atomic bombs, and
 - c.) General factors concerning physical damage and casualty estimates insofar as they related to the above.

The answers to the questions involved are presented in this preliminary report. The chief conclusions from it are:

- 1.) No harmful amounts of persistent radioactivity were present after the explosion as determined by:
 - a.) Measurements of the intensity of radioactivity at the time of the investigation; and
 - b.) Failure to find any clinical evidence of persons harmed by persistent radioactivity.
- 2.) The effects of the atomic bombs on human beings were of two main types:
 - a.) Burns and other physical effects expected from large scale explosions but exceptional in regard to the large area (14.3 square kilometers) over which they extended and in regard to an unusual type of burn due chiefly to infra-red radiation;
 - b.) Delayed effects which indicated effects from radiation.
- 3.) The effects from radiation were due to instantaneous discharge of radiation and not to persistent radioactivity.

The opinions expressed in this preliminary report are not in any sense final. For the most part they represent fairly unanimous opinions of those who took part in the investigation. The final results will be derived from a detailed analysis of the data obtained.

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SECTION I. MEDICAL FINDINGS IN HIROSHIMA AND NAGASAKI.

A. Purpose of study. To determine the actual effects of the atomic bombs on the people of Hiroshima and Nagasaki, and, insofar as possible, to determine to what the effects were due and how many people were injured.

B. Methods. Most of the data were derived from the following lines of investigation:

1. Examination of patients still living.
2. Analysis of records of patients who had died or were not available for examination for other reasons.
3. Autopsy material.
4. Tabulations of data and opinions of Japanese investigators who had studied the earlier patients.

C. Results. The results are given in the following paragraphs:

1. Symptoms and laboratory findings. The symptoms and laboratory findings in patients at Hiroshima and Nagasaki fall into two general groups. The first group includes the immediate effects due to burns and other physical injuries and will be discussed under F below. The second group of findings began after a latent period varying from 3 to 30 days. The important symptoms and physical findings were epilation, severe ulcerative lesions of the mouth and throat, hemorrhagic manifestations including petechiae, severe gastrointestinal symptoms, and rapid and extreme emaciation. Deaths occurred throughout a period extending from 1 week to 2 months after the explosion with the greatest number occurring about 1 month after. The important laboratory findings related primarily to disturbances in the hematopoietic function manifested by leucopenia, anemia, and thrombocytopenia. The most striking findings at autopsy were signs of destruction of the bone marrow and the lymphatics, ulcerative lesions of the colon and rectum; and signs of hemorrhage throughout the viscera. In these cases in general, the earlier the symptoms appeared the more severe was the case, and on this basis they can be divided into three groups. The details of the symptoms, laboratory data, and autopsy findings in patients of these three groups are shown in Table I, a, b, and c.

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Table 1, a.

Symptoms in patients showing delayed effects.

Day after explosion.	<u>Most Severe</u> (Patients usually within 1.0 Km. of center)	<u>Moderately Severe</u> (Between 1.0 and 1.5 Km.)	<u>Mild</u> (1.5 to 2.0 Km.)
1.	1. Nausea and vomiting after 1-2 hours lasting 1-2 days.	1. Nausea and vomiting after 1-2 hours lasting 1-2 days.	
2.			
3.			
4.	<u>LATENT PERIOD</u>		
5.	2. Bloody diarrhea		
6.	3. Vomiting	<u>LATENT PERIOD</u>	
7.	4. Fever		
8.	5. Rapid emaciation		
9.	Death		
10.	(Mortality probably 100%)	2. Beginning epilation progressing until death	<u>LATENT PERIOD</u>
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.		3. Loss of appetite and general malaise.	1. Epilation
19.		4. Fever	2. Anorexia and malaise
20.		5. Herpetiform eruption about mouth and on buccal mucus membranes progressing to necrotic stomatitis with hemorrhagic gingivitis.	3. Sore throat
21.		6. Pallor	4. Pallor
22.		7. Petechiae, bloody diarrhea, epistaxis, and hematemesis.	5. Petechiae
23.		8. Rapid emaciation	6. Diarrhea
24.		Death	7. Moderate emaciation
25.		(Mortality probably 50%)	(Recovery unless complicated by previous poor health or superimposed injuries or infections)
26.			
27.			
28.			
29.			
30.			
31.			

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Table I, b.
Laboratory findings in patients showing delayed effects

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FINDING	MOST SEVERE	MOD. SEVERE	MILD
	3rd-5th	Day of laboratory determination 20-30th	30th-60th
Leucopenia	Moderate	Extreme	Moderate
Anemia	None	Moderate	Severe
Thrombocyto- penia	None	Extreme	Moderate
Hematuria	None	Frequent	Infrequent

Table I, c.
Autopsy Findings in Patients Showing Delayed Effects

	MOST SEVERE	MOD. SEVERE	MILD
General aspect	Emaciation	Emaciation Petechiae Epilation	Emaciation Complicating findings (burns, etc.)
Mouth and pharynx	Ulcerations	Ulcerations	Swelling and edema
Bone Marrow	Grossly normal Early degenera- tive changes.	Mycloid degenera- tion	Myclois regenera- tion Erythroblastic degeneration
Colon and rectum	Necrotic ulceration	Necrotic ulcera- tions Hemorrhage.	General hemorrha- gic findings
Testes and ovaries	* * * *	Atrophied	Atrophied
Other viscera	Terminal changes	Hemorrhage	Complicating find- ings (malnutri- tion; chr.dis, etc. worms)
Lymph Nodes	* * * *	Moderate hyper- plasia	No change.

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2. Cause of symptoms - ~~That~~ these symptoms and findings were primarily due to radiation was concluded from the following:

a. The theoretical calculations predicted an instantaneous discharge of high energy gamma rays and neutrons below the point of detonation which would have been expected to cause serious biological effects.

b. The symptoms and findings were those which would have been predicted from animal experiments and from known toxic effects encountered in clinical therapeutic application of radiation.

c. The existence of a definite latent period before the onset of symptoms and the correlation between the length of the latent period and the severity of the symptoms as shown in Table I, a, strongly suggested that the symptoms were due to radiation.

d. Induced radioactivity had been detected very near the center of the explosion. This could be attributed only to the effect of neutrons. Table II shows such induced radioactivity in bone phosphorus and the relation of its intensity to the distance from the center.

Table II.
Activity of P in bone. (Hiroshima)

No.	Distance from center Km.	Beta ray/min/gm. of ash* x 10 ⁴
1.	0.00	20.3
2.	0.17	24.6
3.	0.25	16.9
4.	0.53	4.8
5.	0.60	0.126
6.	0.70	0.051
7.	1.28	-
8.	2.00	-

*1 gm. of ash corresponds to 6.4 gm. of bone.

(Data from Dr. Koiti Murati, Nuclear Research Laboratory, Institute of Physical and Chemical Research, Tokyo.)

3. Evaluation of symptoms. Of the symptoms and findings described, those which in themselves can be considered to be due to radiation are epilation, leucopenia with its accompanying symptoms, and thrombocytopenia with its accompanying hemorrhagic manifestations. These effects are due almost wholly to the gamma radiation. The additional role that neutrons may have played in the production of these symptoms can not be evaluated from the data.

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Any additional information on the biological effects of radiation which may be forthcoming from the data obtained must await more detailed analysis.

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4. Evidence against effects from persistent radioactivity. That the symptoms from radiation were due to the instantaneous discharge of high energy particles and not to any persistent radioactivity deposited on the ground was also concluded from several facts.

a. Theoretical predictions indicated that the height above the ground at which the bomb was detonated would not produce any dangerous amounts of persistent radioactivity.

b. The amount of radioactivity on the ground determined at the time of the study was very small and was not sufficient to account for any harmful amounts having been present since the explosion. This is more fully discussed in Section II of this report.

c. No persons coming into the areas after the explosion were found who showed any signs or symptoms of radiation effects.

These facts also apply to any effects from radioactive particles scattered along the path of the cloud.

5. Distribution of patients showing effects of radiation. Table II shows the relationship between the distance from the center of the explosion and the occurrence of epilation and hemorrhagic diathesis.

Table III

Relationship between distance from the center of the explosion and the occurrence of epilation and hemorrhagic diathesis. (Nagasaki)

Distance from the center	No. of cases	Percent
0.5 Km.	12	11.3
1.0	43	40.6
1.5	32	30.2
2.0	5	4.7
3.0	10	9.4
4.0	3	2.9
4.1 and over	2	1.9
Total	107	

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It is apparent that the majority of surviving cases showing the symptoms and findings due to radiation were between 1.0 and 1.5 Km. from the center at the time of the explosion. There were few cases studied who were within 0.5 Km. of the center since most of these must have died soon after the explosion. From the Japanese data there may be evidence that patients in Nagasaki as far away as 4.0 Km. did show effects of radiation.

6. Additional effects.

a. Physical injuries. Physical injuries other than burns included fractures, lacerations, contusions, and similar effects such as would be expected from blast directly and from the crumbling buildings and flying debris caused by the explosion. There were evidences of such injuries at least as far out as 3.5 Km. from the center. See Section III of this report.

b. Burns. The burns were of two types. The former were fire burns of the usual type. The latter, which comprised the majority of the burns, however, were distinctive in several respects. That they were due to infra-red rays was concluded from the following:

1. Clinically they resembled sunburns more closely than ordinary fire burns.

2. They were sharply delineated by lines representing the border of bare skin areas, and they were limited to those areas which were facing the center of the explosion. For instance, a patient who had been walking at right angles to a line drawn between him and the center of the explosion and whose arms were swinging might have burns on the outside of the arm nearest the center and the inside of the other arm.

3. Patients who were quite close to the center and who had on white and black striped clothes, may have had burns of the skin only in those areas under the white clothing.

4. Many patients recovered with as much as 2/3 of the total skin area so burned, which is most unlikely with ordinary burns if the burns are deeper than 1st degree, and is further evidence that these differed from the usual type of burns.

The majority of these burns were classified as second degree burns. They healed slowly, but without sloughing or many instances of secondary infection. The patients showing them were most frequently near the center, but with decreasing frequency and severity, they may have extended out as far as 4.0 Km. There was ample evidence of similar burning of physical objects.

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7. Relation of other injuries to effects from radiation.

The evaluation of symptoms and findings due wholly to radiation is complicated by the occurrence of the other types of injury described. The majority of patients who showed effects of radiation also had burns and other physical injuries since both types of injury occurred more frequently in persons near the center of the explosion. This is shown in Table IV, in which the depression of the leucocyte count can be considered as a measure of the extent of injury from radiation.

Table IV

Relationship between leucocyte count and occurrence of burns and other physical injuries.

<u>W.B.C.</u>	<u>Uninjured</u>	<u>Burned</u>	<u>Other physical injuries</u>
500			
1500	0	2	0
2500	3	1	10
3500	9	0	6
4500	2	2	12
5500	10	3	10
6500	24	0	6
7500	13	3	6
8500	9	2	5
9500	5	0	0

8. Treatment. Treatment of the burns and other physical injuries was done by the Japanese by orthodox methods. Despite the inordinate number of patients and the poor facilities due in part to the gross destruction of medical installations, these injuries, and particularly the burns, did very well with very little infection in spite of the unbelievably poor conditions under which some of them were being treated.

Treatment of the radiation effects by the Japanese included general supportative measures such as rest and high vitamin and high caloric diets. Parenteral liver and calcium administration, thrombin preparations, and blood transfusions were used to combat hemorrhage. Parenteral vitamin preparations and pentanucleotide were used by American army medical corps officers after their arrival. No definite effect of these measures on the course of the disease could be demonstrated. The use of sulfonamide drugs by the Japanese and of penicillin by the American physicians undoubtedly helped control superimposed infection.

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9. Casualty estimations. The total number of casualties with the percentage of deaths and the distribution of the casualties and death, particularly in relation to the effects of radiation, can only be roughly estimated at the present time and may never be accurately known.

a. Total casualties. A considerable proportion of the people known to have been in the two cities at the times of the explosions cannot be accounted for. Many of these were probably killed outright and not identified, but a large number may have found their way out of the cities, and there is no record of them. Death certificates are not routinely kept in Japan, and the vital statistics in general are not very complete. From what was found, the best estimates for total casualties in the two cities at the end of September were as shown in Table V.

Table V.
Casualty Estimates.

City	Total present at time of explosion	Dead	Wounded
Hiroshima	400,000	86,000	112,000
Nagasaki	270,000	40,000	50,000

b. Statistics on patients showing effects of radiation. The total number of patients who showed radiation effects and the percentage of these who died is even more difficult to estimate. An inherent defect in this information which can never be overcome is the fact that many patients were killed immediately or died from other injuries before they had time to develop symptoms due to radiation. Records were not kept on the majority of the patients and many of those which were available were incomplete. This is particularly true of the records of patients admitted to the hospitals and who were discharged after their burns and wounds were healing, but before they developed symptoms due to radiation. Attempts to compare the amount of radiation received is made particularly difficult by the inability to estimate the amount of effective shielding in individual cases and this differed in general in the two cities. With all of these qualifications, and if one considers only those patients admitted to hospitals in the two cities, it can be estimated that of approximately 4000 patients admitted to hospitals, 1300 or 33% showed effects of radiation and of this number approximately one-half died. *Only a small percentage of these*

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SECTION II. INTENSITY OF RADIOACTIVITY FOUND IN AND AROUND
HIROSHIMA AND NAGASAKI

A. Purpose of study. To ascertain the presence of residual radioactivity in and around the bombed cities and to evaluate this activity in relation to possible physiological effects.

B. Instruments. Portable counters (Geiger-Mueller Type) with ear phone attachments were found to be the most practical instruments for this work. Landsverk and Wollan electroscopes were also used. Direct reading ionization chamber instruments were available but none were sensitive enough to detect the low intensity radiation present.

C. Calibration. The instruments used were calibrated against known radium sources brought for this purpose. The calibrations were performed before any readings were obtained and twice during their two week period of use.

D. Monitoring. Monitoring parties composed of physicians and technicians trained in this work explored the rubble of the bombed cities on foot and along roads into the environs. Readings were made by all in a prescribed manner and recorded. Water sheds and places of habitation in the vicinities of the town were investigated.

E. Results. The plots of radiation intensities are presented in the form of equi-intensity lines on the accompanying maps of the two cities. Fig. I, Hiroshima; Figs. II & III, Nagasaki.

F. Discussion. From a study of the results obtained, several salient features are seen.

1. In each city there are two distinct areas of low intensity radiation.

a. One beneath the point of detonation.

b. Another separated from the first by several kilometers. These areas can be correlated with the wind directions reported directly after each bombing.

2. Although the intensity of radiation is quite low, it is measurable with the very sensitive instruments used. From these measurements, simple calculations yield the highest radiation intensities which were present at any time after the bombings and also the total amount of radiation which would have been delivered during the whole period following the bombings. If the highest reading in each city is taken, the results of such calculations are shown in Table I.

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Table I
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City	Highest reading mr/hr	Highest reading date	Highest intensity r/hr	Total Radiation		
				R	# days	
Hiroshima	0.4	6 Oct 45	0.576	0915 6 Oct 45 1230	4.17	60
Nagasaki	1.8	26 Sept 45	2.02	9 Aug 45	14.2	47

3. If we consider these intensities from a physiological standpoint, it is quite obvious that the residual radiation alone could not have been detrimental to the health of persons entering or living in the bombed areas after the explosions. Although "tolerance" is exceeded slightly (tolerance being defined as the amount of radiation a human being can take day after day indefinitely without influencing the course of his life or producing residual or latent effects), the total amount of radiation is so small and falls so rapidly that it is soon ineffective. This was confirmed by the fact that no one entering these areas after the explosion was found to suffer effects from radiation. (See Section I-D)

4. The measurements performed were in the main for gamma rays. These are the most penetrating type and the most important from the standpoint of general bodily reactions. Measurements of beta rays were also made but were not calibrated because of technical difficulties and inaccuracy in evaluating the readings. Alpha ray measurements in the field are almost impossible for the same reasons and their biological importance in these conditions is practically nil. No alpha radiation was found with the preliminary measurements. Therefore after spot checks were made for beta and alpha radiation (which were within the expected limits) the gamma radiation was concentrated upon as the most practical measurement from the technical and physiological viewpoints. There is no possibility that there would be any persistent neutron activity.

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NAGASAKI, JAPAN & ENVIRONS
(Enlarged inset of Nagasaki Prefectural Map)

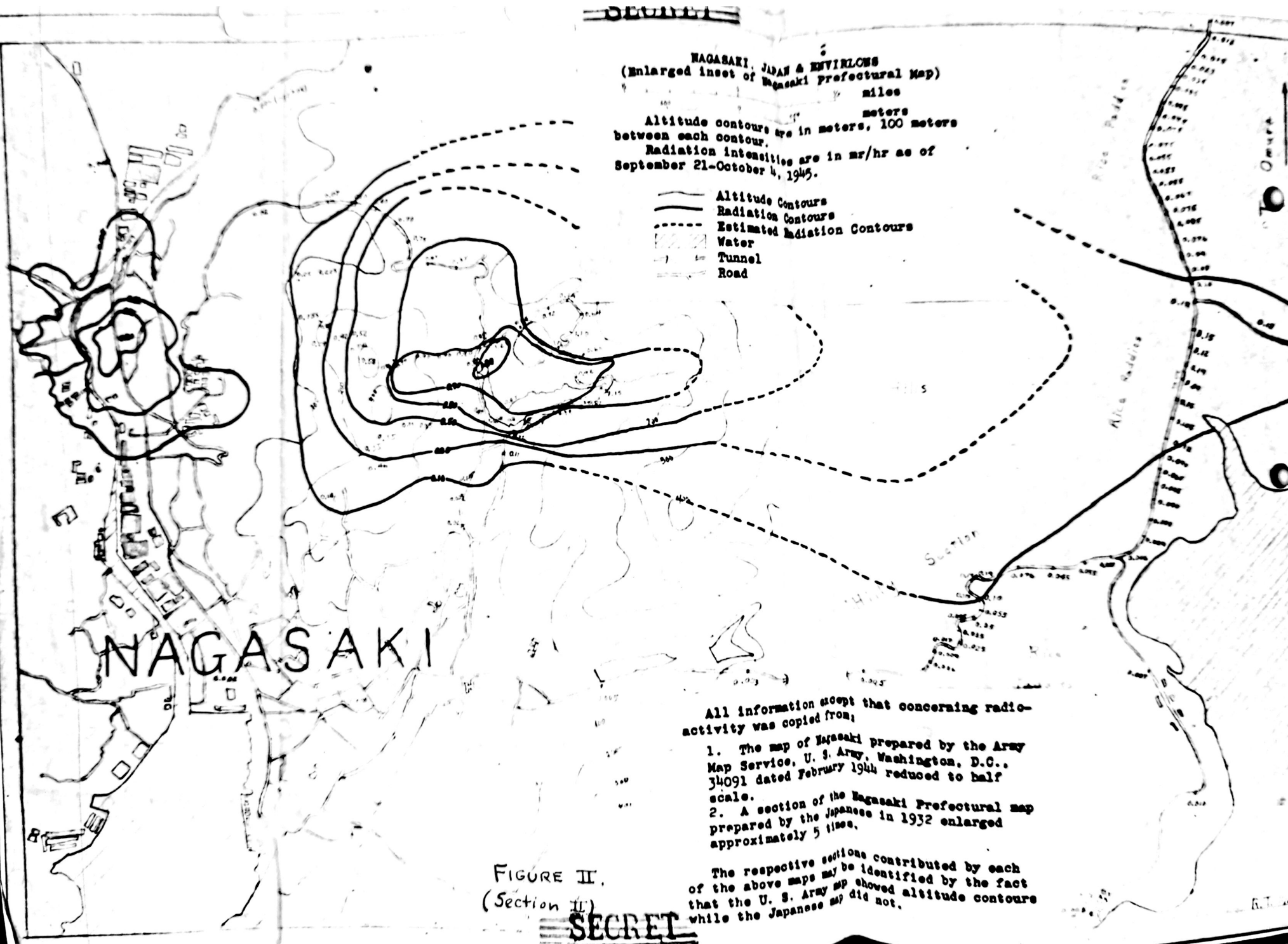
miles

meters

Altitude contours are in meters, 100 meters
between each contour.

Radiation intensities are in mr/hr as of
September 21-October 4, 1945.

-  Altitude Contours
-  Radiation Contours
-  Estimated Radiation Contours
-  Water
-  Tunnel
-  Road



All information except that concerning radio-activity was copied from:

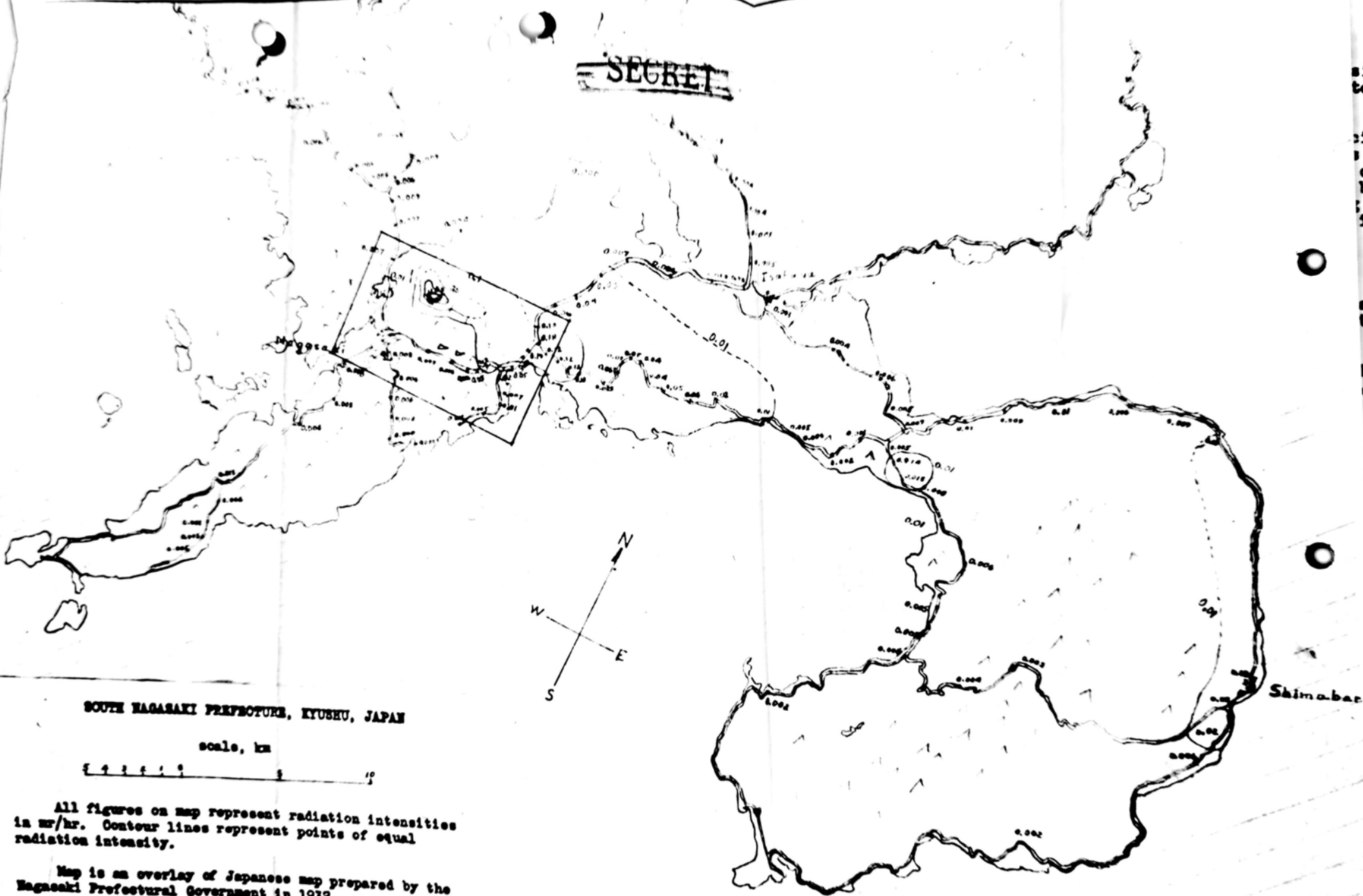
1. The map of Nagasaki prepared by the Army Map Service, U. S. Army, Washington, D.C., 34091 dated February 1944 reduced to half scale.
2. A section of the Nagasaki Prefectural map prepared by the Japanese in 1932 enlarged approximately 5 times.

The respective sections contributed by each of the above maps may be identified by the fact that the U. S. Army map showed altitude contours while the Japanese map did not.

FIGURE II.
(Section II)

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SOUTH NAGASAKI PREFECTURE, KYUSHU, JAPAN

scale, km



All figures on map represent radiation intensities in mR/hr. Contour lines represent points of equal radiation intensity.

Map is an overlay of Japanese map prepared by the Nagasaki Prefectural Government in 1932.

Enlarged inset on following page.

- Contour line
- Estimated Contour
- Road
- Mountains (1000-3000 ft. high)

FIGURE III.
(Section II)

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SECTION III. PHYSICAL DAMAGE IN HIROSHIMA AND NAGASAKI

A. Purpose of study. To observe and record residual evidences of physical damage in the bombed cities and to evaluate these observations in relation to physiological effects.

B. Methods. Army engineers and civilian physicists in both cities observed, photographed, and collected specimens for later tests. Statistics as to the number of buildings and types of construction were obtained. In the main, the physical damage will be reported under separate cover, but the effects of blast, flying debris, primary and secondary fires, and shielding from radiation are important from the casualty viewpoint.

C. Results.

1. Zones of various degrees of damage with an explanation of the type of damage are shown for the two cities in the attached maps. Fig. I, Hiroshima; Fig II, Nagasaki

2. The destruction of buildings and houses in Nagasaki is shown in Table I, compiled by Nagasaki Municipality.

Table I.

Destruction of buildings and houses in Nagasaki.

	<u>Number</u>	<u>Percent</u>
Total in Nagasaki (before bombing)	50,000	100
Blasted (not burned)	2,652	5.3
Blasted and burned	11,494	23.0
Blasted and/or burned	14,146	28.3
Partially burned or blasted	5,441	10.9
Total buildings and houses destroyed or damaged	19,587	39.2
Undamaged (except for minor roof & window breakage.)	30,413	60.8

3. The following observations on the effects of the type of buildings on the casualties were obtained.

a. Wooden buildings. A very large portion of buildings severely damaged by blast were of wood construction, with tile roofs typical of Japanese architecture. Nearly all of these buildings near the center of the blasts (principally dwellings and small factories) collapsed and burned. Casualties sustained by occupants of such buildings were mainly from secondary concussion (effects such as flying missiles and falling walls and from fires. Even though these

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buildings were of very light construction, persons in them were protected from the effects of infra-red and ultra-violet rays, unless they were situated in front of open windows or doorways. On the other hand, persons standing in the open at as great a distance as 3 kilometers from the center of the explosion received "flash burns" to their exposed skin. Very little shielding from high energy radiation was provided by this type of house, however. Also in periphery of the damaged areas, secondary fires in these wooden houses were easily set by overturned charcoal stoves, short circuited electrical wiring, and direct spread of the conflagration.

b. Masonry buildings (brick and stone). A few small factory buildings were of this type of construction. Nearly all of them situated in the blasted areas were collapsed and the occupants of such buildings suffered from injuries of the same nature as did those in wooden type dwellings. These walls, although thicker than the wooden frames, did not protect appreciably from gamma and immediate neutron radiation.

c. Structural steel fram buildings with corrugated iron or asbestos roof and siding. This type of building housed most of the workers in large factories. Near the center of the blast, the frames were twisted and bent, a few were collapsed, but the heavier frames were only slightly injured. Injuries to occupants were almost the same as with wooden buildings except that fewer were totally crushed and burned.

d. Reenforced concrete buildings. While damage to buildings with heavily reenforced concrete frames was severe, the frames themselves were not destroyed and consequently such buildings did not collapse. Although lethal casualties were less in this type of building, serious injury was sustained by occupants from the effects of falling false ceilings and missiles of metal, wood, metal-lath, plaster, and glass. This was the only type of structure which per se offered effective shielding against gamma radiation. Shielding against lethal amounts of gamma radiation was effected by ceilings and walls of reenforced concrete 6-7 inches thick at a distance of 1.2 Km from the center; while persons in adjoining buildings with corrugated iron or asbestos roofs and ceilings were definitely injured. Walls and ceilings of concrete 4 inches thick provided effective shielding at a distance of 1.75 Km from the center. Persons in such buildings standing in exposed situations were injured by the direct effects of long and short wave length radiations. The interior of these buildings were almost all completely burned out from secondary fires.

D. Discussion. Although the physical damage effects of the two cities and their resultant casualties were generally enormous

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and similar, there are some differences that are important to emphasize. The area destroyed and the total casualties suffered were greater in Hiroshima than in Nagasaki. Reasons for this are the following:

a. The bombing point or target at Hiroshima was in the center of the city which was geographically situated on a wide flat delta. The point of impact at Nagasaki was in the center of a narrow valley.

b. Hiroshima was composed mainly of Japanese type houses of wooden construction. The area bombed at Nagasaki contained large steel factory buildings and concrete buildings of modern construction.

c. Just previous to the bombing of Hiroshima plans were being made for the evacuation of unnecessary persons. The day of the bombing 40,000 extra people were brought into the center of the town for instructions on these evacuation plans. One week before the bombing of Nagasaki, such plans for the evacuation of unnecessary persons had been carried out and the population in the bombed areas had been reduced.

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LEGEND

- Completely devastated area. Almost complete destruction except for some reinforced concrete and structural steel remains.
Area - 5.17 sq. mi. 13.39 sq. km.
- Severe damage by fire and moderate damage by blast.
Area - 5.01 sq. mi. 12.97 sq. km.
- Minor damage by blast and fire.
Damage from broken windows to damaged roofs.
Area - 8.5 sq. mi. 22.0 sq. km. (approximate)

HIROSHIMA

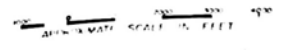


FIGURE I.
(Section III)

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NO. 2 OF 6 COPIES, SERIES A

ATOMIC BOMB ON HIROSHIMA

Eyewitness Account of P. Siemes

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Up to August 6th, occasional bombs, which did no great damage, had fallen on Hiroshima. Many cities roundabout, one after the other, were destroyed, but Hiroshima itself remained protected. There were almost daily observation planes over the city but none of them dropped a bomb. The citizens wondered why they alone had remained undisturbed for so long a time. There were fantastic rumors that the enemy had something special in mind for this city, but no one dreamed that the end would come in such a fashion as on the morning of August 6th.

August 6th began in a bright, clear, summer morning. About seven o'clock, there was an air raid alarm which we had heard almost every day and a few planes appeared over the city. No one paid any attention, and at about eight o'clock the all-clear was sounded. I am sitting in my room at the Novitiate of the Society of Jesus in Nagatsuka; during the past half year the philosophical and theological section of our Mission had been evacuated to this place from Tokyo. The Novitiate is situated approximately two kilometers from Hiroshima, half-way up the sides of a broad valley which stretches from the town at sea level into the mountainous hinterland, and through which courses a river. From my window, I have a wonderful view down the valley to the edge of the city. Suddenly - the time is approximately 8:14 - the whole valley is filled by a garish light which resembles the magnesium light used in photography, and I am conscious of a wave of heat. I jump to the window to find out the cause of this remarkable phenomenon, but I see nothing more than that brilliant yellow light. As I make for the door it doesn't occur to me that the light might have something to do with enemy planes. On the way from the window I hear a moderately loud explosion which seems to come from a distance, and at the same time the windows

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are broken in with a loud crash. There has been an interval of perhaps ten seconds since the flash of light. I am sprayed by fragments of glass. The entire window frame has been forced into the room. I realize now that a bomb has burst and I am under the impression that it exploded directly over our house or in the immediate vicinity. I am bleeding from cuts about the hands and head. I attempt to get out of the door. It has been forced outwards by the air pressure and has become jammed. I force an opening in the door by means of repeated blows with my hands and feet and come to a broad hallway from which open the various rooms. Everything is in a state of confusion. All windows are broken and all the doors are forced inwards. The book-shelves in the hallway have tumbled down. I do not note a second explosion and the fliers seem to have gone on. Most of my colleagues have been injured by fragments of glass. A few are bleeding but none has been seriously injured. All of us have been fortunate since it is now apparent that the wall of my room opposite the window has been lacerated by long fragments of glass. We proceed to the front of the house to see where the bomb has landed. There is no evidence, however, of a bomb crater; but the southeast section of the house is very severely damaged. Not a door nor a window remains. The blast of air had penetrated the entire house from the southeast, but the house still stands. It is constructed in a Japanese style with a wooden framework, but has been greatly strengthened by the labor of our Brother Cropper as is frequently done in Japanese homes. Only along the front of the chapel which adjoins the house, have three supports given way (it has been made in the manner of Japanese temple, entirely out of wood). Down in the valley, perhaps one kilometer toward the city from us, several peasant homes are on fire and the woods on the opposite side of the valley are aflame. A few of us go over to help control the flames while we are attempting to put things in order, a storm comes up and it begins to rain.

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Over the city, clouds of smoke are rising and I hear a few slight explosions. I come to the conclusion that an incendiary bomb with an especially strong explosive action has gone off down in the valley. A few of us saw three planes at great altitude over the city at the time of the explosion. I, myself, saw no aircraft whatsoever.

Perhaps a half-hour after the explosion, a procession of people begins to stream up the valley from the city. The crowd thickens continuously. A few come up the road to our house. Their steps are dragging. Many are bleed or have suffered burns. We give them first aid and bring them into the chapel, which we have in the meantime cleaned and cleared of wreckage, and put them to rest on the straw mats which constitute the floor of Japanese houses. A few display horrible wounds of the extremities and back. The small quantity of fat which we possessed during this time of war was soon used up in the care of the burns. Father Rektor who, before taking holy orders, had studied medicine, ministers to the injured, but our bandages and drugs are soon gone. We must be content with cleansing the wounds. More and more of the injured come to us. The least injured drag the more seriously wounded. There are wounded soldiers, and mothers carrying burned children in their arms. From the houses of the farmers in the valley comes words: "Our houses are full of wounded and dying. Can you help, at least by taking the worst cases?" The wounded come from the sections at the edge of the city. They saw the bright light, their houses collapsed and buried the inmates in their rooms. Those that were in the open suffered instantaneous burns, particularly on the lightly clothed or unclothed parts of the body. Numerous fires sprang up which soon consumed the entire district. We now concluded that the epicenter of the explosion was at the edge of the city near the Jokogawa Station, three kilometers away from us.

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We are concerned about Father Kepp who, that same morning, went to hold Mass at the Sisters of the Poor, who have a home for children at the edge of the city. He had not returned as yet.

Toward noon, our large chapel and library are filled with the seriously injured. The procession of refugees from the city continues. Finally, about one o'clock, Father Kepp returns together with the Sisters. Their house and the entire district where they live has burned to the ground. Father Kepp is bleeding about the head and neck, and he has a large burn on the right palm. He was standing in front of the nunnery ready to go home. All of a sudden, he became aware of the light, felt the wave of heat and a large blister formed on his hand. The windows were torn out by the blast. He thought that the bomb had fallen in his immediate vicinity. The nunnery, also a wooden structure made by our Brother Gropper, still remained but soon it is noted that the house is as good as lost because the fire, which had begun at many points in the neighborhood, sweeps closer and closer, and water is not available. There is still time to rescue certain things from the house and to bury them in an open spot. Then the house is swept by flame, and they fight their way back to us along the shore of the river and through the burning streets.

Soon comes news that the entire city has been destroyed by the explosion and that it is on fire. What became of Father Superior and the three other Brothers who were at the center of the city at the Central Mission and Parish House? We had up to this time not given them a thought because we did not believe that the effects of the bomb encompassed the entire city. Also, we did not want to go into town except under pressure of dire necessity, because we thought that the population was greatly perturbed and that it might take revenge on any foreigners which they might consider spiteful onlookers of their misfortune, or even spies.

Brother Stolte and Brother Erlinghagen go down to the road which is still

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full of refugees and bring in the seriously injured who have sunken by the wayside, to the temporary aid station at the village school. There iodine is applied to the wounds but they are left uncleaned. Neither ointments nor other therapeutic agents are available. Those that have been brought in are laid on the floor and no one can give them any further care. What could one do when all means are lacking? Under these circumstances, it is almost useless to bring them in. Among the passerbys, there are many who are uninjured. In a purposeless, insensate manner, distraught by the magnitude of the disaster, most of them rush by and none conceives the thought of organizing help on his own initiative. They are concerned only with the welfare of their own families. It became clear to us during these days that the Japanese displayed little initiative, preparedness, and organizational skill in preparation for catastrophes. They despaired of any rescue work when something could have been saved by a cooperative effort, and fatalistically let the catastrophe take its course. When we urged them to take part in the rescue work, they did everything willingly, but on their own initiative they did very little.

At about four o'clock in the afternoon, a theology student and two kindergarten children, who lived at the Parish House in the city, come and report that the Church, Parish House and adjoining buildings had burned down, and that Father Superior LaSalle and Father Schiffer had been seriously injured and that they had taken refuge in Asano Park on the river bank. It is obvious that we must bring them in since they are too weak to come here on foot.

Hurriedly, we get together two stretchers and seven of us rush toward the city. Father Rektor comes along with food and medicine. The closer we get to the city, the greater is the evidence of destruction and the more difficult it is to make our way. The houses at the edge of the city are all severely damaged. Many have

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collapsed or burned down. Further in, almost all of the dwellings have been damaged by fire. Where the city stood, there is a gigantic burned-out scar. We make our way along the street on the river bank among the burning and smoking ruins. Twice we are forced into the river itself by the heat and smoke at the level of the street. Frightfully burned people beckon to us. Along the way, there are many dead and dying. On the Wisasi Bridge, which leads into the inner city, we are met by a long procession of soldiers who have suffered burns. They drag themselves along with the help of staves or are carried by their less severely injured comrades.... an endless procession of the unfortunate. Abandoned on the bridge, there stand with sunken heads a number of horses with large burns on their flanks. On the far side, the cement structure of the local hospital is the only building that remains standing. Its interior, however, has been burned out. It acts as a landmark to guide us on our way. Finally we reach the entrance of the park. A large proportion of the populace has taken refuge there, but even the trees of the park are on fire in several places. Paths and bridges are blocked by the trunks of fallen trees and are almost impassable. We are told that a high wind, which may well have resulted from the heat of the burning city, had uprooted the large trees. It is now quite dark. Only the fires, which are still raging in some places at a distance, give out a little light. At the far corner of the park, on the river bank itself, we at last come upon our colleagues. Father Schiffer is on the ground pale as a ghost. He has a deep incised wound behind the ear and has lost so much blood that we are concerned about his chances for survival. The Father Superior has suffered a deep wound of the lower leg. Father Cieslik and Father Kelinsorge have minor injuries but are completely exhausted.

While they are eating the food that we have brought along, they tell us of their experiences. They were in their rooms at the Parish House - it was

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quarter after eight, exactly the time when we had heard the explosion in Nagatsuke - when came the intense light and immediately thereafter the sound of breaking windows, walls and furniture. They were showered with glass splinters and fragments of wreckage. Father Shiffer was buried beneath a portion of a wall and suffered a severe head injury. The Father Superior received most of the splinters in his back and lower extremity from which he bled copiously. Everything was thrown about in the rooms themselves, but the wooden framework of the house remained intact. The solidity of the structure that was the work of Brother Gropper again shone forth. They had the same impression that we had in Nagatsuke: that the bomb had burst in the immediate vicinity. The Church, school, and all buildings in the immediate vicinity collapsed at once. Beneath the ruins of the school, the children cried for help. They were freed with great effort. Several others were also rescued from the ruins of nearby dwellings. Even the Father Superior and Father Schiffer, despite their wounds, rendered aid to others and lost a great deal of blood in the process. In the meantime, fires which had begun some distance away are raging even closer, so that it becomes obvious that everything would soon burn down. Several objects are rescued from the Parish House and were buried in a clearing in front of the Church, but certain valuables and necessities which had been kept ready in case of fire could not be found on account of the confusion which had been wrought. It is high time to flee, since the oncoming flames leave almost no way open. Fukai, the secretary of the Mission, is completely out of his mind. He does not want to leave the house and explains that he does not want to survive the destruction of his fatherland. He is completely uninjured. Father Kleinsorge drags him out of the house on his back and he is forcefully carried away. Beneath the wreckage of the houses along the way, many have been trapped and they scream to be rescued from the oncoming flames. They must be left to their fate. The way

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to the place in the city to which one desired to flee is no longer open and one must make for Asano Park. Fukai does not want to go further and remains behind. He has not been heard from since. In the park, we take refuge on the bank of the river. A very violent whirlwind now begins to uproot large trees, and lifts them high into the air. As it reaches the water, a water spout forms which is approximately 100 meters high. The violence of the storm luckily passes us by. Some distance away, however, where numerous refugees have taken shelter, many are blown into the river. Almost all who are in the vicinity have been injured and have lost relatives who have been pinned under the wreckage or who have been lost sight of during the flight. There is no help for the wounded and some die. No one pays any attention to a dead man lying nearby.

The transportation of our own wounded is difficult. It is not possible to dress their wounds properly in the darkness, and they bleed again upon slight motion. As we carry them on the shaky litters in the dark over the fallen trees of the park, they suffer unbearable pain as the result of the movement, and lose dangerously large quantities of blood. Our rescuing angel in this difficult situation is an unknown Japanese Protestant pastor. He has brought up a boat and offers to take our wounded upstream to a place where progress is easier. First, we lower the litter containing Father Shiffer into the boat and two of us accompany him. We plan to bring the boat back for the Father Superior. The boat returns about one-half hour later and the pastor requests that several of us help in the rescue of two children whom he had seen in the river. We rescue them. They have severe burns. Soon they suffer chills and die in the park. The Father Superior is conveyed in the boat in the same manner as Father Shiffer. The theology student and myself accompany him. Father Cieslik considers himself strong enough to make his way on foot to Nagatsuki with the rest of us, but

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Father Kleinsorge cannot walk so far and we leave him behind and promise to come for him and the housekeeper tomorrow. From the other side of the stream comes the whinny of horses who are threatened by the fire. We land on a sand spit which juts out of the shore. It is full of wounded who have taken refuge there. They scream for aid for they are afraid of drowning as the river may rise with the sea, and cover the sand spit. They themselves are too weak to move. However, we must press on and finally we reach the spot where the group containing Father Schiffer is waiting. Here a rescue party had brought a large case of fresh rice cakes but there is no one to distribute them to the numerous wounded that lie all about. We distribute them to those that are nearby and also help ourselves. The wounded call for water and we come to the aid of a few. Cries for help are heard from a distance, but we cannot approach the ruins from which they come. A troupe of soldiers comes along the road and their officer notices that we speak a strange language. He at once draws his sword, screamingly demands who we are and threatens to cut us down. Father Laues, Jr., seizes his arm and explains that we are German. We finally quiet him down. He thought that we might well be Americans who had parachuted down. Rumors of parachutists were being bandied about the city. The Father Superior, who was clothed only in a shirt and trousers, complains of feeling freezing cold, despite the warm summer night and the heat of the burning city. The one man among us who possesses a coat gives it to him, and in addition, I give him my own shirt. To me, it seems more comfortable to be without a shirt in the heat.

In the meantime, it has become midnight. Since there are not enough of us to man both litters with four strong bearers, we determine to remove Father Schiffer first to the outskirts of the city. From there, another group of bearers is to take over to Nagatsuki; the others are to turn back in order to rescue Father Superior. I am one of the bearers. A theology student goes in front to

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warn us of the numerous wires, beams and fragments of ruins which block the way and which are impossible to see in the dark. Despite all precautions, our progress is stumbling and our feet get tangled in the wire. Father Krueer falls and carries the litter with him. Father becomes half unconscious from the fall and vomits. We pass an injured man who sits all alone among the hot ruins and whom I had seen previously on the way down. On the Nisasa Bridge, we meet Father Tappe and Father Luhmer, who have come to meet us from Nagatsuki. They had dug a family out of the ruins of their collapsed house some fifty meters off the road. The father of the family was already dead. They had dragged out two little girls and placed them by the side of the road. Their mother was still trapped under some beams. They had planned to complete the rescue and then to press on to meet us. At the outskirts of the city, we put down the litter and leave two men to wait until those who are to come from Nagatsuki appear. The rest of us turn back to fetch the Father Superior. Most of the ruins have now burned down. The darkness kindly hides the many forms that lie on the ground. Only occasionally in our quick progress do we hear calls for help. One of us remarks that the remarkable burned smell reminds him of incinerated corpses. The upright, squatting form which we had passed by previously is still there. Transportation on the litter, which has been constructed out of boards, must be very painful to the Father Superior, whose entire back is full of fragments of glass. In a narrow passage at the edge of town, a car forces us to the edge of the road. The litter bearers on the left side fall into a two meter deep ditch which they could not see in the darkness. Father Superior hides his pain with a dry joke, but the litter which is now no longer in one piece cannot be carried further. We decide to wait until Brother Kinjo can bring a hand cart from Nagatsuki. He soon comes back with one that he has requisitioned from a collapsed house. We place Father Superior on the cart and wheel him the rest of the way, avoiding as much as pos-

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sible the deeper pits in the road. About half past four in the morning, we finally arrive at the Novitiate. Our rescue expedition had taken almost twelve hours. Normally, one could go back and forth to the city in two hours. Our two wounded were now, for the first time, properly dressed. I get two hours sleep on the floor; some one else has taken my own bed. They I read a Mass in gratiarum actionem, it is the 7th of August, the anniversary of the foundation of our Society. Then we bestir ourselves to bring Father Kleinsorge and other acquaintances out of the city.

We take off again with the hand cart. The bright day now reveals the frightful picture which last night's darkness had partly concealed. Where the city stood everything, as far as the eye could reach, is a waste of ashes and ruin. Only several skeletons of buildings completely burned out in the interior remain. The banks of the river are covered with dead and wounded, and the rising waters have here and there covered some of the corpses. On the broad street in the Hakushima district, naked burned cadavers are particularly numerous. Among them are the wounded who still live. A few have crawled under the burnt-out autos and trains. Frightfully injured forms beckon to us and then collapse. An old woman and a girl whom she is pulling along with her fall down at our feet. We place them on our cart and wheel them to the hospital at whose entrance a dressing station has been set up. Here the wounded lie on the hard floor, row on row. Only the largest wounds are carefully dressed. We convey another soldier and an old woman to this place but we cannot move everybody who lies exposed in the sun. It would be endless and it is questionable whether those whom we can drag to the dressing station can come out alive, because even here nothing really effective can be done. Later, we ascertain that the wounded lay for days in the burnt-out hallways of the hospital and there they died. We must proceed to our goal in the park and are forced to leave the wounded to their fate. We make our way to the place where our Church stood to dig up those few belongings that we had buried

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yesterday. We find them intact. Everything else has been completely burned. In the ashes, we find a few molten remnants of the holy vessels. At the park, we load the housekeeper and a mother with her two children into the cart. Father Kleinsorge feels strong enough, with the aid of Brother Nobuhara, to make his way home on foot. The way back takes us once again past the dead and wounded in Hakushima. Again no rescue parties are in evidence. At the Misasa Bridge, there still lies the family which Fathers Tappe and Luhmer had yesterday rescued from the ruins. A piece of tin had been placed over them to shield them from the sun. We cannot take them along for our cart is full. We give them and those nearby water to drink and decide to rescue them later. At three o'clock in the afternoon, we are back in Nagatsuki.

After we have had a few swallows and a little food, Fathers Stolte, Luhmer, Erlinghagen and myself, take off once again to bring in the family. Father Kleinsorge requests that we also rescue two children who had lost their mother and who had lain near him in the park. On the way, we were greeted by strangers who had noted that we were on a mission of mercy and who praised our efforts. We now met groups of individuals who were carrying the wounded about on litters. As we arrived at the Misasa Bridge, the family that had been there was gone. They might well have been borne away in the meantime. There was a group of soldiers at work taking away those that had been sacrificed yesterday. More than thirty hours had gone by until the first official rescue party had appeared on the scene. We find both children and take them out of the park; a six-year old girl who was uninjured, and a twelve year old girl who had been burned about the head, hands, and legs, and who had lain for thirty hours without care in the park. The left side of her face and the left eye were completely covered with blood and pus, so that we thought that she had lost the eye. When the wound was later washed, we noted that the eye was intact and that the lids had just become stuck together. On the way home, we took another group of three refugees with us. They first

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wanted to know, however, ~~CONFIDENTIAL~~ that our nationality was safe. They, too, feared that we might be Americans who had parachuted in. When we arrived in Nagatsuki, it had just become dark.

We took under our care fifty refugees who had lost their all. The majority of them were wounded and not a few had dangerous burns. Father Rektor treated the wounds as well as he could with the few medicaments that we could, with effort, gather up. He had to confine himself in general to cleansing the wounds of purulent material. Even those with the smaller burns are very weak and all suffered from diarrhea. In the farm houses in the vicinity, almost everywhere there are also wounded. Father Rektor made daily rounds and acted in the capacity of a painstaking physician and was a great Samaritan. Our work was, in the eyes of the people, a greater boost for Christianity than all our work during the preceding long years. Three of the severely burned in our house died within the next few days. Suddenly the pulse and respirations ceased. It is certainly a sign of our good care that so few died. In the official aid stations and hospitals, a good third or half of those that had been brought in died. They lay about there almost without care, and a very high percentage succumbed. Everything was lacking; doctors, assistants, dressings, drugs, etc. In an aid station at a school at a nearby village, a group of soldiers for several days did nothing except to bring in and cremate the dead behind the school.

During the next few days, funeral processions passed our house from morning to night, bringing the deceased to a small valley nearby. There, in six places, the dead were burned. People brought their own wood and themselves did the cremation. Father Luhmer and Father Laures found a dead man in a nearby house who had already become bloated and who emitted a frightful odor. They brought him to this valley and incinerated him themselves. Even late at night, the little valley was lit up by the funeral pyres.

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We made systematic efforts to trace our acquaintances and the families of the refugees whom we had sheltered. Frequently, after the passage of several weeks, some one was found in a distant village or hospital but of many there was no news, and these were apparently dead. We were lucky to discover the mother of the two children whom we had found in the park and who had been given up for dead. After three weeks, she saw her children once again. In the great joy of the reunion were mingled the tears for those whom we shall not see again.

The magnitude of the disaster that befell Hiroshima on August 6th was only slowly pieced together in my mind. I lived through the catastrophe and saw it only in flashes, which only gradually were merged to give me a total picture. What actually happened simultaneously in the city as a whole is as follows: As a result of the explosion of the bomb at 8:15, almost the entire city was destroyed at a single blow. Only small outlying districts in the southern and eastern parts of the town escaped complete destruction. The bomb exploded over the center of the city. As a result of the blast, the small Japanese houses in a diameter of five kilometers, which comprised 99% of the city, collapsed or were blown up. Those who were in the houses were buried in the ruins. Those who were in the open sustained burns resulting from contact with the substance or rays emitted by the bomb. Where the substance struck in quantity, fires sprang up. These spread rapidly. The heat which rose from the center created a whirlwind which was effective in spreading fire throughout the whole city. Those who had been caught beneath the ruins and who could not be freed rapidly, and those who had been cut off by the flames, became casualties. As much as six kilometers from the center of the explosion, all houses were damaged and many collapsed and caught fire. Even fifteen kilometers away, windows were broken. It was rumored that the enemy fliers had first spread an explosive and incendiary material over the city and then had created the explosion and ignition. A few maintained that they saw

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the planes drop a parachute which had carried something that exploded at a height of 1,000 meters. The newspapers called the bomb an "atomic bomb" and noted that the force of the blast had resulted from the explosion of uranium atoms, and that gamma rays had been sent out as a result of this, but no one knew anything for certain concerning the nature of the bomb.

How many people were a sacrifice to this bomb? Those who had lived through the catastrophe placed the number of the dead at at least 100,000. Hiroshima had a population of 400,000. Official statistics place the number who had died at 70,000 up to September 1st, not counting the missing ... and 130,000 wounded, among them 43,500 severely wounded. Estimates made by ourselves on the basis of groups known to us show that the number of 100,000 dead is not too high. Near us there are two barracks, in each of which forty Korean workers lived. On the day of the explosion, they were laboring on the streets of Hiroshima. Four returned alive to one barracks and sixteen to the other. 600 students of the Protestant girls' school worked in a factory, from which only thirty to forty returned. Most of the peasant families in the neighborhood lost one or more of their members who had worked at factories in the city. Our next door neighbor, Tamura, lost two children and himself suffered a large wound since, as it happened, he had been in the city on that day. The family of our reader suffered two dead, father and son; thus a family of five members suffered at least two losses, counting only the dead and severely wounded. There died the Mayor, the President of the central Japan district, the Commander of the city, a Korean prince who had been stationed in Hiroshima in the capacity of an officer, and many other high-ranking officers. Of the professors of the University, thirty-two were killed or severely injured. Especially hard hit were the soldiers. The Pioneer Regiment was almost entirely wiped out. The barracks were near the center of the explosion.

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Thousands of wounded who died later could doubtless have been rescued had they received proper treatment and care, but rescue work in a catastrophe of this magnitude had not been envisioned; but since the whole city had been knocked out at a blow, everything which had been prepared for emergency work was lost, and no preparation had been made for rescue work in the outlying districts. Many of the wounded also died because they had been weakened by under-nourishment and consequently lacked in strength to recover. Those who received good care slowly healed the burns which had been occasioned by the bomb. There were also cases, however, whose prognosis seemed good who died suddenly. There were also cases who had only small external wounds who died within a week or later, after an inflammation of the pharynx and oral cavity had taken place. He thought at first that this was the result of inhalation of the substance of the bomb. Later, a commission established the thesis that gamma rays had been given out at the time of the explosion, following which the internal organs had been injured in a manner resembling that consequent upon Roentgen irradiation. This produces a diminution in the numbers of the white corpuscles.

Only several cases are known to me personally where individuals who did not have external burns died later. Father Kleinsorge and Father Cieslik, who were near the center of the explosion, but who did not suffer burns became quite weak some fourteen days after the explosion. Up to this time small incised wounds had healed normally, but thereafter the wounds which were still unhealed became worse and are to date (in September) still incompletely healed. The attending physician demonstrated a leucopenia. There thus seems to be some truth in the statement that the radiation had some effect on the blood. I am of the opinion, however, that their generally undernourished and weakened condition was partly responsible for these findings. It was also noticed about that the ruins of the city emitted deadly rays and that many workers who went there to aid in the clearing died, and that the central district would be uninhabitable for some time

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to come. I have my doubts as to whether such talk is true and myself and others who worked in the ruined area for some hours shortly after the explosion suffered no such ill effects.

None of us in those days heard a single outburst against the Americans on the part of the Japanese, nor was there any evidence of a vengeful spirit. The Japanese suffered this terrible blow as part of the fortunes of war...something to be borne without complaint. During this war, I have noted relatively little hatred toward the allies on the part of the people themselves, although the press has taken occasion to stir up such feelings. After the victories at the beginning of the war, the enemy was rather looked down upon, but when allied offensive gathered momentum and especially after the advent of the majestic B-29's, the technical skill of America became an object of wonder and admiration. The following anecdote indicates the spirit of the Japanese; A few days after the atomic bombing, the secretary of the University came to us asserting that the Japanese were ready to destroy San Francisco by means of an equally effective bomb. It is dubious that he himself believed what he told us. He merely wanted to impress upon us foreigners that the Japanese were capable of similar discoveries. In his Nationalistic pride, he talked himself into believing this. The Japanese also intimated that the principle of the new bomb was a Japanese discovery. It was only lack of raw materials, they said, which prevented its construction. In the meantime, the Germans were said to have carried the discovery to a further stage and were about to initiate such bombing. The Americans were reputed to have learned the secret from the Germans, and they had then brought the bomb to a stage of industrial completion.

We have discussed among ourselves the ethics of the use of the bomb. Some consider it in the same category as poison gas and were against its use on a civil population. Others were of the view that in total war, as carried on in

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Japan, there was no difference between civilians and soldiers, and that the bomb itself was an effective force tending to end the bloodshed, warning Japan to surrender and thus to avoid total destruction. It seems logical to me that he who supports total war in principal cannot complain of a war against civilians. The crux of the matter is whether total war in its present form is justifiable, even when it serves a just purpose. Does it not have material and spiritual evil as its consequences which far exceed whatever the good that might result? When will our moralists give us a clear answer to this question?

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