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ATOMIC BOMB CASUALTY COMMISSION

Supplementary Report

Medical Report on the Fukuryu Maru No. 5 Incident

by

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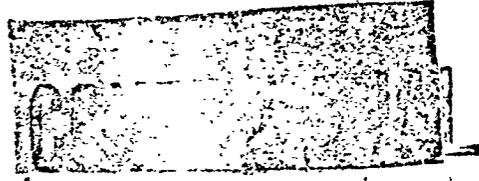
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Supplementary Report

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ACKNOWLEDGMENTS

 Numerous individuals and agencies of the United States and Japan have contributed their help and encouragement in the preparation of this preliminary report. It is with gratitude we list the various groups and it is with regret that we must gloss over the individuals.

 United States Embassy

 United States Navy

 United States Army

 406 General Medical Laboratory

 United States Air Force

 Atomic Bomb Casualty Commission

 Atomic Energy Commission

 Japan Ministry of Welfare

 Japan Ministry of Foreign Affairs

 National Institute of Health (Japan)

 Tokyo University

 Tokyo University Hospital

 North City Hospital, Yaisu

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SUPPLEMENTARY REPORT

Following the initial examination of some of the patients and the contact with Japanese investigators, the Japanese-American scientific rapport deteriorated. This was evidenced by many events as reported by Mr. Eisenbud and the ABCC team. This supplementary report, therefore, will deal with data gleaned from the Japanese, corrections and additions to the preliminary report, and some of the findings on two fish and a ship monitored subsequently:

The blood counts on the crewmembers of the Fukuryu Maru were obtained from the Japanese investigators with the greatest difficulty. Certainly many subsequent blood counts were made, but even though both the Japanese government and the Japanese physicians promised the American team access to these figures, there were no counts made available after 8 April. On this date Drs. Morton and Lewis visited nine patients at the Tokyo University Hospital. All appeared much better as evidenced by skin lesions. After visiting the patients, their white blood counts were reviewed. Striking to the American doctors and obviously missed by the Japanese investigators was a severe granulocytopenia and a slight lymphocytopenia. Regretfully, the figures cannot be reproduced as the American group was not allowed notes, but had to rely on memory for the reproduced counts of 8 April. There certainly appeared to be an inverse relationship between total white blood cell counts and the lymphocyte percentage. The lower the white count, the higher the percentage of lymphocytes, ranging as high as 70%.

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THE SHIP

In the preliminary report by the ABCC team certain deductions were made concerning the ship. These deductions have since been disproved.

The ship has been reported by the Japanese government to be seven years old. This finding along with other background data on both ship and crew will be forthcoming from the United States Embassy in Tokyo.

As relations between the American team and the Japanese worsened, a policy was set up whereby only by invitation would a ship or its cargo be monitored. On 9 April a request to monitor the Kaifuku Maru No. 5 at Uraga was received. This ship was monitored and that same evening a marlin (sailfish) that was part of the catch was also investigated. This fish was later dissected and shipped to the AEC New York laboratories for analysis. Fish from the Kaifuku Maru No. 5 which were supposedly "hot" were ascertained to be at the National Institute of Health in Tokyo. No invitation was received to monitor these fish.

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Friday 9 April - 8:30 p.m.

Ship - KAIFUKU MARU No. 5

	<u>gamma plus beta</u> <u>mr/hr</u>	<u>counts/min</u>
Background	0.03	90
Bow	0.02	60
F'wd cabin	0.03	90
Stbd side f'wd	0.03	90
Stbd side midship	0.02	60
Stbd side aft	0.03	90
Stern	0.03	90
Bow	0.02	60
Port side f'wd	0.02	60
Port side midship	0.03	90
Port side aft	0.02	60
Upper deck port	0.03	90
Upper deck stbd	0.04	120
Fish line on upper deck port side	0.06	180
Line markers atop port side wheel house	0.04	120
Atop wheelhouse	0.04	120

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Friday 9 April - 8:30 p.m.

<u>Fish</u>	<u>mr/hr</u>	<u>counts/min</u>
Pharynx	0.07	210
Left gill	0.07	210
Right gill	0.04	120
Intestine	0.08	240
Skin	0.04	120

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11 April

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Fish: Marlin (Spikefish)

Total Weight: about 50 pounds

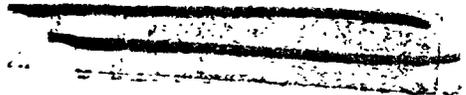
	<u>grams</u>
Left gill	110
Right gill	118
Left pectoral fin	18
Right pectoral fin	20
Skin	412
Muscle	
Anterior	24
Midbody	30
Posterior	14
Vertebral Column	
Anterior	12
Midbody	8
Tail	16

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12 April 1954 - Tokyo

On April 12 the Foreign Ministry informed the American Embassy that a "hot" fish had been found at the Tsukiji Fish Market in Tokyo. This fish had been sent to Tokyo University where it would be available to the American group. This fish was monitored, but the ship that had caught it was unknown.

Fish: Marlin (Spearfish)

	<u>mr/hr</u>	<u>counts/min</u>
Background	.02	60
Pharynx	.03	90
Left gill	.05, .06	180
Right gill	.06	180
Left pectoral fin	.08	240
Right pectoral fin	.08, .09	270
Skin		
Left ant	.06	180
Left mid	.05	150
Left post	.03	90
Right ant	.05	150
Right mid	.04	120
Right post	.03	90
Gut of fish		
Mid	.07	210
Ant	.2	600
Post	.04	120



In reviewing the case histories, physical examinations, and laboratory data that are available, there are seen certain differences between the peoples of Hiroshima and Nagasaki, and the unfortunate fishermen. These differences are, for the most part, one of degree; however, there are new signs and symptoms which were present following the 1945 atom bomb explosions.

Pigmentation - this was an uncommon complaint in 1945. The cases in the crewmen seem to have started within 24 hours to 6 days. It was limited seemingly to areas where dust and dirt could come in contact with the skin. These darkened portions desquamated, but information as to time of completion of the peeling is not available. It is assumed that these lesions were due to beta burns, though some quarters have stated radioactive coral might be the cause.

Ulcerations - these were located on areas where dirt and dust would be held in close contact with the skin. They are seen in the ears, which were not washed well; on the hands, where cotton gloves were worn; around the neck, where collars rubbed. The hair, particularly, was prone to catch and hold radioactive particles, washing of the hair did not seem to help and the shaving of the head did not occur for several weeks after returning to Japan.

Itching and vesiculation - these complaints were also limited to the same areas as the burns and ulcerations.

Purpura-like lesions - no petechiae or purpuric areas were seen by the American group. However, there were discrete raised purple lesions on the abdomen, along the belt line (see photographs), ranging in size from a few millimeters up to 2.5 cm. These areas were amongst the first to desquamate and revealed normal pink epidermis.

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Epilation - the earliest case, we recorded, started on the fourth day and ranged to one case starting to epilate on the 20th day. The average day of epilation was the 10th day.

Eye lesions - almost all the crewmen interrogated had some type of complaint referred to the eye or orbit. As the dust collected in the eye or on the lid many complained of tearing, smarting or itching. Within 24 hours a thick sticky yellow discharge was being secreted to such a degree that some of the men could only see by prying the lids apart with their fingers. In some cases this was followed by severe pain.

One has the impression that many of the signs and symptoms of the fishermen as compared to the A-bomb survivors shows a decreased latent period - the complaints occurring earlier in the crewmen. This latter group, to the American team's knowledge, had no hemorrhagic diatheses or oropharyngeal lesions.

These 23 fishermen appear to be of extreme interest to the United States, not only because of their medical lesions, but because of their importance to national defense. As far as it is known these men are the only humans who have been constantly subjected to irradiation for fourteen days. Ordinarily, one would not think of doing such an experiment on animals; yet, due to a freak accident, the experiment occurred to a group of men.

To draw sweeping conclusions from such a small sample would be dangerous. However, the few findings are significant. It is certainly desirable to have all case histories, physical examinations, and laboratory work as complete as possible. With these aims, it is hoped that a more mutual beneficial arrangement can be completed between the American and Japanese investigators.

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COLOR PHOTOGRAPHS

Figures 7A - 16A taken 22 March 1954
Compare with black and white photographs Figures 7 - 16 on same date

Case T-1

MASUDA, Sanjiro

Fig. 7A- Epilation seen in
this photograph and in
Fig. 8A.

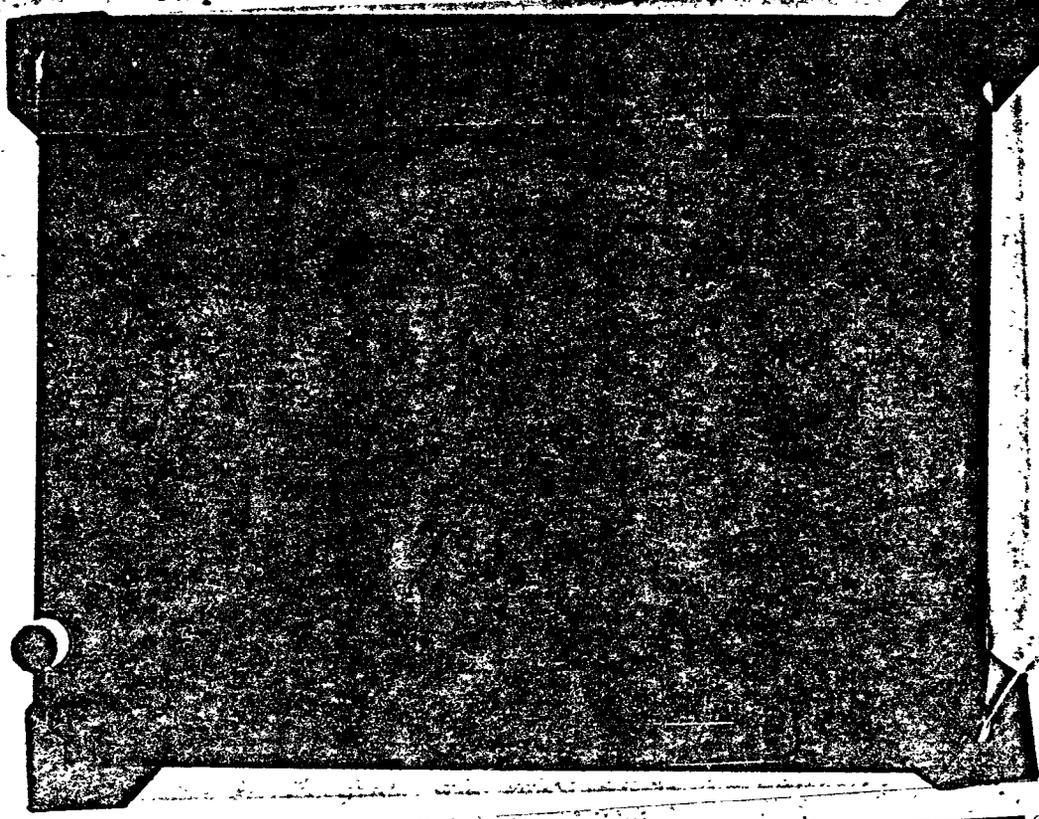


Fig. 8A - Desquamation in
areas of deep pigmentatio
(cf. Fig. 4). Itchiness
and smarting in collar
area.

MASUDA T-1



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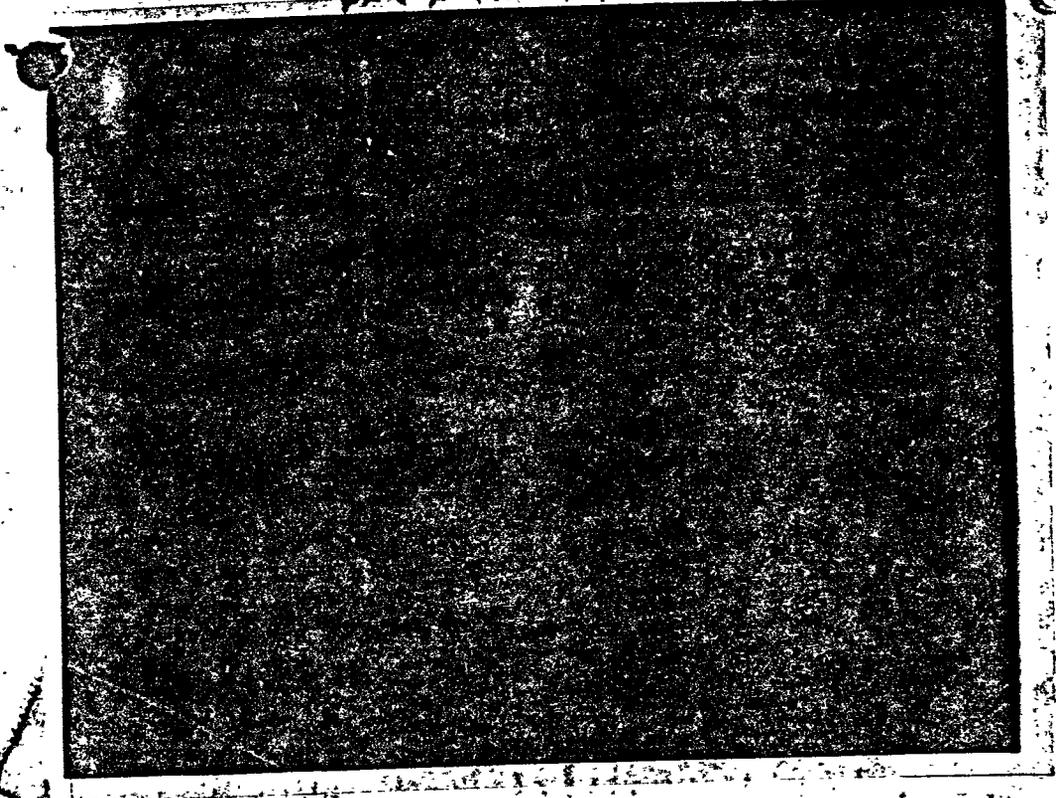


Fig. 9A - Desquamation and localized epilation visible.

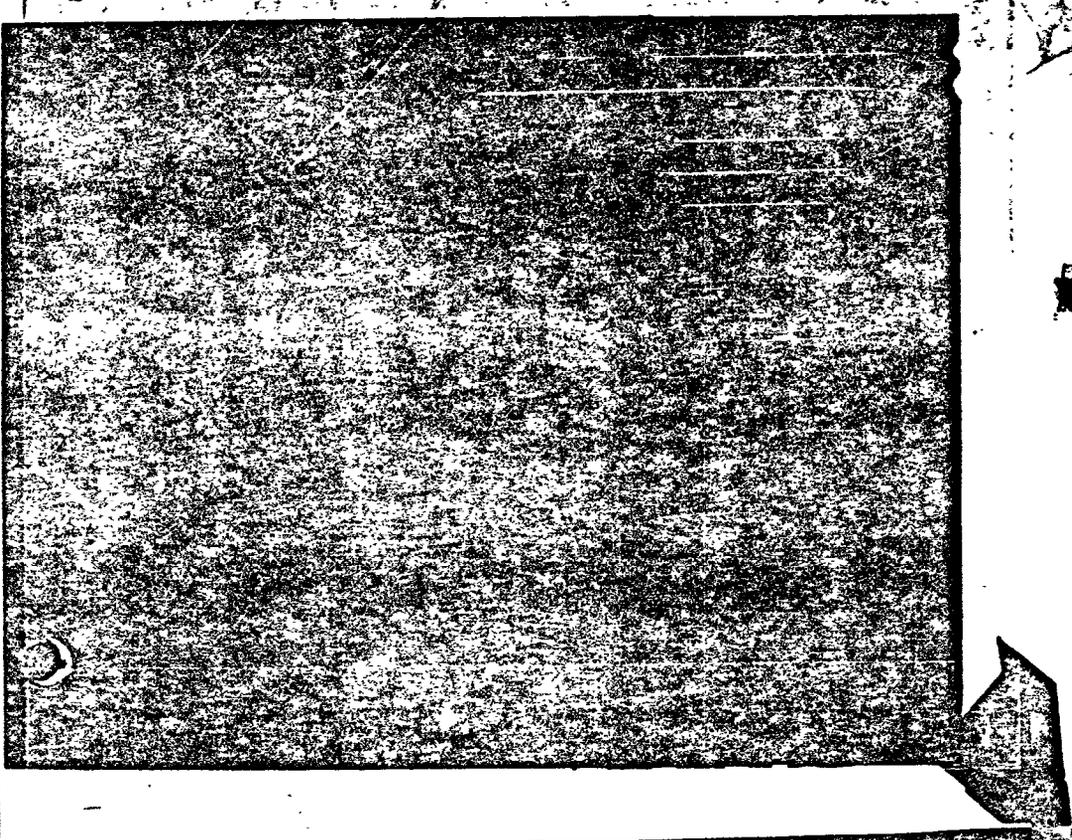
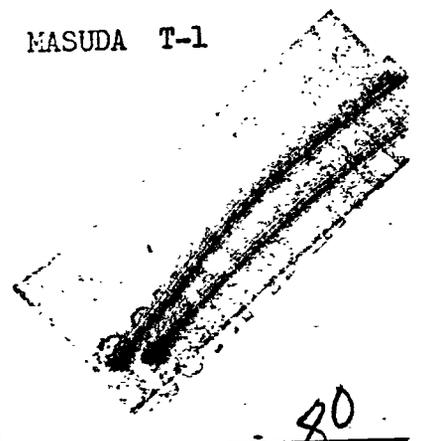


Fig. 10A - Left ear. Bro vesicles, encrusted ulcerations visible.

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MASUDA T-1



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Fig. 11A - Less involvement of right side of face and right ear.

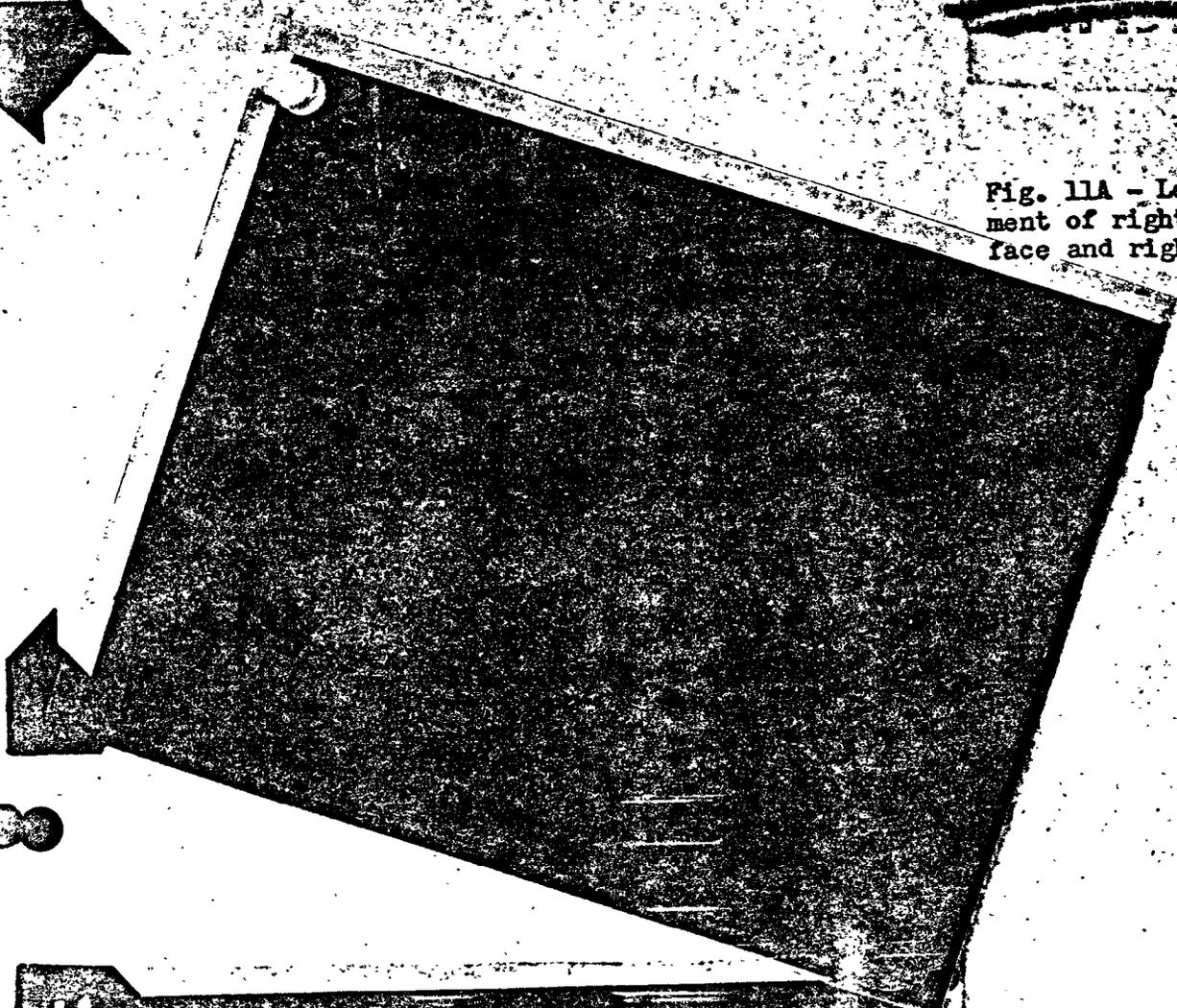
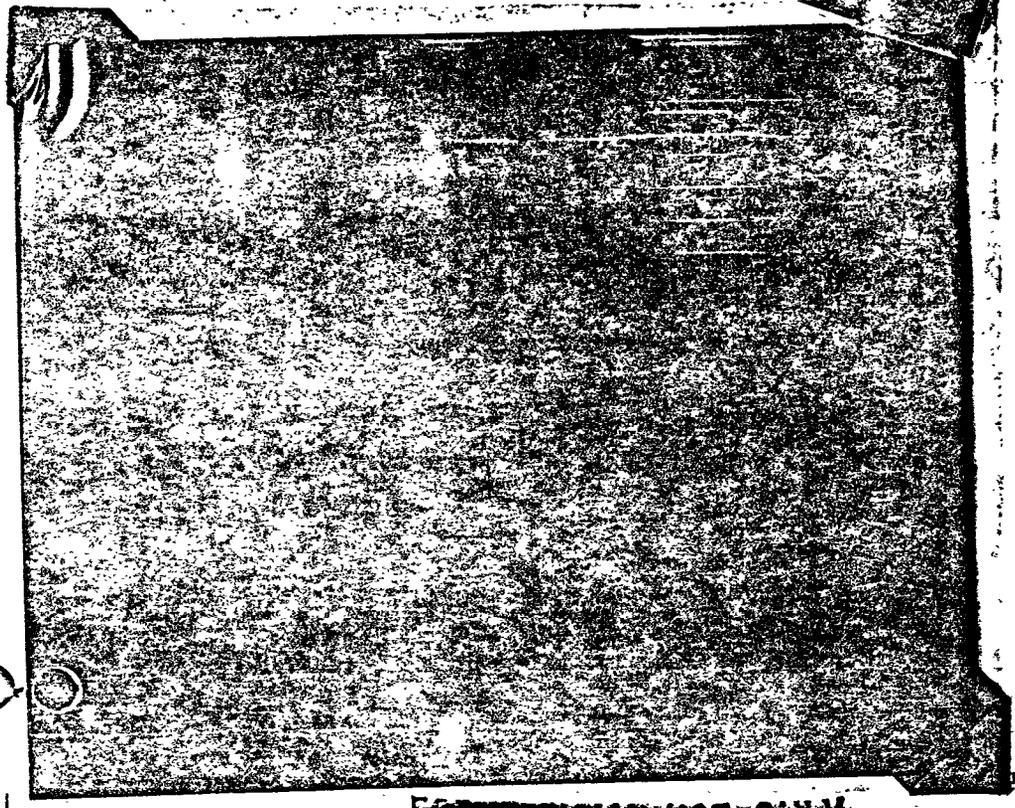
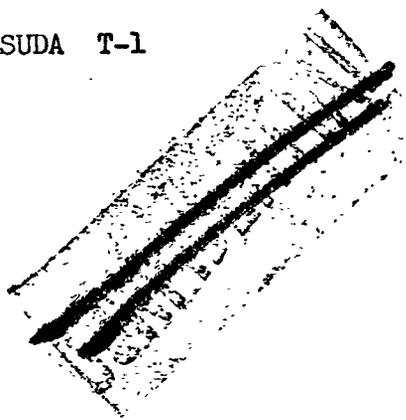


Fig. 12A - Top of head, top of photograph being anterior. Slight ulceration shown, surrounded by boggy swelling of scalp. Mild epilation seen. Patient complains of mild pain in this area,



MASUDA T-1



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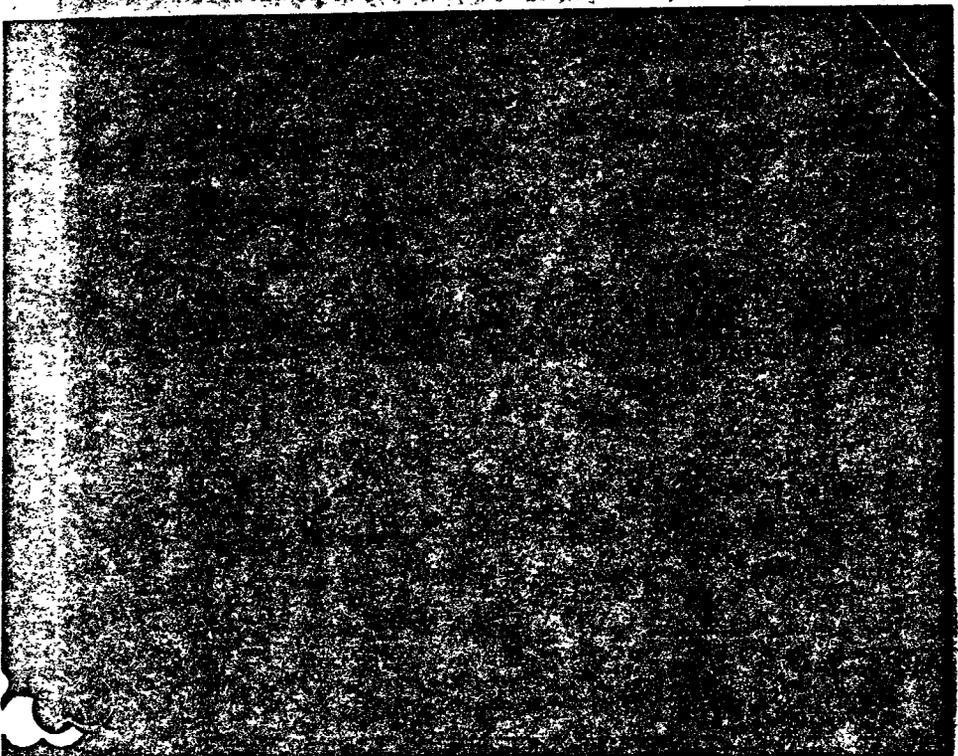


Fig. 13A - Patient still has slight swelling of fingers.

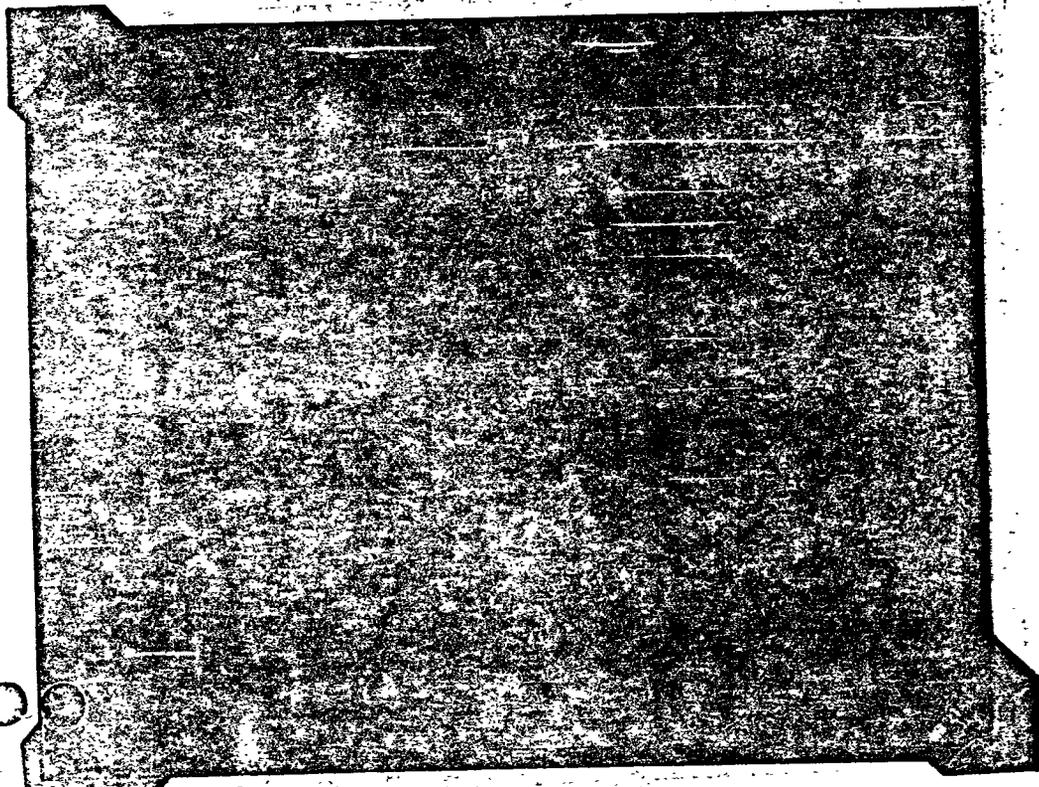
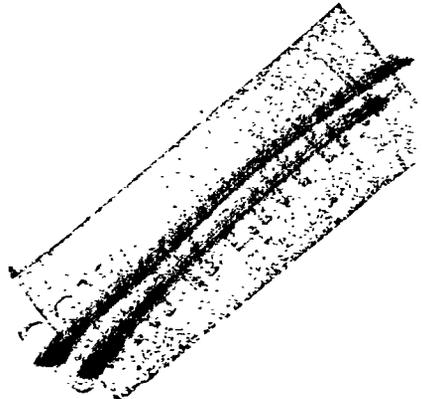


Fig. 14A - Reddening and deepening of furrows at base of left thumb.

MASUDA T-1



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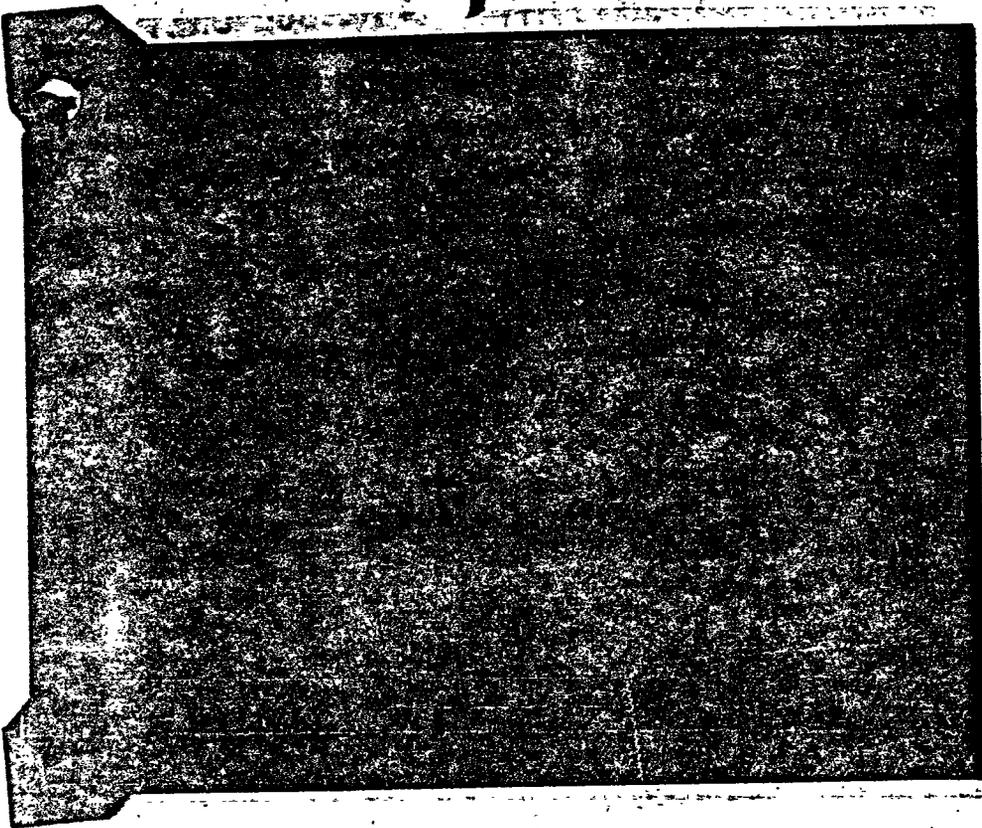


Fig. 15A - Desquamation with small, shallow ulceration at base of thumb.

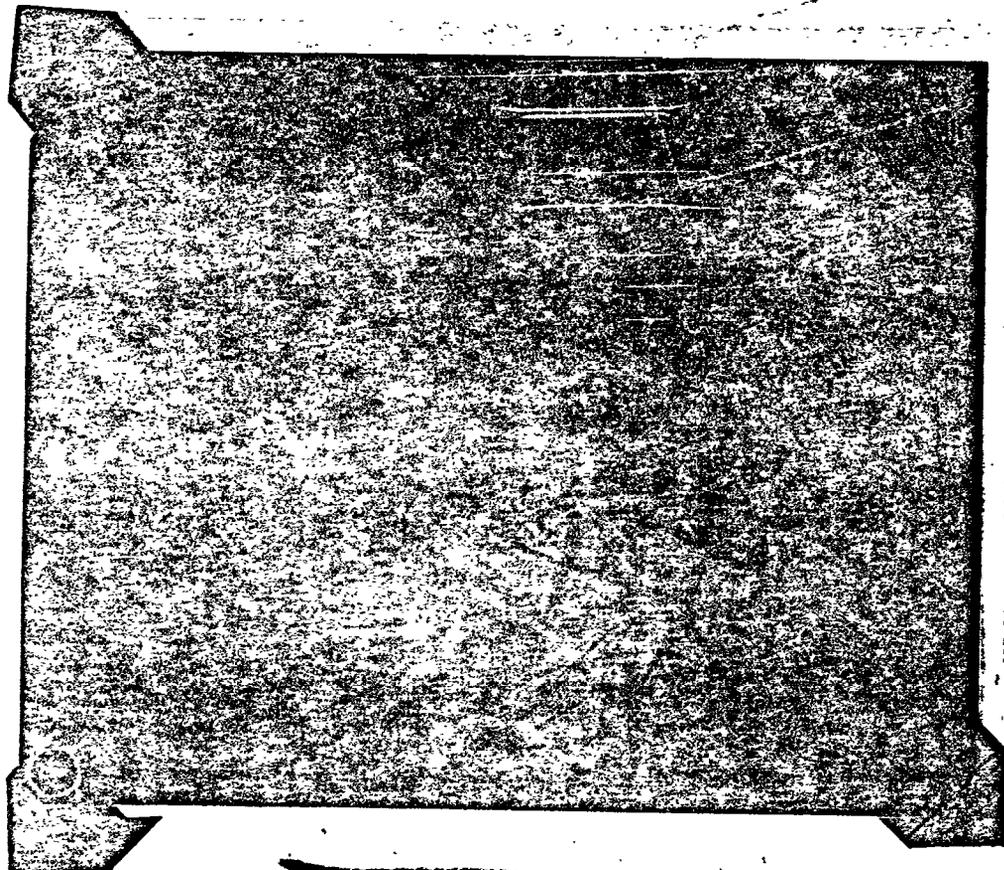
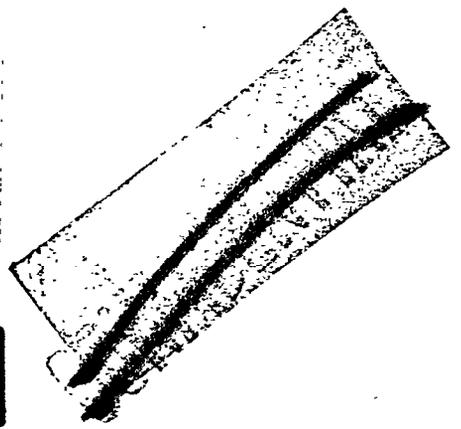


Fig. 16A - Showing pigmented purpura-like lesions at belt area.

MASUDA T-1.



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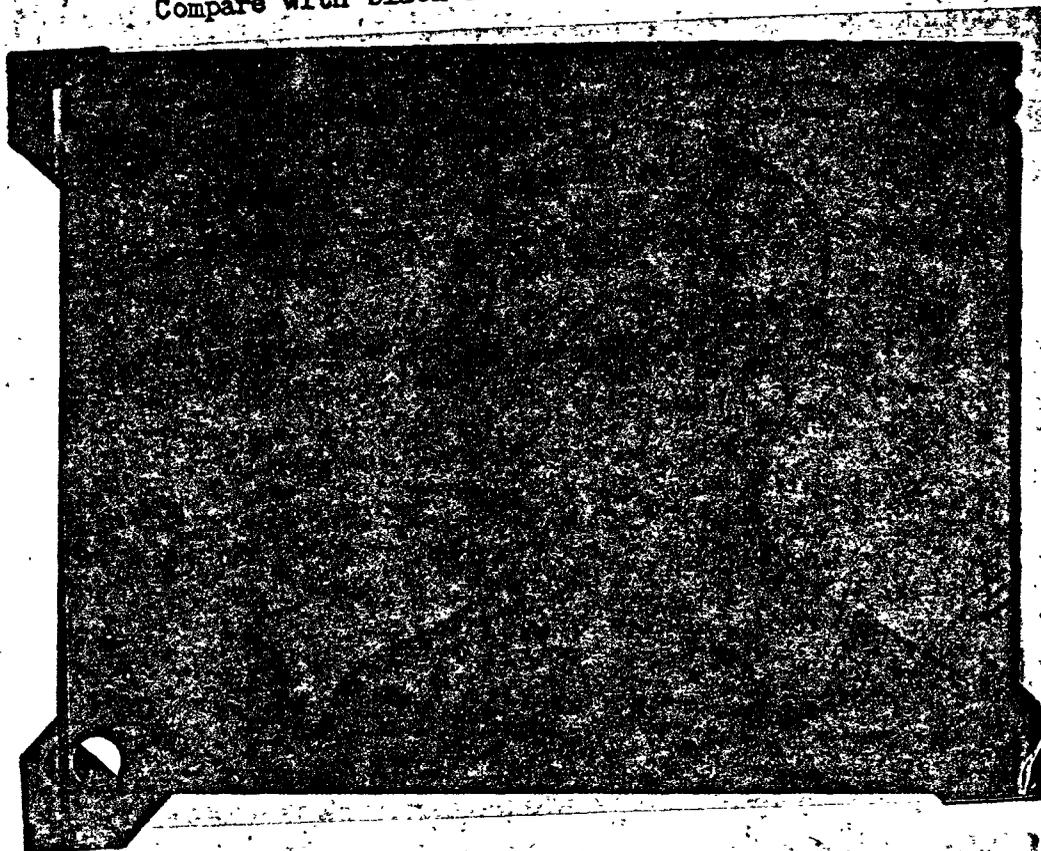
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Figures 25A - 30A were taken on 22 March 1954

Compare with black and white photographs Figures 25 - 30 on same date



Case T-2

YAMAMOTO, Tadashi Age 28

Fig. 25A - Deep pigmentation and areas of desquamation on face and neck.

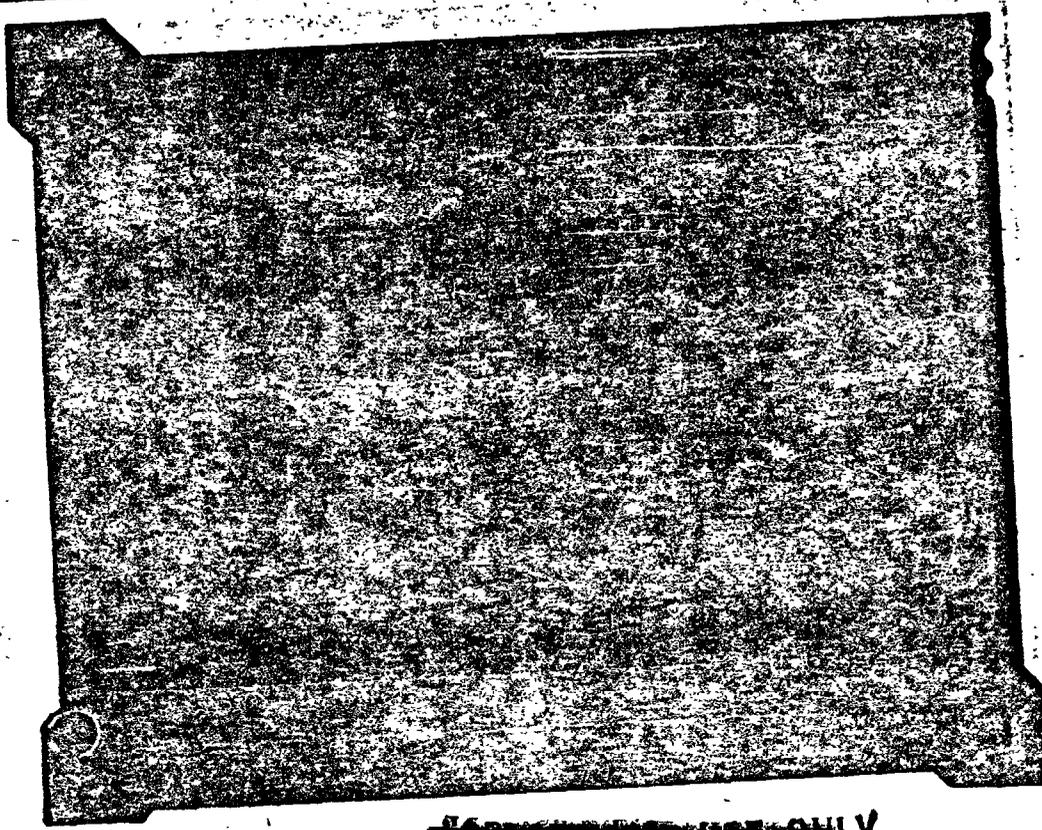
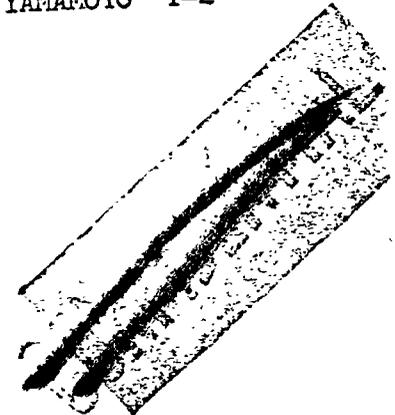


Fig. 26A - Shallow ulcerations of left ear lobe.

YAMAMOTO T-2



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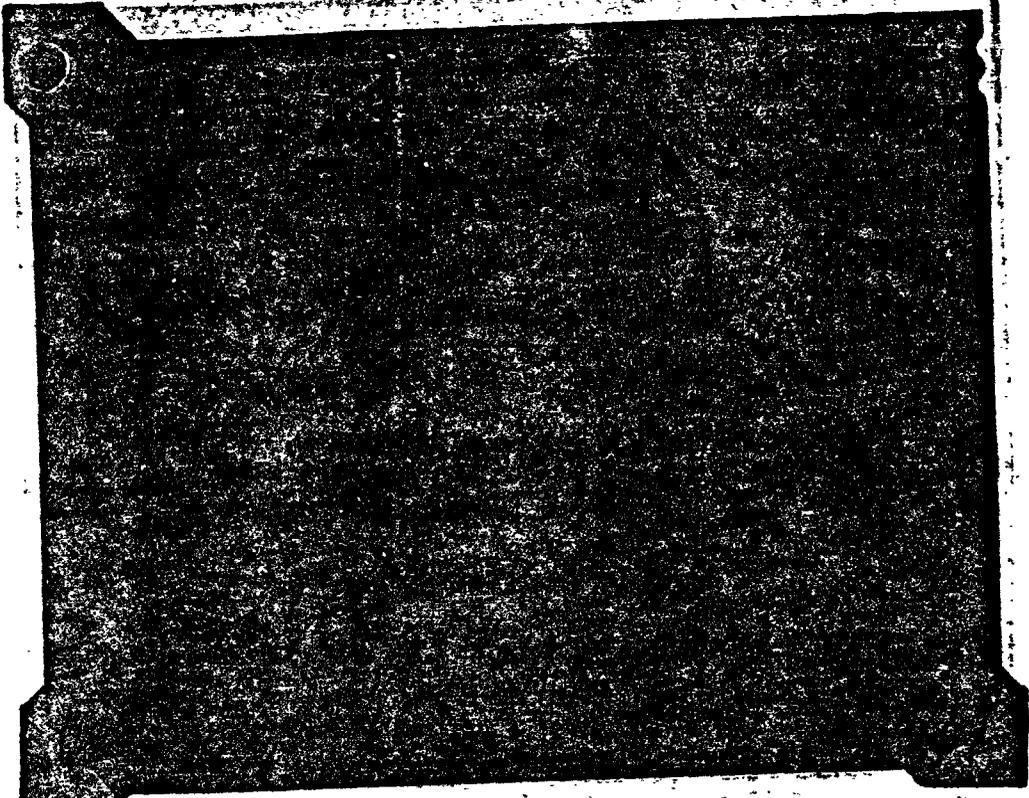


Fig. 27A - Mild epilation and desquamation revealing clear skin.

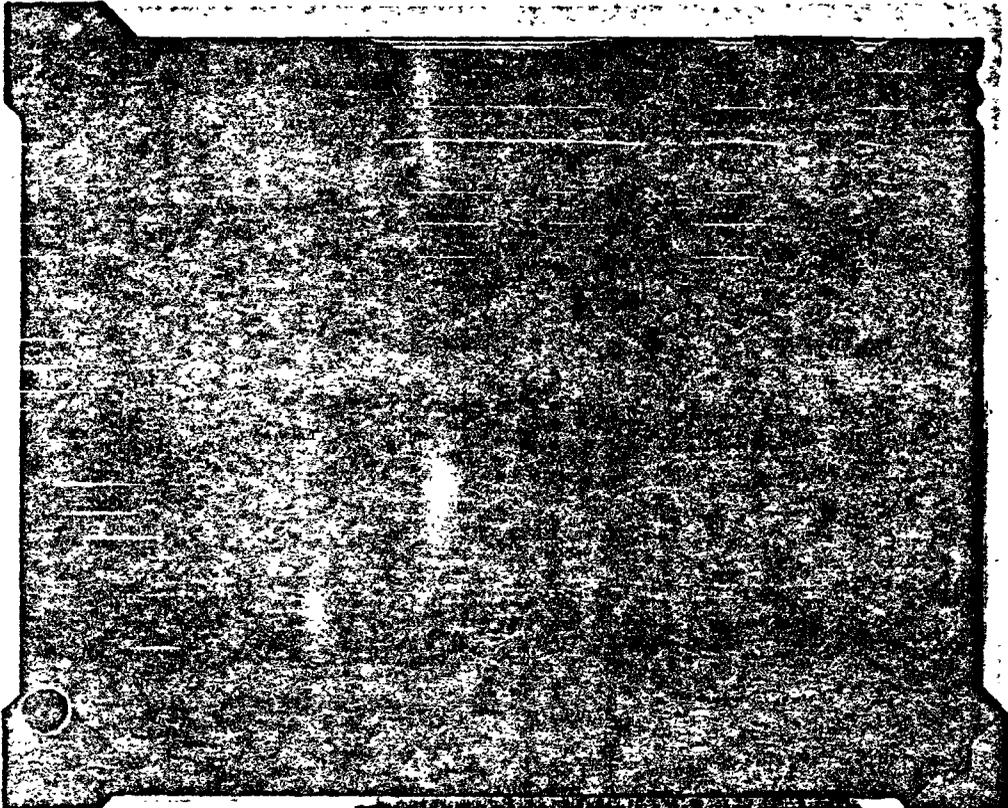


Fig. 28A - Pigmented, purpura-like lesions, slightly raised. One shows small area of desquamation, revealing pink skin underneath.

YAMAMOTO T-2.



65



Fig. 29A - Desquamation
in fingers.

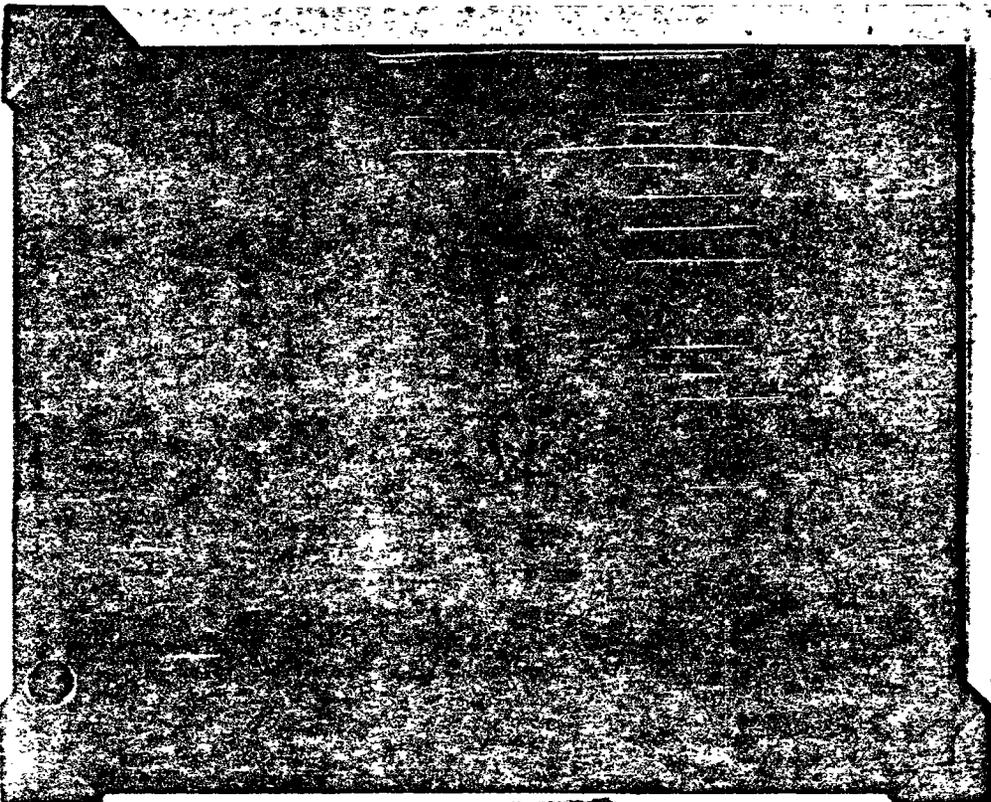
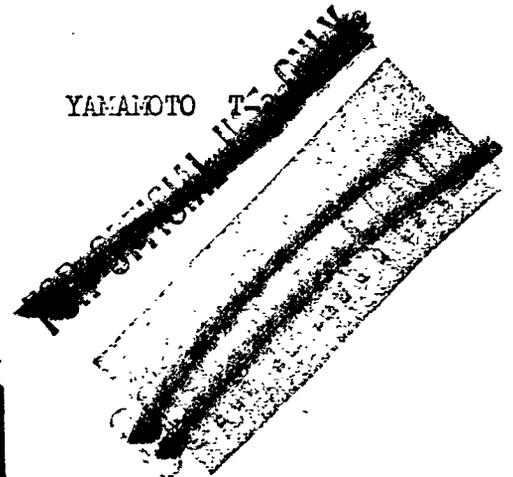


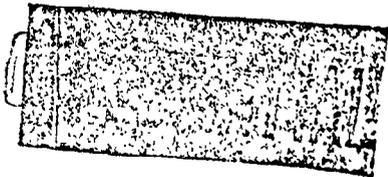
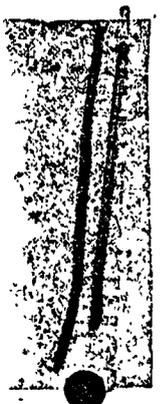
Fig. 30A - Second, third,
and fourth fingers have
developed vesiculation
in volar surfaces. Punc-
tate said to be serous
and sterile. Dead skin
later cut away, revealing
healthy-looking pink skin.



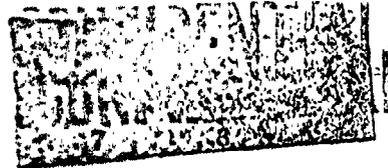
YAMAMOTO T-3

WHITE BLOOD CELL COUNTS

	14 March 15	16	17	18	19	20	21	22	23		
MISAKE, Yoshio Age 30		4300	2900								
SUZUKI, Chinzo 29		3600	6300								
MASUDA, Sanjiro 29	9000	6200	6600	6700	4700	3960	5300	4680	4570	4300	4660
HATTORI, Takeji 38	5900	6400	7300								
TAKAGI, Kaneyasu 30		3100	5100								
YAMAMOTO, Tadashi 28	5000	6800	7400	4000	4400	5300	5700	4360	2910	4050	3410
ANDO, Saburo 28		3800	8700								
IKEDA, Masao 25		6200	7000								
MASUDA, Kyonosuke 25		6800	8000								
SAITO, Akira 25	5200	5000	9300								
YOSHIDA, Katsuo 24		6200	9000								
HANDA, Shiro 22	5100	5200	6500								
KUBOYAMA, Aikichi 39		7200	6900								
MISAKI, Susumu 27		6300	7100								
HIRAI, Isamy 20	6700	5800	7200								
KUBOYAMA, Shiro 23		6000	5700								
KAWASHIMA, Masayoshi 26	6600	5600	6800								
MASUDA, Yuichi 18	6100	6000	9400								



26 March	27	28	29	30	31	1 April	2	3	4	5	6
	2000	4100	2100	2100	1850	2450	1650	2700	2600		
	2100	1500	800	1700	1000	1100	1600	1700	1500		
	3000	4300	4500	4800	5300	5200	4600	4500	4100		
	4700	7500	5300	4400	3200	5100	2800	3400	5400		
	1950	1850	1500	1600	1050	1200	1150	1400	2050		
	3200	2700	3200	3800	3800	2400	2800	2700	3800		
	3300	4200	3150	3100	3100	2800	3100	3200	2500		
		11200				6100	6300	4900	6850	4400	
		7700				5400	5800	5000	5200	4100	
		8050	3400			4800	5300	5400	5000	5000	
		7900				6100	6500	6000	5600	6000	
		8200			5300	5200	5800	5100	4700	4900	
		5300	4050			3800		3700	2800	2950	
		4300			4300	4700	5100	6050	5000	4700	
		4000	3100			3700	2300	1500	1500	2000	
		4800				4400	4600	4200	4900	5700	
		3950	4200			4200	4900	3800	4600	3850	
		5300				4700	5100	4250	4700	3050	



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	14	15	16	17	18	19	20	21	22	23	24	25
SUZUKI, Takashi Age 24			4800	8700								
KOZUKA, Hiroshi 23			7900	6000								
HOSONE, Hisao 18	5600			7700								
TSUTSUI, Hisakichi 22				7500								
OISHI, Matashichi 20			4100	5000								
Total	55200		117300	162100	10700	9100	9260	11000	9040	7480	8350	8070
Number	9		21	23	2	2	2	2	2	2	2	2
Average	6133		5582	7048	5350	4550	4630	5500	4520	3740	4175	4035



26 March

27 28

29

30

31

1 April 2

3

4

5

6

7

8

5200

8400

6100

4200

3600

3950

4300

6850

6950

5800

4100

5800

4800

5000

6650

6500

5800

6700

6400

3700

5350

4600

4800

4800

4300

4200

6300

4300

4750

4100

3600

3700

4000

Total

20250

127200

35300

55350

100300

90150

92100

93600

89800

14800

Number

7

23

11

13

23

21

23

23

23

Average

2893

5532

3209

4258

4361

4293

4004

4070

3904

2114

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RADIATION SIGNS AND SYMPTOMS OF ALL PATIENTS

Unit No.	Malaise	Nausea	Diarrhea	Fever	Vomit- ing	Oropharyn- geal lesions	Purpura	Epilation
* T-1								+
* T-2	+	+						+
* T-3		+			+			+
T-4		+						+
T-5	+							+
T-6								
T-7								
T-8								
T-9								+
T-10								
11								
T-12								
T-13								
T-14								
T-15								+
* T-16	+	+						+
T-17								
T-18	+	+						+
* T-19	+	+			+			+
T-20								+
* T-21								+
T-22	+							+
T-23								+

Patients examined by ABC doctors. ~~FOR OFFICIAL USE ONLY~~
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RADIATION SIGNS AND SYMPTOMS OF ALL PATIENTS (cont)

Unit No.	Increased Pigmentation	Loss of Appetite	Skin lesions (vesiculations, etc.)	Eye Signs	Purpura-like Lesions
* T-1	+		+	+	+
* T-2	+	+	+	+	+
* T-3	+	+	+	+	
T-4	+		+		+
T-5			+	+	+
T-6					
T-7					
T-8					
T-9			+		
T-10					
T-11					
* T-12					
T-13					
T-14					
T-15			+		
* T-16			+		+
T-17					
T-18	+	+	+	+	+
* T-19	+		+	+	
T-20			+		
* T-21	+		+	+	
T-22	+	+		+	+
T-23			+		+

* Patients examined by ABCO doctors.

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HEMATOLOGY REPORT

On 19 March 1954, patients MASUDA Sanjiro (T-1) and YAMAMOTO Tadashi (T-2) were seen in Tokyo University Hospital and blood counts were performed by Dr. Sears and Miss Tsuchitani, chief hematology technician. Blood smears were made and will be examined after staining at ABCC in Hiroshima. Bone marrow specimens were obtained 16 March 1954 from these two patients by Dr. Miyoshi and one unstained slide of marrow from each patient was given to ABCC. These will be examined after staining in Hiroshima. Dr. Miyoshi also had stained slides of marrow from patients MASUDA Sanjiro and YAMAMOTO Tadashi. These were examined 19 March 1954 by Dr. Sears but conditions were such that only low power lens of microscope could be used. No abnormality of either marrow was observed under these circumstances.

Reports of blood counts on MASUDA Sanjiro and YAMAMOTO Tadashi performed by Yaizu and Tokyo University Hospitals are tabulated below as well as the counts performed by ABCC members.

20 March 1954 - The 21 patients at Yaizu were visited but ABCC staff were not permitted to obtain any blood or bone marrow specimens. Reports of blood counts performed by Yaizu staff are tabulated below.

Blood slides had been made 17 March 1954 on all patients and sent to Tokyo University Hospital. On 22 March 1954 these slides were examined by Dr. Sears and Miss Tsuchitani. Differential count of 100 cells was performed on each specimen as well as a thorough low power

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lens study. In general, these blood smears, while adequate, were not of the quality considered desirable by ABCC. The smears were made on glass slides rather than cover slips and the latter method is considered to give greater accuracy. There was distortion of many white blood cells so that identification was rendered difficult. The stain was lighter than that used by ABCC and recognition of platelets was especially unsatisfactory. However, a general impression of white blood cell distribution and red blood cell and platelet appearance could be obtained and these are tabulated below. There was satisfactory agreement between reported white blood counts and appearance of white cells on slides; i.e., there was an abundance of cells on stained slides whose reported counts were normal or slightly elevated and an apparent paucity of cells on the slide from MISAKI Yoshio (T-16) whose reported white cell count was 2900 on 17 March 1954. The blood slide from SUZUKI Shinzo (T-19) had apparently become damaged and only a small portion of the material remained. Red cells and platelets could not be observed satisfactorily. The patient appears to have a definitely abnormal white cell differential count and should have further very careful study.

Bone marrow specimens were obtained 16 or 17 March 1954 by Dr. Hiyoshi from four Yaisu patients, ANDO Saburo (T-3), MISAKI Yoshio (T-16), SUZUKI Shinzo (T-19) and TAKAKI Kaneshige (T-21). A stained slide of each marrow was examined 22 March 1954 by Dr. Sears. These smears were also made on glass slides rather than cover slips and demonstrated much cell distortion so that an accurate count was

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impossible to perform. Again only general impressions could be obtained and these are discussed below.

Bone marrow "counts" are reported by the staff at Tokyo University. It has not been our practice to perform total "counts" on bone marrow as their value is considered highly questionable because of the heterogeneous nature of bone marrow specimens.

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