

PRISONERS OF WAR :
THE AMERICAN EXPERIENCE

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TO MY FATHER, A FORMER POW OF GERMANY, TO WHOM I OWE SO MUCH



October 13, 1988

In Reply Refer To:

Mr. Stan Sommers
1410 Alder Road
Marsfield, WI 54449

Dear Stan:

It was indeed a pleasure writing this paper on the American Prisoners of War Experience. I learned a great deal and developed a great sympathy for all Ex-POWS. My hope and desire is that anyone who reads it will likewise be so moved. I also hope the paper shall serve as a learning resource for doctors, administrators and patients.

My sincere and heartfelt thanks is extended to two people without whose help this manuscript would not have been possible. First, my wife and editor, Dr. Nadine Khouzam Skelton who devoted literally countless hours reviewing, critiquing and supporting me toward completion of this work. The second is Mrs. Leila Magee who graciously tolerated my constant changes and revisions while typing this work. To them both, I will always be grateful.

Sincerely,

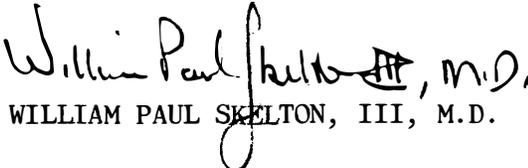

WILLIAM PAUL SKELTON, III, M.D.

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PRISONERS OF WAR: THE AMERICAN EXPERIENCE

The American Ex-POW is rapidly vanishing. Once numbering over 140,000, now only 78,000 remain. All, while prisoners, have been subjected to an incomprehensible spectrum of torture, starvation, poor housing and unsanitary conditions. The vast majority were captured during WWII and are quietly succumbing to natural and residual disease states. Despite their overall similarities, each theater of operation was vastly different. The WWII European POWs were segregated based on their service branch, rank, race and religion. The cruelest treatment came at the hands of the Japanese and Koreans with death rates approaching 40%.

Considering Table 1, it is noted that there have been 142,307 POWs since World War I. The vast majority of these were captured during World War II with approximately 130,000 internees. Most of these were from the European Theater of operation with over 93,000 prisoners involved.

TABLE 1: NUMBER OF AMERICAN POWs:

	Total	WWI	Total WWII	WWII Pacific	WWII Europe	Korean Conflict	Viet Nam
-Captured & Interned:	142,307	4,120	130,201	27,465	93,941	7,141	766
-Still Classified as POW:	1						1
-Died While POW:	17,026	147	14,072	11,107	1,121	2,701	114
-Refused Repatriation:	21					21	
-Returned to U.S. Military Control:	125,253	3,973	116,129	16,358	92,820	4,418	651
-Est.# of Returnees Alive on 1/1/88:	78,264	228	69,843	9,167	60,676	3,449	614

Table 2 graphically emphasizes the incredible differences in the survival rates among POWs of different theaters. Considering the WWII European POWs, 35.4% have died since the day of capture. This is consistent with the mortality rate of age matched controls from the rest of WWII European combat veterans. However, since the day of capture, 66.6% of Pacific Theater Ex-POWs and 51.7% of Korean Theater Ex-POWs have died. This large disparity between the three theaters has several etiologies which will be discussed in detail in the following pages.

TABLE 2: SURVIVAL DATA

	ALIVE 1/1/88 (# captured)	PERCENT DEAD SINCE CAPTURE
WWI	228 (4120)	94.5
WWII		
European	60,676 (93,941)	35.4
Pacific	9,167 (27,465)	66.6
KOREA	3,449 (7,141)	51.7
VIETNAM	614 (766)	19.8

Table 3 reveals that the World War II European prisoners spent slightly less than one year in captivity and the average age at capture was 25 years. This reflected the fact that most European prisoners were draftees. The Pacific Theater prisoners' average length of internment was 3.15 years and the average age at capture was 26.7 years.

TABLE 3: ESTIMATED AVERAGE LENGTH OF INTERNMENT (DAYS/YEARS) AND AVERAGE AGE AT CAPTURE AND RELEASE (YEARS):

	WWII Europe	WWII Pacific	Korean Conflict
Average Length of Internment	3477.95	1,14873.15	73772.02
Average Age at Capture	25.0	26.7	23.2
Average Age at Release	26.1	29.4	25.4

Two major points must be emphasized here; first, the vast majority of the Pacific Theater of operation prisoners were captured on Bataan and Corregidor at the beginning of World War II and were not released until the end of the war. Also, the average age at capture was two years older than the average European POW, reflecting the fact that these men were regular Army soldiers on the whole versus the draftees seen in Europe. As can be seen in the Korean Conflict, the average age had dipped to 23.2 years of age, again symbolizing the fact that these men were draftees. Their average length of internment was 2.02 years.

Table 4 is a study of former POW mortality data. There have been several studies conducted by the National Academy of Science and National Research Council. The earliest of these studies was one by Cooper and Cohen in 1954. This study found that the average European POW died at no greater rate upon repatriation than similar age matched controls who were not POWs. However, Cooper and Cohen also noted in 1954 that among Pacific Theater repatriated POWs there was a much increased incidence of death in the first two years of the study, tapering off in the last four years of the study. The difference was due to the incidence of tuberculosis, cirrhosis and trauma. They felt the high rate of tuberculosis was secondary to the decreased immunity of the repatriated POWs as a consequence of chronic avitaminosis as well as the high rate of infectivity that was so prevalent in the camps. Cirrhosis was felt to be caused by a combination of both alcohol abuse upon repatriation and chronic liver damage from the malnutrition of the POW experience. The high incidence of death due to trauma was generally felt secondary to psychological difficulties in readjusting to United States society.

TABLE 4: FORMER POW MORTALITY DATA

<u>NAS/NRC (Keehn-1975)/ VA Comparison (1979)</u>	<u>WWII Europe</u>	<u>WWII Pacific</u>	<u>Korean Conflict</u>
POWs in NAS Sample/POWs Identified in VA Com- parison:	2,035/85,385	3,147/19,160	3,932/4,418
Deceased POWs in NAS Sample/VA Comparison:	291/13,582	668/ 4,494	382/499
Percent of POWs Who Died in NAS Sample/VA Comparison:	14.3/15.9	21.2/23.5	9.7/11.2
Number of Years Survived Since Repatriation:	20.76/24.40	18.51/22.52	13.20/16.19

The second NAS/NRC study was completed by Nefzger, studying the period ending with the Cooper and Cohen study up to 1965. Nefzger confirmed that there was no increased mortality among European POWs and showed that after nine years there was no increase among age matched control returning veterans with the Pacific Theater of operation. He again corroborated Cooper and Cohen's study that there was an increased incidence of death from tuberculosis, cirrhosis and trauma.

The third NAS/NRC study was completed in 1979 by Keehn. He also confirmed the data presented earlier by Cooper, Cohen and Nefzger and his data can be seen in the left aspect of each column on Table 4. The WWII European column, in the third line, reveals the percent of POWs who died in the NAS sample. Keehn noted that 14.3% of all European POWs had died by 1975. However, Keehn also noted that 15% of all non-European POWs had died by 1975, and this confirmed the fact that there were no statistically significant differences in the death rates among the two groups. In the World War II Pacific Theater of operation statistics, 21.2% of these men had died by 1975 again reflecting the fact of the increased early mortality in the first nine years. In the Korean Conflict, 9.7% of these men had died and their mortality was also felt to be significantly higher in the first 13 years after repatriation.

Table 5 emphasizes the percent of living POWs compared to all living veterans receiving service-connected disability compensation. Among the European Theater of operation POWs, 41.2% are receiving some degree of SC disability and among Pacific Theater of operation World War II veterans, 50.6% are receiving disability. Compared to the 9.6% of all World War II veterans receiving some type of disability, this is approximately 4 to 5 times higher. Of all Korean POWs, 59.2% are receiving SC compensation compared to 5.1% of all Korean veterans.

TABLE 5: PERCENT OF LIVING POWs COMPARED TO ALL LIVING VETERANS RECEIVING SERVICE-CONNECTED DISABILITY COMPENSATION

	POWs	ALL VETERANS
WWII European Theater	41.2	
WWII Pacific Theater	50.6	
TOTAL WWII:	42.8	9.6
Korea	59.2	5.1
TOTAL WWII & Korea:	43.6	8.4

Table 6 summarizes the average degree of service-connected disability. In the European Theater of operation, the average degree is 27.0%. This compares almost exactly to the total World War II average degree of 27.9%. In the World War II Pacific Theater POWs, the average degree of service-connected disability is 40.3%. In Korea, the average degree of POW disability is 36.1% compared to all Korean veterans of 30.6%. As can be noted, the European Theater POW is not any different from his counterpart age matched control whereas the Pacific Theater veteran is, on an average, 13% more disabled; the Korean POW is, on an average, 6% more disabled.

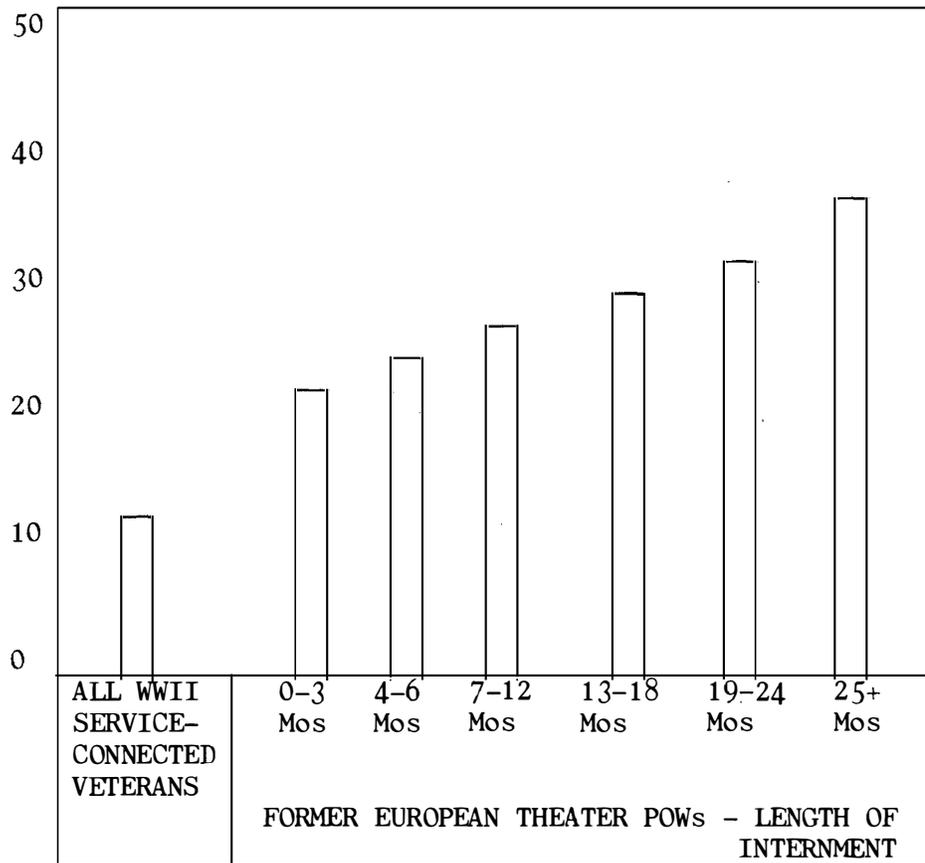
TABLE 6: AVERAGE DEGREE OF SERVICE-CONNECTED DISABILITY

	POWs	ALL VETERANS
WWII European Theater	27.0	
WWII Pacific Theater	40.3	
TOTAL WWII:	29.3	27.9
Korea	36.1	30.6
TOTAL WWII & Korea:	29.7	28.5

In Table 7, which deals with the percent of service-connected former European Theater POWs with a diagnosis of anxiety neurosis, a direct correlation is seen between the length of internment and the percent of anxiety neurosis. Among all World War II SC veterans, 11% have a diagnosis of anxiety neurosis. The percent of anxiety neurosis is linearly related to the length of internment; between 0-3 months of internment one can expect a 24% incidence of anxiety neurosis, and by greater than 25 months of internment, the incidence of anxiety neurosis is found to be 35%. Beebe, who conducted the last NAS/NRC research for the VA, stated that 11.4% of all ex-European Theater POWs were SC for anxiety versus 3.2% of European Theater of operation veterans in general.

TABLE 7: PERCENT OF SERVICE-CONNECTED FORMER EUROPEAN THEATER POWs WITH DIAGNOSIS OF ANXIETY NEUROSIIS CORRELATED WITH LENGTH OF INTERNMENT

PERCENT OF SERVICE-CONNECTED VETERANS w/DIAGNOSIS OF ANXIETY NEUROSIIS



We see in Table 8 the percent of living service-connected disabled veterans rated 50% or greater. The figures in this category for the European Theater POWs are 20.1% versus approximately 22% of all World War II veterans. In contrast, 48.8% of World War II Pacific POWs are considered 50% or greater disabled compared to the 22% among all veterans. In POWs out of Korea, the figures are 34.7% compared to 25.5% of all Korean age matched control veterans.

TABLE 8: PERCENT OF LIVING SERVICE-CONNECTED DISABLED RATED 50% OR GREATER

	<u>POWs</u>	<u>ALL VETERANS</u>
WWII European Theater	20.1	
WWII Pacific Theater	48.8	
TOTAL WWII:	25.9	21.9
Korea	34.7	25.5
TOTAL WWII & Korea	26.4	22.1

Concluding data is found in Table 9 where the percent of living, service-connected disabled rated unemployable among the European Theater ex-POWs is 5.3% which is exactly the same as the 5.4% seen in the category from World War II. World War II Pacific Theater is, however, 22.0%, this is four times higher than the all veteran category. Lastly, the Korean Theater of Operation POWs are at 8.9% versus all veterans from the Korean Theater of Operation at 6.3%.

TABLE 9: PERCENT OF LIVING SERVICE-CONNECTED DISABLED RATED UNEMPLOYABLE

	<u>POWs</u>	<u>ALL VETERANS</u>
WWII European Theater	5.3	
WWII Pacific Theater	22.0	
TOTAL WWII:	8.7	5.4
Korea	8.9	6.3
TOTAL WWII & Korea	8.7	5.3

Table 10 reveals the statistically significant causes for service-connected disability among former POWs. In every group, anxiety neurosis ranks at the top of the list. Closely following behind, however, and in some instances even in greater magnitude than anxiety neurosis is avitaminosis. This was extensively studied by the Morgan Board Debarkation Hospitals. Among avitaminoses, beriberi was felt to be the most significant. A history of wet beriberi was found in 77% of all returning ex-POWs from the Philippines and dry beriberi in 50%. Avitaminosis in this group was found in 50-70% and intestinal parasites in 60-70%, primarily Ascaris and hookworm. Among the Korean Conflict ex-POWs, avitaminosis was also extremely high as were gastrointestinal parasites. Some 40% of these ex-POWs were diagnosed on returning as still harboring some sort of gastrointestinal infection. Ascaris, amoeba, hookworm, Shigella and Salmonella were the primary pathogens.

TABLE 10: STATISTICALLY SIGNIFICANT SERVICE-CONNECTED DISABILITIES AMONG FORMER POWs (1946-1979)

WWII Europe	WWII Pacific	Korean Conflict	Vietnam Era
anxiety neurosis	anxiety neurosis	anxiety neurosis	currently being studied
avitaminosis	avitaminosis	avitaminosis	
arthritis	arthritis	arthritis	
frozen feet residuals	frozen feet residuals	frozen feet residuals	
scars	scars	scars	
	skin diseases	skin diseases	
	beriberi	beriberi	
	pellagra	pellagra	
	malaria	malaria	
	eye diseases	eye diseases	
	respiratory diseases	respiratory diseases	
	gastrointestinal diseases	gastrointestinal diseases	
	genitourinary diseases		
	psychoneurological diseases		
	cardiovascular diseases		

EUROPEAN THEATER

The military personnel in the European Theater of operation and the ex-POWs therein involved fall into two distinct groups. The first consisted of flyers and members of bomb crews. In general, these men

were captured earlier in the war and more often than not interned in stalags. The second group was the infantry soldiers who were often of a lower rank and captured after the Battle of the Bulge. In fact, the vast majority of European Theater ex-POWs were in this group. These men oftentimes were not afforded the benefits of proper shelter from the elements especially during the winter of 1944-45. They were also not fed as well as the first group and they were subjected to long death marches to move from the advancing American and Russian armies. The overall mortality in the European Theater of operations was approximately 1% with 1,124 men dying out of 93,941.

There are several reasons for this low death rate. The vast majority of the men were captured toward the war's end; therefore, even though they lost a great deal of weight acutely, they were not subjected to having to live with malnourishment under adverse physical circumstances for extended periods of time as were the POWs in the Pacific Theater of operation. Also, in general, the German POWs received somewhat better treatment at the hands of their captors in that Germany signed and ratified the Geneva Convention, even though more often than not the Germans did not follow its rules to the literal letter. Thirdly, even though the German high command had a desire that all commandos and flyers be killed, the regular Luftwaffe officers more often than not were much more sympathetic to the POWs. Another thing to consider is the fact that on the whole the diet among the German POWs was much better than the diet given to the Pacific POWs. Oftentimes Red Cross parcels supplemented the diet in Germany whereas this was not the case in the Philippines, and the German POWs were also frequently given vegetables with their potato soup and black bread. Lastly, America had captured several thousand German prisoners in the North African campaigns and it was to Germany's great benefit to treat our prisoners decently in the hopes that their own prisoners could be treated well.

The transfers in Germany were generally by vehicle after the men had been captured initially, especially the flyers in the beginning of the war. However, by the end of the war, the transfers were often of a forced march type when the Germans were retreating from the advancing American and Russian armies. It is here that men succumbed to the natural elements of the winter of 1944-45 and froze to death or died of dysentery during the forced marches.

For the fortunate few who were in the oflags, the barracks were of a standard German type construction. These were usually 40 x 130 feet long, each containing 10 rooms leading from a central hallway that ran lengthwise with the buildings. There were usually two washrooms without running water and the pit latrine for night use located near the rear of the barracks. Each room therein was approximately 15 x 23 feet. It was designed to provide facilities for 16 men with 8 wooden double-deck bunks. In a few instances, the bunks were triple-decked, increasing the capacity of each room to 24 men.

PACIFIC THEATER

The Pacific POWs experienced a mortality rate of 40% with approximately 11,107 deaths out of the 27,465 internees. The vast majority of the deaths and most of the prisoners came from the fall of Bataan and Corregidor. The fall of Bataan alone gave the Japanese 78,000 troops to deal with; 66,000 of these were Philippine nationals. These men were forced into a march which later became known as the Death March in which 17,000 of them died. In this 100 mile trek, 650 Americans died mostly from beheadings and shootings and over 16,500 Philippine nationals were murdered. There were several reasons for the high mortality rate of the prisoners captured on Bataan and subsequently on Corregidor. Most of it can be explained by looking at the Japanese miscalculations.

- 1) Of greatest importance was the poor physical condition of the Americans and the Philipinos prior to capture. The Morgan Board Debarkation Hospitals documented an average 40-50% weight loss among all POWs prior to their capture. Due to severe food shortages on Bataan and Corregidor, General MacArthur had put all troops on half rations in January 1942. That provided each man with approximately 2,000 calories per day. In February, the rations were cut to 1,500 calories and by March to 1,000 calories. Normal work in the Philippines at that time required at least 3,500 to 4,000 calories per day per man. To give you an example of just how bad off these men were, approximately 70% of the men in the 31st Infantry on Bataan were on the sick list on the day of capture. These men were suffering from malnutrition of various types, malaria and dysentery.
- 2) No transportation was provided for the men captured on Bataan. The Japanese had felt that the American forces would surrender approximately three weeks later than they did, and they felt they would surrender in the northern region of Bataan instead of the southern region. The combination of the earlier capitulation and the further distance, aggravated by the fact that the few vehicles that the Japanese had were being used to bring troops to the southern region of Bataan, forced the Americans to march for days on end in the hot sun with little or no protective gear.
- 3) No food was provided and the only water the men were able to drink was that from water buffalo watering holes. This water supply was always infested with gastrointestinal parasites and it gave the men severe dysentery to such an extent that the more they drank the more fluids they lost. In fact, the lust for water, more than anything, was the reason so many Americans were killed by the Japanese during the death march; as they would run toward the watering holes, the Japanese would shoot them on the spot or bayonet them as they were drinking.

4) The Japanese made a gross underestimation of the eventual numbers. They had reckoned that due to their Bushido Code in which they did not recognize the concept of prisoners of war, the Americans would also not recognize that concept and would die before surrendering. They felt that death in battle was the highest honor while surrender was the lowest disgrace. They, therefore, unexpectedly captured approximately 13,000 Americans on Bataan with 66,000 Philippine nationals who were scouts and guides plus another 25,000 civilians when they were only contemplating approximately 10,000 internees. This grossly overwhelmed their ability to deal with such numbers.

For the men who survived the Death March, the life at the internment camps was a little better; 1,500 out of 8,000 Americans died at Camp O'Donnell in the first six months. Even worse was Cabanatuan where 2,700 out of the 6,500 American internees died in the first year. The POWs captured on Corregidor were given extremely harsh treatment after their surrender. They were forced to lay in the open sun for 18 days with very little water and no food until they were eventually transferred by ferry across the Manila Harbor and forced to walk down the streets of Manila so they could be disgraced in front of the local Philippine civilians. They were then interned at Bilibid Prison and given extremely harsh treatment for the first year.

The diet in the Pacific was the most important factor in the deaths of so many prisoners. The diet consisted mostly of a polished rice. It was always that rice which was discarded by the Japanese and was filthy and rancid, often containing gravel and insects. The typical diet among the camps varied greatly. Even at best it was never adequate. Sometimes the Japanese substituted weeds for vegetables. A half canteen cup, usually 8 oz. or 160 calories, of a thin rice gruel twice and on rare occasions three times a day was the standard. At times no food at all was available. About once a week a water buffalo was slaughtered by camp veterinarians to feed approximately 10,000 prisoners. Usually this supplemented the diet by only a few grams of protein per prisoner.

The transfers in the Pacific were particularly pitiful and brutal. In his book "And Some Survived", Manny Lawton gave a descriptive account of transfers on the Japanese hell ships. These were cargo ships where the American POWs were forced to lay in the hold for the entire trip across the South China Sea on their way to be used as slave laborers in Japan or occupied China. The conditions inside the ships were deplorable. Refuse was kept in a bucket which was raised only once a day and it often spilled over into the faces of the men beneath who were packed so closely that they could not lay down. Food and water were often lowered in the same bucket. Within a few days of the voyage, the men were so dehydrated from lack of water and dysentery that there was no longer any reason to fill the refuse buckets. One of the most pitiful examples of the loss of lives in the Philippines occurred on the Arisan Maru where 1,800 American POWs were forced into the hold of an unmarked ship. American submarines

were patrolling in the South China Sea and spotted this unmarked ship; they torpedoed this ship with the resultant loss of 1,795 American lives. Only 5 Americans survived this terrible ordeal and rode to China in a life boat. The Arisan Maru was not the only ship in which so many died. There were several others including the Brazil Maru, with the loss of 1,426; one particular unknown Maru with 1,100 dead; and the Shinyo Maru with 668 dead.

In his book "Bataan, the March of Death", Stanley Falk talks of the unrelenting sense and determination for survival in the face of the terrible surroundings that allowed many Americans to return home. Charles Stenger in his VA's Statistical Data Report of 1979 confirms the fact that 90% of all Philippine POWs received regular and direct physical punishment.

KOREAN CONFLICT

In the Korean Conflict, the mortality rate was 38% with 2,701 confirmed deaths out of 7,140. There were several reasons for this huge mortality rate, but the prime reason that stands out above all the rest is that the Koreans never recognized the concept of prisoners of war; they had never ratified the Geneva Convention and considered the Americans war criminals. Most of the deaths during the Korean Conflict came during the early part of the hostilities. The Department of Defense Reports of 1955 revealed that 500 out of the 700 captured POWs in late 1950 froze to death on one particular march.

Reviewing Clarence Anderson's article in the Journal of the American Medical Association in 1954, he details the differences among the philosophy and the treatment of the American POWs in the different camp settings:

- 1) The temporary camps were in effect from July 1950 to February 1951. Uniformly, the POWs received the worst treatment in these camps: very little food, very little shelter, and constant beating and mental harassment.
- 2) The permanent camps were from March 1951 until October 1951 and essentially much better conditions were available due to the fact that the armistice negotiations had begun to make progress and much decreased physical and psychological harassment was the norm.
- 3) By November 1951 until repatriation in 1953, there were fluctuations in the captors' attitudes toward the POWs reflecting the progress in the armistice negotiations but generally there was an increase in the diet and the clothing.

The diet in Korea was mainly of a corn or millet variety. The average weight loss confirmed by the debarkation hospitals was 40-50% per man from the preinternment weight.

The Korean POWs experienced the brainwashing techniques that the European and Japanese POWs had not. Since this was a war against the Communist ideology, the Communists tried to indoctrinate the American POWs with their philosophy and, in fact, sent several POWs back throughout the war in hopes of trying to persuade the other U.N. troops to cease fighting. Their concept of brainwashing was accelerated by weakening the physical resistance of the American POWs by exposing them to cold and hunger. They uniformly broke down the military organization's groups and placed people in areas according to race and rank. They also forced men to attend compulsory group indoctrination programs. By the end of the war 21 former American POWs refused repatriation in this country.

VIETNAM

Lastly, Vietnam with its presumed mortality rate of 106 out of 766 confirmed captured men. This war had two separate theaters. In South Vietnam, the soldiers who were involved with the Vietcong generally were U.S. foot soldiers and 25% of these captured men succumbed to death. There was generally less torture and fewer interrogations. Since the Vietcong themselves were poorly fed, the Americans were at the end of their food line so that there was a chronic food shortage. North Vietnam was somewhat different. There the POWs were mostly downed aviators, 5% of whom died. They were often used for psychological and propaganda purposes and there was severe physical and mental torture with somewhat inadequate food.

POW PHYSICAL PROBLEMS

Marasmus is a total deficiency of calories. Kwashiorkor is a deficiency of protein. Malnutrition was a problem for both the European and Asiatic prisoners. In Europe, in general, there was a lack of sufficient calories with an adequate vitamin intake. Just the opposite was true in Asia, where a lack of sufficient vitamins but an adequate caloric intake was found. Usually, the B vitamins were the most often lacking. Several particular syndromes were noted by physicians who were themselves POWs. Dr. Jacobs coined the term "oculo-oro-genital syndrome" to describe the malnutrition-related and tropical skin disorders among his fellow POWs. This syndrome consisted of inflammation of the eyes (conjunctivitis) and the mouth (stomatitis) and the skin of the scrotum (dermatitis). Dr. Jacobs also reported that malnutrition in the Pacific POWs caused a loss of the libido and normal functioning of the male sex organs. He coined the term "castration syndrome". This syndrome was characterized by atrophy or loss of the hair follicles, thinning and loosening of the skin and atrophy of the sebaceous glands which he felt indicated a decrease in the male sex hormone production. Pacific Theater POW physician Gottlieb reported on malnutrition-related liver diseases resulting in fatty changes in the liver. A high incidence of infectious hepatitis was also noted as well as cirrhosis in young men who had no antecedent alcoholic condition.

VITAMIN DEFICIENCIES

The vitamin deficiencies that the POWs encountered were primarily concentrated in the Philippine POWs. Among the vitamin deficiencies, the B-complex vitamins were the most noticeable. B-complex vitamins are comprised of two groups:

Group A consists of nicotinamide or niacin, riboflavin, thiamine or Vitamin B1, pantothenic acid and biotin. These vitamins are concerned with the intracellular metabolism of carbohydrates, fats and proteins. In other words, they are the energy-releasing vitamins. A deficiency of any of the Group A vitamins manifests itself in tissues with a high metabolic activity and turnover rate.

Group B vitamins on the other hand are related to red blood cell production. These are the hematopoietic vitamins. They are the ones that are responsible for the red blood cell production without which oxygen cannot be delivered from the lungs to the body.

Among all of the vitamin deficiencies beriberi was considered by many to be the worst. Beriberi, the Singhalese word for weakness, is a deficiency of thiamine (Vitamin B1). It is a water soluble vitamin which means that cooking will leach this vitamin out of its food sources. There is a constant daily need because the body cannot store great amounts of thiamine. The major sources of thiamine are pork, organ meats, particularly liver, heart, kidneys, leafy green vegetables, nuts and legumes.

Dr. Hibbs was a Pacific Theater physician who was also a POW. He wrote an article in the Annals of Internal Medicine in 1946 entitled "Beriberi in Japanese Prison Camp". He believed that beriberi was the most important of all the malnutrition-related diseases suffered by the American POWs and that it was directly responsible for more disability and death during captivity than any other vitamin deficiency disease. Dr. Hibbs estimated that nearly everyone in his camp suffered from some form of beriberi. Dr. Nardini who was also a Pacific Theater POW physician observed that most POWs in his camp also suffered from beriberi.

Beriberi is a multisystem disorder. Its prime effects are seen on the heart and the nervous system. The nervous system is affected from the brain cortex to the spinal column and into the peripheral nervous system. For simplicity's sake, beriberi is divided into three general categories:

- 1) Cardiac beriberi which deals mainly with the heart.
- 2) Dry beriberi which is primarily a nervous system beriberi.
- 3) Wet beriberi which is a nervous system involvement with edema or swelling of the legs.

Cardiac beriberi is caused by severe thiamine deficiency lasting for a period of three months or longer. There are three accepted stages of cardiac beriberi: mild, moderately severe, and acute or perniciously fatal (shoshin cardiac beriberi). Three primary physiologic alterations are noted in cardiac beriberi. The first is a dilatation of the peripheral arterioles and capillaries with increased blood return to the venous side. Since the arteries dilate, there is less resistance to blood flow and the blood returns to the heart faster, producing a high output cardiac failure. Volume overload to the right side of the heart also occurs eventually leading to biventricular cardiac failure. Lastly, sodium retention occurs resulting in edema formation. The combination of high cardiac output and low systemic vascular resistance is the sine qua non of beriberi heart disease. Metabolic acidosis is a prominent feature in shoshin beriberi. On pathologic examination, the heart is usually dilated and flabby. No endocardial or valvular lesions are discerned. Interstitial edema is the most common finding noted wherein the heart muscle cells are filled with fluid. In his observations of cardiac beriberi, Dr. Hibbs identified three types of beriberi heart disease. The first type, which accounted for 95% of all his diagnosed cases, was characterized by an irregular heart rate acute attacks of dyspnea (shortness of breath), and congestive heart failure. The second type was a biventricular disease which was a chronic condition usually resulting in death after repatriation. The third type, myocardial edema (swelling of the heart muscle) was an acute condition which resulted in death shortly after the onset of edema.

The nervous system is the most severely affected by beriberi. The basic pathologic change is axonal degeneration with destruction of both the axon and myelin sheath. In addition, variable amounts of segmental demyelination may occur. In other words, all nerves have a central body with outreaching arms. These arms are covered with a fatty layer which allows the nerve to receive and transmit signals. It is the degeneration of the arms and their fatty layers in beriberi that causes the symptoms. These changes affect primarily the motor (or movement) and sensory peripheral nerves, the spinal cord, and the brain stem. The distal (furthest away) segments of the longest and largest myelinated fibers in the crural (thigh) and, to a lesser degree, the brachial (arm) nerves reveal the most striking changes.

In the Livermore Veterans Administration Medical Center Study, extensive electrodiagnostic testing was carried out on 32 former Japanese camp POWs with a history of beriberi neuritis. These findings are summarized in Table 11.

TABLE 11: SUMMARY OF ELECTRODIAGNOSTIC FINDINGS IN FORMER POWs

	Ex-POWs-NN	Ex-POWs-PN	TOTAL
NUMBER OF CASES w/ELECTRODIAGNOSTIC EVIDENCE OF:			
1. Axonal neuropathy with both abnormal EMG* and abnormal NCS**	3	14	17
2. Axonal neuropathy with only abnormal EMG*	0	10	10
3. Axonal neuropathy with only abnormal NCS**	1	0	1
NUMBER OF CASES WITH NO ELECTRODIAGNOSTIC EVIDENCE OF AXONAL NEUROPATHY	3	1	4
TOTAL SUBJECTS:	7	25	32

Ex-POWs-NN: Former POWs with no clinical evidence of peripheral neuropathy.

Ex-POWs-PN: Former POWs with clinical evidence of peripheral neuropathy.

*Abnormal EMG (electromyography or motor study)

**Abnormal NCS (nerve conduction study)

The results were compatible with a distal polyneuropathy of the axonal degeneration type in 28 cases or 87.5%. As can be seen from the Table, of the ex-POWs with a peripheral neuropathy, 14 had an abnormal motor and nerve study while 10 had only an abnormal motor study; even among the ex-POWs who had no clinical evidence of a peripheral neuropathy, 4 had abnormal studies. In the article by Gill and Bell in the Journal of Neurology, Neurosurgery and Psychiatry entitled "Persistent Nutritional Neuropathy Amongst Former War Prisoners", 898 ex-Far East British POWs were extensively examined. The study revealed 24 instances of definite symptomatic neurologic disease as shown in Table 12.

TABLE 12: NUTRITIONAL NEUROPATHY AMONGST 898 Ex-FEPOWs ASSESSED 23 to 36 YEARS AFTER CAPTIVITY

A. "DEFINITE" (symptomatic) neurological disease:		B. "POSSIBLE" (asymptomatic) neurological disease:	
1. Peripheral neuropathy	24	1. Impaired tendon reflexes	21
2. Optic atrophy	19	2. Impaired sensation	13
3. Sensorineural deafness	13	3. Optic atrophy	5
4. Myelopathy	2	4. Fasciculation	1
		5. Wasting and weakness	1
		6. Spastic monoparesis	1
TOTAL of 58 conditions amongst 49 ex-FEPOWs (prevalence of 5.5%)		TOTAL of 42 abnormalities amongst 38 ex-FEPOWs (prevalence of 4.2%)	

This represents approximately 3% which is entirely consistent with the 3% found by Le Quesne in her article entitled "Persisting Nutritional Neuropathy in Former War Prisoners" in the British Medical Journal in March 1983.

The clinical symptomatology of beriberi neuropathy is as diverse as the disease process itself. The vast majority of patients experience some degree of weakness, paresthesia (disturbances of nerve sensation) and pain. The symptoms are insidious (slowly progressive) in onset and progression. Initially, the symptoms are localized to the distal (furthest away) dermatomes (sensory areas) of the arms and legs and progress proximally (centrally) if left untreated. Since the sciatic (large nerve in the hip) nerve is the most vulnerable to the destructive process, the legs are affected first. They are always affected earlier and more severely than the arms. Most beriberi neuropathy presents with a motor disability hence the name in Sinhalese. However, in 25% pain and paresthesias are the main complaints. The paresthesias may manifest themselves in several different forms. There may be a dull constant ache in the feet or legs, tightness in the calves, cramping in the feet or calves, or coldness of the feet. The most annoying sensation is the burning of the soles or dorsum (top) of the feet. This sensation is intermittent, worsened by contact stimuli and oscillates in severity. Some patients in the POW camps were noted to be unable to tolerate walking or even have bed sheets touch their feet. Dr. Hibbs made several observations regarding the complaints of burning feet. He noted that in some camps hundreds of men would place their feet in ice water or snow or expose their feet to the cold night air in Japan to alleviate the pain. Others would walk the floor at night out of sheer desperation in an attempt to alleviate the constant pain. Often the mere vibration caused by someone passing within several feet was sufficient stimulus to produce the pain.

The motor (muscle system) likewise reveals a wide spectrum of involvement. As with the peripheral nerves the signs are bilateral (both sides) and worse in the distal part of the legs. The thigh muscles are usually involved, indicated by difficulty in arising from a squatting position. Also characteristic of the disease are foot and wrist drop. Absolute paralysis is rare. Dr. Hibbs observed that 2% of Japanese POWs developed a motor paralysis. However, the usual case of immobility is due to contractures at the knees and ankles.

A very characteristic finding on physical examination is tenderness of the muscles to palpation. This is most commonly observed in the muscles of the calves. The deep tendon reflexes are almost always lost in the limbs.

The peripheral sympathetic fibers are also involved with excessive sweating of the soles and the dorsal aspects of the feet as well as volar surfaces (palms) of the hands, this being a common presentation. Since most cases involve only the limbs, the abdominal, thoracic and bulbar

musculature are usually spared. In patients with severe neuropathy, dysphagia (difficulty swallowing) occurs due to involvement of the vagus nerve. Hoarseness or weakness of the voice may be observed and is due to involvement of the recurrent laryngeal nerve.

The mainstay of therapy in beriberi is an adequate replenishment of all B vitamins.

Pellagra is the Italian word for pelle which is skin, and agro which means rough. This results from a deficiency of niacin in the diet. Pellagra, like thiamine, is a Group A B-complex vitamin and is water soluble. The sources of niacin are very similar to the sources of thiamine, primarily being liver, yeast, beef, pork, fruit and most vegetables and grain cereals. Almost no niacin is present in polished rice. In addition, niacin can be made by the human intestinal bacteria if there are other precursor vitamins and amino acids available. These other precursor vitamins are found in the same foodstuffs that niacin is, so this is not an acceptable alternative. Pellagra can be remembered as being the disease of the three D's: dermatitis, diarrhea and dementia. The dermatitis is symmetrical (on both sides). It is worse on the sun exposed surfaces with sharply demarcated borders. Initially, the area is reddened and thickened. As the disease process continues, you can see an actual sloughing of the epidermis, or top layers of the skin. There can be a total loss of the pigment cells so there can be areas of white non-pigmented lesions next to areas of red ulcerated lesions. Around the neck, the lesion can be quite prominent and is termed Casal's necklace, comprizing the area between the neck and where the shirt would come to on the chest.

The diarrhea is caused by the same pathologic process involving the gastrointestinal tract. This can be seen from the mouth to the rectum. However, it is most prominent along the esophagus, the stomach and the colon, or the large intestine. The dementia in its early stages presents as a psychoneurosis. The patients experience insomnia; they are irritable; they are nervous; they have increased anxiety and they show depression. If left untreated, the brain can actually look as if it were inflamed, termed a neuritis type picture. Peripheral nerve involvement also occurs with signs and symptoms virtually indistinguishable from beriberi neuropathy. In many POW camps a specific syndrome was noted, referred to as a spinal spastic syndrome. These men had mental and emotional changes, dimness of vision, and at times a widespread muscular rigidity, a delirium, coma and death. Concomitant Vitamin A deficiency may have contributed to the dimness of vision.

The treatment is niacin replacement. The skin, the gastrointestinal tract and the sensory system all respond. However, the dementia, if it progresses to that point, is unresponsive to all therapy.

Riboflavin, pantothenic acid and biotin are the remaining group A B-complex vitamins. Rarely is a deficiency of any one of these vitamins ever noted and a pure deficiency of any one is virtually impossible. Usually their deficiencies compound the deficiencies seen in the thiamine and niacin deficiency groups, and they also present with mental status changes, diarrhea and dermatitis.

Folic acid is a Group B B-complex vitamin involved in making red blood cells. A deficiency of folic acid will cause an inability of the red blood cells to mature properly. The cells will become much larger than normal and much fewer of them will be made. This produces what we call a megaloblastic anemia. B-12 is another B B-complex vitamin and is the most important vitamin to make red blood cells. Unlike folic acid, a deficiency of B-12 only manifests itself from several months to years later. B-12 is synthesized by bacteria in our intestinal tract. It is absorbed into the small intestine dependent on a cofactor produced in the stomach, named intrinsic factor. It can also be found in certain food-stuffs, such as liver, kidney, fish, meat products and dairy foods. A deficiency of this, like folic acid, produces megaloblastic anemia. However, a deficiency of B-12 will also cause the fatty sheaths around the nerves in the brain, the spinal column and the periphery to degenerate. Primarily affected are the dorsal and the lateral tracts of the spinal cord producing an inability to walk properly.

The Vitamin C (L-ascorbic acid) deficiency state is known as scurvy. Vitamin C is also water soluble. Since humans are unable to synthesize Vitamin C, we are totally dependent on outside sources for our supply. The foods richest in Vitamin C are: citrus fruits, their juices, strawberries, canteloupes, raw or minimally cooked vegetables, especially peppers, broccoli, cauliflower, kale, brussel sprouts, turnip greens, cabbage, tomatoes and potatoes. The Vitamin C content of fruits and vegetables varies with the conditions under which they were grown, stored and cooked. Vitamin C is extremely susceptible to damage from heating and cooking quickly destroys the vitamin and leaches it out of the food. Vitamin C has several functions. It is essential for the formation of collagen (the protein of the connective tissues), ground substance (the essential base structure of all cells), osteoid (bone tissue prior to calcium deposition), dentine (the bases of the teeth) and the intercellular cement substance (the material between the cells which binds them).

Since scurvy is characterized by failure of the formation of collagen, ground substance, osteoid, dentine, and intercellular cement substance, the major effects on the body include poor wound healing, decreased bone formation, weakness and blood vessel fragility resulting in hemorrhages. The first signs of Vitamin C deficiency are often petechial or spot-like hemorrhages around the hair follicles. These are followed by bruises, coiled hairs, thickening of the hair follicles, gum changes, shortness of breath, joint pains, nerve sensation problems and anemia or low blood count. The gums are often severely affected. They often swell and bleed under the surface. This is complicated by infection which itself breaks down the tissue further. As the disease progresses, the blood vessels become even more weakened and the minor trauma of daily life may yield a massive loss of blood. The most affected areas are the ones subjected to the most stress such as the skin, the joint areas and around the bones. Hemorrhages into the eyeballs, the conjunctiva and the brain are all common. Nosebleeds and blood in the urine or feces are often seen. The patients are usually anemic resulting from the loss of blood and from additional vitamin deficiencies.

The first sign of Vitamin A deficiency is nyctalopia, or night blindness. Later, changes in the conjunctival mucosa are seen, named Bitot's spots which are keratin debris deposited on the limbal conjunctiva. This affects the acuity of the person's vision.

The loss of trace elements in the diet for prolonged periods of time can also lead to deficiency states. An essential fatty acid deficiency is characterized by a desquamatus dermatitis, or loss of the upper layers of skin, a hair loss and a decrease in the platelet, or clotting cell, count. Deficiencies of zinc may yield poor wound healing and decreased taste sensation. Loss of copper may yield small red blood cells or a hypochromic microcytic anemia. A deficiency of chromium may yield an impaired glucose tolerance test, an encephalopathy or thinking disorder and a peripheral neuropathy. A loss of selenium may produce muscle pains, cardiomyopathy, or problems with the heart muscle, and a hemolytic anemia.

INFECTIOUS DISEASES IN POWs

For a variety of reasons, the POWs were subjected to infectious diseases at a higher rate than their age matched counterparts in non-captive situations. Most importantly, the malnutrition weakened their resistance in fighting off certain diseases. Their immunity was generally decreased and in addition the crowded living state rapidly spread disease from patient to patient.

PROTOZOAL DISEASES

Malaria was particularly prominent among Pacific Theater POWs. Malaria is caused by a plasmodia, or single-celled parasite. It is transmitted only by the bite of the female anopheles mosquito. Man is the only known reservoir for mosquito larvae. The larvae are injected into the bloodstream and migrate to the liver. They mature in the liver and when mature they invade the red blood cells as the red blood cells pass through the liver. When they burst from the red blood cells, the patient experiences the characteristic chills of malaria. There are four recognized forms of malaria that infest man. Plasmodium falciparum is the most virulent (severe) of all malaria and can easily cause death. Plasmodium vivax and Plasmodium ovale are both usually benign. However, they have a chronic hepatic (liver) stage and can cause recurrences for many years to come. The last type of malaria is called Plasmodium malariae.

The basic problem with malaria is that as the parasites cause the red blood cells to rupture, all the normal contents of the red blood cells burst into the bloodstream. There are cells in the body that normally clean up the bloodstream called the reticuloendothelial cells. These cells are concentrated in the liver, spleen and lymph nodes. The liver is, therefore, universally enlarged in malaria. The spleen is the principal organ affected. Depending on the duration of the infection and

the patient's resistance, the spleen may enlarge several times. Since its capsule is thin, the spleen is predisposed to rupture and the patient may exsanguinate (hemorrhage to death internally). In malignant falciparum malaria, there are many changes in the brain. One of the most prominent features is an extreme congestion of the vessels so that they may be plugged with the parasitized red blood cells. Because the vessels in the brain are plugged, there is a stasis or slowing of the blood as it goes through these vessels. This slowing predisposes to hemorrhages and infarctions in the brain and many of these patients experience strokes. The kidneys are also often enlarged and congested with the waste.

The gastrointestinal side effects of the POW experience were as debilitating and as severe as any of the vitamin deficiencies. One of the worst was amebiasis caused by the single celled organism, *Entamoeba Histolytica*. This disease is limited exclusively to humans and it ranges from a chronic mild diarrhea in cases of minimal intestinal involvement to a severe purging dysentery with extensive ulcerations of the intestinal wall. The right side of the colon, particularly the cecum and the ascending colon, is affected most often. However, in severe cases the entire colon can be involved. These organisms invade the crypts of the colonic glands and burrow in through the wall. From this, ulcerations are formed. In about 40% of the cases, the amoebae can penetrate into blood vessels in the body and are drained into the liver, producing abscesses. These abscesses may become gigantic in size and produce a hepatitis-like picture with complete loss of liver function. Also, the lung may become involved after the hepatic involvement either by draining of the parasites through the blood vessels or by direct penetration through the liver capsule into the diaphragm and into the lung itself. The diagnosis of this disorder is by identification of the amoebic cysts in the stool. The disease is usually self-limited and quickly over after the body's own immune system fights the parasites, but in some cases it may linger for years to come.

Giardiasis is another single celled parasite that invades the gastrointestinal tract. The dominant findings in the symptomatic cases are diarrhea, a right upper quadrant pain and occasionally a malabsorption picture. The condition is extremely amenable to treatment and only rarely sufficiently persistent or chronic to have great clinical significance.

TUBERCULOSIS

POWs were often subjected to an extremely high incidence of tuberculosis while in POW camp and later upon return to the United States. Specifically, 9 years after repatriation, Philippine POWs were still dying of tuberculosis at a higher rate than the age matched controls who were not POWs in the Pacific Theater of operations; and 13 years after repatriation, the Korean ex-POWs were dying at a higher rate than age matched controls who were not POWs. Tuberculosis is caused by a myco-

bacterium that affects primarily the lungs and causes a devastating loss of lung tissue. There can be an actual eroding of the lung tissue into the major blood vessels. The patient often coughs up blood. It is characterized by a cyclical pattern of fever and night sweats and a relentless loss of weight if left untreated. The involved individual may develop what is termed a miliary tuberculosis, whereupon the bacteria spreads throughout the entire body even affecting the lymph nodes in the neck and axillae (armpits). If these lymph nodes rupture, it is termed scrofula. Unfortunately, adequate therapy was not available for tuberculosis until the early 1950's.

VIRAL DISEASES

1. Hepatitis was also a major problem among the POWs primarily in the Pacific Theater of operations, both in the Philippines and Korea. It was also due to crowding and unsanitary conditions. The usual forms of hepatitis are caused by a virus. There are several different types:

- a) Hepatitis A is transmitted generally through unsanitary and crowded conditions. It was primarily spread by flies on unprotected food and the drinking of impure water.
- b) Hepatitis B is called serum hepatitis and is usually transmitted by blood or urine.
- c) Non-A Non-B Hepatitis is an undiagnosed probable viral hepatitis.

There can be many other causes of hepatitis from simple malnutrition to bacterial diseases but, in general, it is an inflammation of the liver. The liver becomes unable to detoxify the substances that the person ingests and the affected individual develops jaundice and turns yellow.

2. Dr. Katz examined over one thousand Pacific Theater POWs. He felt that Dengue fever was an extremely debilitating illness. This condition is caused by a virus and characterized by symptoms of weakness of the muscles in the extremities, severe pains in the head, eyes, joints and sore throats.

HELMINTHIC DISEASES

Among American POWs held in Asia during WWII and the Korean Conflict, worm infections were a very common problem. The Morgan Board Rebarcation Hospitals reported that 60 to 70 percent of all Pacific POWs harbored intestinal parasites, usually ascaris and hookworm. Repatriation physicals determined that 40 percent of all Korean POWs harbored parasites, usually ascaris, amoeba or hookworm.

Strongyloides is an intestinal nematode (worm). It is a parasitic infection most commonly found in warm or tropical areas and is very rare in industrialized regions. Strongyloides is the worst of all the worm infections because it can multiply and autoinfect (reinfect) the host or affected person. By so doing, the infection can remain chronic. Conversely, hookworm, ascaris and trichure are worms that do not reinfect and will spontaneously resolve. The British have conducted several long term studies of Strongyloides in their Far East Ex-POWs. In one study of 160 Ex-POWs, Strongyloides was found in 44 (27.5%) people thirty-five years after liberation. The most successful way to diagnose the parasite was by microscopic examination of the stool. Strongyloidiasis is a parasitic infection usually limited to the intestinal tract. In individuals with a lowered resistance or an immune deficiency state, it can become disseminated throughout the entire body. The infected larvae are in the soil and penetrate the skin of the feet in people not wearing shoes or the skin of the mouth in people who eat improperly cooked food. On penetration, the larvae produce a small inflammatory reaction. They then enter blood vessels and are carried off to the lungs. They burrow out of the lung blood vessels into the lung air spaces themselves and then migrate up the respiratory tree and are swallowed into the intestine. They then attach themselves to the mucosa primarily in the small intestine where the female lays her eggs. The usual clinical manifestations are principally related to the intestinal tract and the lung. When the parasites emerge from the lung they often cause a bronchial irritation, a cough and a bloody sputum. Often, the parasites can even be seen within the sputum. Once they are in the small intestine, they produce the abdominal pain. Occasionally, the parasites can even invade the lower bowel and give rise to abdominal cramps and diarrhea. Blood in the stool is very common; and as with almost all parasitic infections there is an eosinophilia, or an allergic reaction in the blood.

Ascaris lumbricoides is caused by the giant roundworm. The adult worms can measure from 15 to 30 cm. (7 to 15 inches) in length. The eggs are deposited on the soil by fecal contamination and the parasite is swallowed by the new host (man). The larvae, which develop in the small intestine, also penetrate the wall of the intestine and enter the lymphatics or the blood vessels that drain to the lungs. Then they emerge from the blood vessels into the lung spaces, migrate up the respiratory tree and are swallowed into intestinal tract. Once in the intestinal tract, they develop into adult forms, they mate, and eggs are produced which are excreted in the feces and deposited into the soil and the life cycles commences again. The disease is diagnosed with stool cultures and it is treated with appropriate anti-worm drugs. A severe infestation of this particular worm can cause severe malnutrition and malabsorption by draining the host's own reserves. Intestinal blockage may even occur.

Ancylostomiasis is commonly called the hookworm. This worm develops through a life cycle essentially identical to Strongyloides. The eggs are found in soil contaminated by previously infected people, and people who have no shoes or protective foot gear have their feet penetrated by these larvae. The larvae are then carried from the blood stream to the blood supply of the lungs. They migrate through the walls of the lungs

and, just like in Strongyloides, migrate up the respiratory tract into the trachea and are swallowed. In the small intestine they develop into adults. They primarily attack the portion of the small intestine known as the duodenum. Here the worms become extremely large. They secrete a toxic fluid which weakens the wall of the intestine, allowing the head of the worms to burrow through the wall and enabling them to suck blood continuously and obtain their oxygen and glucose, or sugar, requirements. At the same time, the person may ooze blood from around the attachment sites. It is estimated that a host may lose as much as 100 cc's (3-4 oz.) of blood a day. Since the hookworm has a life span of years, a heavy infestation may account for a considerable loss of blood. Over the years, this may develop into the previously described syndrome of microcytic hypochromic anemia, wherein there is a virtual complete deficiency of iron in the body producing this particular type of anemia. These patients may also have a loss of protein from the blood. The diagnosis of this condition rests upon the identification of eggs in the stool samples and again is amenable to treatment with the proper agents.

SKIN DISEASES

Skin infections in the POWs were particularly common in both European and Pacific Theaters of operation as well as in Korea and Vietnam. One of the most devastating of all was ulcerative impetigo. This disorder is caused by bacteria that produce skin infections and skin ulcers. These ulcers can be extremely deep and are primarily located on the limbs of the body with preference to the legs. The only effective therapy is long-term antibiotics. Generally, antibiotics were not available until 1945. Since most POWs were not fortunate enough to have been furnished antibiotics, even when available, many times they were left with chronic scarring of the extremities.

Scabies is a skin infection caused by a mite. It is spread by skin to skin contact and by using clothes contaminated with the mite. This was especially prevalent among the prisoners in the German POW camps as they often used old blankets or each other's clothes particularly after some were transferred to other camps. It was also prevalent in the Philippines but not as much so, since not so many clothes were needed by them. One of the characteristic features of scabies is that it causes a generalized intractable itching sensation. The lesions can be of many types. Generally, they look like little burrows under the skin about one-half inch long with perhaps a little bleb or vesicle at the end of the burrow. Another problem with scabies lesions is they tend to become infected with bacteria leading to the formation of skin ulcers.

One of the most prominent skin infections among POWs, particularly in the Philippines and the Pacific Theater in general, was fungal infections of the skin. The fungal infections are divided into two groups:

- 1) Superficial fungal infections, also referred to as ringworm or dermatophytosis.

- 2) Deep fungal infections which involve everything beneath the surface layer of the skin. These are generally seen in the immunocompromised, or severely malnourished, prisoners.

The superficial fungal infections involve dermatophytes which grow in the soil, on animals and on human beings. There are several different types. Tinea capitis refers to a dermatophytosis of the scalp. Tinea barbae is a similar infection of the beard. Tinea corporis is an infection by the fungus of the trunk and the extremities. Tinea cruris (jock itch) occurs most frequently in obese men during warm weather. Conditions which predispose to infection include heat, friction and maceration. This infection usually first appears on the upper inner thighs with gradual extension of well-demarcated moist red patches. Tinea pedis is an infection of the feet (Athlete's foot). It is characterized by persistent redness and scaling, maceration between the toes, sometimes accompanied by malodor and itching. Tinea versicolor usually occurs on the upper trunk and is highly distinctive in its appearance. There are several small round lightly colored lesions. Finally, onychomycosis is a fungal infection of the nail bed. This produces a gradual thickening of the nail bed and is almost always not susceptible to treatment by anti-fungal agents.

EYE DISEASES

Conjunctivitis is an inflammation of the lining of the eye ball. It can be caused by a virus, bacteria, a host of parasites or even an allergic reaction. Oftentimes if left untreated, conjunctivitis may lead to scarring of the layers over the pupil and cause blindness.

OSTEOARTHRITIS

Osteoarthritis (degenerative joint disease) is the most common disease of both the axial and peripheral joints. It is characterized by progressive deterioration and loss of the articular cartilage and by reactive changes at the margins of the joints. The clinical manifestations are characterized by slowly developing joint pain, stiffness, enlargement of joints and limitation of motion. Osteoarthritis can be divided into primary of unknown etiology and secondary forms. Regardless of the form, x-ray evidence of osteoarthritis can be detected as early as the third decade of life. The prevalence of osteoarthritis increases with age and the disease is almost universal in patients 65 years or older. The earliest pathologic changes in osteoarthritis are surface irregularities due to fissuring and pitting, which are followed by erosions. These erosions, initially focal, become confluent and lead to large areas of denuded surface. The initial involvement of superficial and middle layers is followed by full thickness loss of cartilage down to the bone. Osteophyte spur formation is a proliferative lesion seen most prominently at joint margins. Histologic examination of early osteoarthritis reveals a proliferative response with general hypercellularity and increased numbers of chondrocytes in clusters of cells. Later, hypocellularity is noted. In addition, biochemical alterations are also noted in osteoarthritis. The proteoglycan (connecting matrix) content of osteoarthritic cartilage is diminished and is directly proportional to the disease severity.

The cartilage in osteoarthritis is not passively eroded away, but in fact the synthesis of all matrix components is markedly increased. DNA synthesis, normally absent in adult articular cartilage, is active in osteoarthritic tissue and appears to be roughly proportional to the disease severity. Its extraordinary rapid metabolic activity suggests that the articular chondrocyte is responding to the chondritic stress of arthritis by a reparative reaction which appears to be quite brisk and, in theory, could heal the disease. Since the disease is one of gradual erosion of the articular surface over time, it suggests that the destruction is more rapid than the repair.

These observations suggest that the initiating event in osteoarthritis, although unknown, influences the cellular process in several ways. The chondrocytes under the influence of the initiating insult either die or begin to replicate themselves. Variations in the degree of altered synthesis and degradation produce the alterations and structures consisting of altered collagen, increasing water and swelling and slowly diminishing the concentration of proteoglycan. With advancing disease, the mechanical factors become more important. The insult is perpetuated and the enzymes released cause even more severe degradation. Despite very active chondrocytes' synthetic activities, the cartilage cannot keep pace with the disease and eventually becomes eroded and totally destroyed. The nature of the initiating event in this pathologic scheme is not known but clearly the most likely candidate is trauma either acute or even more reasonably chronic. Another factor of importance is aging which may itself not be a cause of osteoarthritis, but may cause changes in the chondrocyte function required for the osteoarthritic process to begin or be perpetuated. The progress of osteoarthritis may be very slow and the initial phases may be slower perhaps nonprogressive. However, with advancing age, presumably in susceptible individuals, the process may accelerate in an almost exponential manner to produce the clinical features. The clinical symptomatology may be either localized to a few specific joints or generalized throughout the entire body. Cartilage has no nerve supply and is, therefore, insensitive to pain. The pain from osteoarthritis arises from other intraarticular and periarticular structures. Pain early in the course of the disease occurs after joint use and is relieved by rest. Later, pain occurs with minimal motion or even at rest. Crepitus is a feeling of cracking as the joint is moved. Joint enlargement results from synovitis (inflammation of the joint), increased amounts of synovial fluid, or proliferative changes in cartilage and bone. Heberden's nodes are characterized by spur formation at the distal interphalangeal joints of the fingers. Bouchard's nodes are characterized by changes at the proximal interphalangeal joints.

The treatment of osteoarthritis should be individualized for each patient. Protection of joints from overuse is extremely important especially if weight bearing joints are involved. Appliances such as canes can be very beneficial. Weight reduction should be encouraged in all patients if obesity is noticed. Isometric exercises in which muscles

are strengthened against weight resistance while the joint is kept in a normal anatomic position can be quite useful. Isotonic exercises in which the joints are put through a range of motion while being exercised should be used without resistance. Otherwise, the basic pathologic process may be aggravated. Pharmacologic agents are often necessary to relieve the pain in a patient with severe osteoarthritis. Nonsteroidal antiinflammatory agents, such as aspirin, which have both analgesic and antiinflammatory properties are still generally considered the drugs of first choice. Oral steroid therapy is generally contraindicated in osteoarthritis. However, intraarticular injections of corticosteroids, if judiciously managed, may be beneficial in the occasional flare-ups of osteoarthritis.

Finally, in patients with intractable pain and total loss of motion, surgical evaluation and removal of the joint with insertion of a prosthetic device may be of great benefit especially in the knee and hip.

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A PRISONER OF WAR

It is a melancholy state. You are in the power of the enemy. You owe your life to his humanity, your daily bread to his compassion. You must obey his orders, await his pleasure, possess your soul in patience. The days are very long, hours crawl like paralytic centipedes. Moreover, the whole atmosphere of prison is odious. Companions quarrel about trifles and get the last pleasure from each other's society. You feel a constant humiliation in being fenced in by railing and wire, watched by armed men, and webbed about by a tangle of regulations and restrictions.

— Winston Churchill

Prisoners of War are soldiers, sailors, airmen, marines, or civilians. They are not war criminals; they are veterans of the military services or civilian agencies. As men of honor they represent an unfortunate group, victims of enemy capture, taken while fighting for their country. It must never be that they are stripped of their self respect, their dignity or their inherent rights as human beings or as veterans of their country's combat forces. It is impossible to relieve their hardships and suffering, their loneliness, their physical and mental illnesses and disorders, or to even reassure them with respect to their family and loved ones. **THEY HAVE NOT BEEN FORGOTTEN-THEY MUST NEVER BE FORGOTTEN.**

by Raymond W. Murray, M. D., Medical Consultant, V.F.W.

"A lot of people talk about making sacrifices for God and country—but you have made them...A lot of people talk about hell and what it's like—but you have been there... A lot of people talk about heroism—but you have lived it."

by Rev. Edwin F. Taylor, chairman, YMCA Armed Services

"The one thing that usually persists through all stages is hope. Just as children in Barracks L318 and L417 in the concentration camp of Terezin maintained their hope years ago, although out of a total of about 15,000 children under fifteen years of age only around 100 came out of it alive."

The sun has made a veil of gold So lovely that my body aches Above the heavens shriek with blue convinced I've smiled by some mistake. The world's abloom and seems to smile. I want to fly but where, how high? If in barbed wire, things can bloom Why couldn't I? I will not die!

-1944, Anonymous
"On a Sunny Evening"