

PHILIPPINE PERSPECTIVES 1945 and 1985

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Lingayen Beach 1945

It is a beautiful day in July of '85. I walk upon a beach whereon I once ran ashore on the 9th of January of 1945. The beach, a scimitar of pale gray sand, stretches for 40 miles around the crown of a horseshoe shaped gulf facing the China Sea. Our landing, the largest amphibious operation of the Pacific war, occurred in the Lingayen Gulf of Luzon Island in the Philippines. It was the prelude to our dash down the Luzon plain and the liberation of Manila.

I look to the sea. Instead of 600 ships, a lone fishing boat, with outrigger and two men, approaches through the gentle surf. Overhead, the sky is blue with high flying clouds; the haze from the ship's guns and rockets is missing. I look to the left and right. Six people are all I see. The beach is clear, not even one piece of litter. I look toward land. The scene has not changed; two hundred yards of windy sand slopes upward into the row of low lying dunes, blue sky beyond.

Why did we come here forty years ago? We never asked, but we learned as we moved southward and into Manila. We had come from fighting in the jungles of the Solomon Islands, a place where warfare hurts only the combatants. There we entered a world of people, families, children, villages, farms, a large city. The people taught us why we had come: the sick children who had never seen a doctor, the churches without a minister, schools and universities closed, malnourishment evident on every hand, and in Manila, starvation the norm.

Why have I returned? I have wanted to see what had happened to a people in forty years. Have they changed? We had been very close. We shared our rations. We suffered and died together. The Philippine people had been part of us. Had we done much over the years? Do the people have enough to eat? What about schools, health, transportation, jobs? What is life like?

In '45, we ran over the low dunes, miraculously with little opposition. We ran along the rice paddies and fish ponds to our point of rendezvous. Everything was exactly as the rubber contour maps we had studied on the long ship journey had predicted. Across the dunes it looks the same today, but there are more bamboo (nipa) huts, for the population has grown. I remember hurrying through Binmaley, our first village (Barrio) after landing, only this time my wife and I have had a delightful lunch at a beautiful restaurant built on pilings out over a large fishpond. All the villages have grown. In an adjoining town, Lingayen, we found a memorial park containing two old Navy fighters and two Sherman tanks, each on a concrete pad. A troop of boy scouts were setting up camp, a comforting sight.

That first night ashore, three of us crawled under a nipa hut to get out of a light rain. The little huts were made of basket woven bamboo with thatched roofs and were about four feet off the ground. An entire family may live in one.

All night long a baby cried. It's voice was music to our ears, for we had not seen a baby since leaving Fiji two years before. That touch of family gave us a feeling of warmth. The next morning when our battalion aid station was set up, that family appeared along with many others. Later, I talked with our surgeon. He told me that the baby was dying, and he could do little. From that day onward until the war ended and we went home, our medics treated civilians for all the illnesses that had developed in a land deprived of proper medical care for three years.

My division, the 37th, pushed southward, the 40th on our right and I Corp on our left. Manila was our goal, 100 weary miles away. It was rice paddies or sugar cane fields with frequent barrios and towns, all criss-crossed with rivers and streams. Our retreating foe usually had destroyed the bridges.

Urbiztondo

The morning of our first Sunday ashore found us approaching the village of Urbiztondo. In the distance, coming from the center of town, were the unmistakable notes of a trumpet. Soon we arrived at the town square, a grassed area of a few acres with a church facing one side and houses and stores on the other. Some of the buildings had balconies similar to those seen in New Orleans. Standing on a balcony, overlooking the road from the North, a young man was blowing on an old battered brass trumpet. He was playing "Star Dust" over and over as more troops appeared and passed through town. He rested from time to time when his weary lips gave out or whenever a lull appeared in the traffic, but soon he would point his horn skyward toward the north and render a few more choruses of the tune he loved best. His tear-washed face radiated happiness. Between performances, he waved and shouted his joy.

It was my luck, that morning, to park my radio command car in front of the church under a tree beside the bell; hence, I could observe the parade of little events that usually go unnoticed. The church was typical of that land, large in area, but with a low roof; made of white stuccoed masonry with a somewhat higher facade. The village churches had an appealing charm. Some of the churches had tall bell towers, but this one did not. Its bell hanged from a small four-pole bamboo structure in the yard. It also happened that the Catholic chaplain of the 148th Infantry, pack on his back, wandered into town. Finding a church at hand on Sunday morning, his first in a couple of years, he unslung his pack and went in telling some bystanders that he would conduct mass, the first, it turned out, that the town had had in three years. Word spread quickly. Soon a man appeared and began ringing the church bell. Others opened all the doors and windows. People came from miles around, women wearing *mantillas* on their heads, men with roosters under their arms, children at their feet. The men would tie the rooster's feet together, place the birds under a bush, and with their families, go into church. Inside, the good Father conducted one service after another all to the clear overriding notes of "Star Dust".

Damp-eyed people came out as new arrivals went in; units of troops approached and passed southward. The chaplain and the trumpeter continued with their self-appointed obligations. Men retrieved their roosters and gathered in little groups about the square. Women visited as they tended their babies.

Children romped about. Every one was waiting respectfully for the chaplain to finish. Finally the last mass was over. The chaplain came out, pausing to receive the thanks and blessings of the grateful, teary-eyed throng. He stopped by my car to fill his canteens and chat a moment.

"How did it feel to have a civilian congregation for a change, Father?", I asked. "A most satisfying morning," he replied. "A very devout people. Very devout", he added, with a touch of reverence in his voice, as he glanced about the little groups of men now busy organizing cock fights and placing bets. So saying, he slung his faded jungle pack on his back and headed southward, on foot, in pursuit of his paripatetic flock. As he departed down the road the gold notes of "Star Dust" trailed after him.

Urbiztondo has grown. We find the square a bit cluttered with more buildings. The church? It's had its roof raised about one storey and has a new gleaming facade, higher and more ornate. The bell is gone, but from what looks like a new belfry a huge loud speaker protrudes. It stands on the spot where I parked 40 years ago, under the same but larger shade tree. The church has lost much of its charm, and we are alone in the square, not even a rooster passed by, but then it is a Thursday afternoon.

The Upper Plain

After Urbiztondo my unit passed through village after village: Bayambang, Camiling, Paniqui, and the town of Tarlac. As we arrived at each we were greeted by women with tears in their eyes and, as a gesture of welcome, passing out chunks of raw sugar. The sugar crop was just in, and much like maple sugar they simply boiled down the juice and poured it into half coconut shells to harden. They gave away tons. We munched raw sugar all the way to Manila. It dripped molasses and loaded with B vitamins and minerals. It was just what we needed, but did not fully appreciate. They wanted to give us all their food, but sugar, their current cash crop, was really all they had. It was unnecessary for them to give it away no matter how grateful they felt. We did, however, repay the debt later in Manila. Whenever we stopped for a day, kids swarmed around us, climbed over trucks and equipment and sucked on C ration hard candy. Their older sisters asked for magazines so they could find out from the ads what kind of dresses they should be wearing. For about a week we kept expecting air raids, so we dug fox holes everytime we stopped very long. I remember a friend, Bill Poporoski, digging a huge hole. I asked him, "Why?" "I figured I can grab four kids in each arm and sweep them in under me when the bombs come", he replied. Bill was the biggest sucker for kids. Unlike our jungle warfare, no bombs ever came.

As we moved further south the people did not look as healthy. Being farther from the coast and its abundant fish, protein became scarce. At first it showed up in isolated families; later malnutrition became endemic. Its victims developed extended bellies, running sores, matted eyes, sick looking skin, and were prone to illnesses. The state of malnutrition climaxed into starvation in Manila.

There is a second great plain on Luzon Island. It is the Cagayan valley that

contains the Cagayan river flowing 130 miles northward to the top of the island. Yamashita chose the valley and its parallel mountain ranges as the final great delaying action for his retreating troops. Access is through rough mountains by narrow passes or by air. While we were in our rest area after Baguio the war in Europe ended, which meant that junior divisions were being sent to the Pacific to join us in the final big one coming up. The point system was announced and soon a few higher point men were heading home. We received many replacements for all units and once again basic combat training began. Meanwhile the 25th division had managed to move up route 5 toward the Cagayan valley as far as the Balete pass where they bogged down. Our 148th was sent up to help them. In five days the enemy was routed and the 24th could pass through and have the honours. The follow up action by the 25th was too slow so once more we were on the move. Passes to Manila were cancelled, and farewells to girls were made. We ran through the pass.

I remember passing through the 25th area. They had whitewashed stones lining the walkways to their tents, every sign of a leisure garrison life. We passed a large fenced area. A sign said, "25th division stockade." What kind of an outfit is it that needs a stockade in war time?

Soon we passed through the mountains and onto the billard table flat plain; our goal was Aparri at the mouth of the river at the sea. Speed was essential. Yamashita tried at many towns and river crossings to set up defences, but our infantry always arrived too soon. Our regiments leapfrogged each other with the resting units spreading out chasing straggling units into the flanking mountains. We had all kinds of supporting troops: heavy corps artillery, air support, a half dozen Philippine guerrilla and newly organized army units, and all kinds of support units. At times the division was spread over sixty miles. Communication within my battalion was a problem, especially if a mountain got in the way. Every time we moved a firing battery it was put right up in front with the infantry outposts, otherwise, within a day it would be out of range. Our bulldozers never stopped moving forward. They would get the gun positions dug and then head up the road hoping that at their 2.5 mile per hour speed they would be at the next position in time. We chased from one side of the valley to the other as enemy units moved into the hills.

I remember once driving out one of those side roads looking for one of our scattered firing batteries. My driver and I were alone. It was the kind of terrain that made one leary. Stragglers and infiltrators love to catch lonely vehicles like mine on out-of-the way roads. We passed an abandoned enemy tank, its gun aimed at us. I regretted having only a pistol. Then suddenly we rounded a curve, and I heard a bell. We slowed and approached cautiously. There, in a clearing stood a little country schoolhouse straight out of my midwest childhood. In its doorway a young woman stood ringing a hand bell, the kind I remembered responding to at the end of recess time. I felt an overwhelming feeling of security and good will. I had never felt safer in my life. We watched the children run past her into the school, then we drove on. That scene was typical of those people. Schools had been closed for a long time, but as soon as we had passed through, the teacher did not have to be told. She knew her duty. She opened the door and rang the bell. The kids responded, much like the church scene I mentioned earlier.

A new aspect of that war developed. The enemy was running out of supplies

and all the things that were needed. We began to find stragglers too sick to go on and more often, a few at a time surrendering. I remember once seeing two enemy soldiers trying to surrender to a long string of fast moving trucks, but nobody had time to stop. Other times we would find where the enemy had shot the sick and wounded rather than have them surrender, but more and more the pathetic troops came out of the hills and accepted our hospitality. Over the years the enemy had been rarely visible. We did not have strong feelings, one way or the other, toward them. Ours had been a feeling of, "Get the job done so we can go home". Now as we watched those pathetic, sick, hungry wretches come out of the hills we began to have feelings for them. It was difficult to imagine them as the fanatic enemy of the past years. We also wondered about the near future when we would be fighting the worst battle of all time: the invasion of their home land; their brothers totally surrounded, equally fanatic, would have nowhere to retreat to.

Despite all our best efforts and speed we did not make it to Aparri first. We were up above Tuguegarao when the 11th airborne dropped in on Aparri by parachute thus taking the honors.

Not too long thereafter the bomb was dropped and the war officially ended. Our infantry still had weeks of work persuading the enemy to come out. Yamashita did. Radios were dropped to known enemy groups so they could be assured of the surrender, and thousands did. I remember seeing a truckload of enemy nurses; we had never associated women with the enemy. Everything possible was done to get the poor people out and cared for. There are those who, with hindsight and the benefit of later knowledge, have condemned the dropping of the bomb. If it had not occurred, there is no evidence that the enemy would have surrendered before the whole country of Japan would have been destroyed. We would have been fighting every man, woman, and child. Those who disagree never faced those people as an enemy. The death toll would have been enormous on all sides. Nobody ever wins a war; you just get them stopped.

Fort Stotsenburg

Within two weeks of landing, the 37th had moved sixty miles south. I Corp on our left flank had encountered much opposition as the enemy retreated eastward into the mountains leaving us with an exposed flank 53 miles long. When the 40th on our right ran into heavy resistance in the foothills of the western mountains we knew our turn had come. Clark Field and Fort Stotsenburg lay dead ahead. The battle for the area and the surrounding highlands delayed us about a week with the 129th Infantry regiment aided by part of the 145th and the 160th from the 40th Division doing the job. The enemy, with every advantage of terrain and fortifications fought with the kind of fanaticism we had been expecting from our experiences in the Solomons. The battle was short but bitter, a portent of things to come.

Meanwhile MacArthur had brought the 1st Cavalry Division up from Leyte, attached it to our corps, and said, "Join the race to Manila". The completely motorized units could move faster than our infantry and the glamorous "Cavalry" better suited MacArthur's posture in the news. Our 148th pushed on

down Highway 3 while the 1st took parallel Route 5. I remember seeing MacArthur. He arrived in his jeep and was held up at one of the blown-out bridges. We were trying to get our 105's and ammo across to keep up with the infantry. He had to wait. The guns had higher priority. He and our Division Commander, General Beightler, met at that point. Although they were old comrades from Rainbow Division during days of WWI, the 1st Cavalry had his blessing.

The race was on. Our 148th was off first with the rest of our division leap-frogging after. Both Divisions met ever increasing opposition. The need for haste was humane. Several thousand Allied civilians were interned at Santo Tomas University, and the native civilian population was getting desperate. Our route led through swamp lands and jungle-like terrain. Over 50 bridges were blown and the rivers had to be forded. One long bridge at Calumpit used up all the bridging materials that the engineers had and still wasn't enough. We had to use boats and pontons. The delay cost us the race. The highways joined near a town called Plaridel. We got there first so we had the job of cleaning out 350 enemies who were putting up a desperate delaying action. The road to Manila was now direct. Soon we reached the city line.

When MacArthur left Manila three years earlier he declared it an open city to avoid its destruction. He now gave the enemy an opportunity to do the same. Our division piled up in open fields just north of the line. An armored unit of the cavalry, having passed through us below Plaridel, entered the city and broke through the walls of Santo Tomas University grounds to rescue our citizens. History gives them the credit for the race, but once in, they were surrounded and couldn't get out. Meanwhile, at the city line we found a large building, the Balintawak brewery, full of beer. As units approached they got the news. Soon every available container was filled with beer. Beer flowed. To get to it one waded. Men poured helmets full over their heads. The surrounding hillsides and fields were full of joyous men flushing out the dust of miles and weeks of struggling down the plain. The next morning General Beightler, contrary to MacArthur's desires said, "Go in", and the boys of the 148th slugged in and rescued the cavalry and our citizens at Santo Tomas.

Manila

Manila is divided into two parts by the Pasig river which flows from the east into Manila Bay. The original walled city called Intramuros lies on the south side of the river mouth. It is dominated by Fort Santiago which was a prime target when Dewey arrived in 1898. The fort proved to be our final target also. Manila, The Pearl of the Orient, was a beautiful city of wide avenues crossing graceful bridges, of handsome modern reinforced concrete buildings, churches and colleges built in the old Spanish tradition, spreading residential areas, and occasionally, clusters of little nipa huts. One had a feeling of air and spaciousness. Tropical trees and park areas were scattered throughout. Manila was a centuries-old melting pot of many races and cultures. The local language, Tagalog, reflected that mold. Everyone seemed to speak three languages. The native Filipinos might include several Philippine dialects as well as Spanish and

English, and the Chinese, at least two Chinese variations. Many Americans married to other nationals lived there.

The enemy chose to defend the city. The Admiral in charge had over 16 thousand men. They stripped every damaged plane and ship in the area of all weapons, bombs, depth charges, and supplies. All were moved into the central areas. Streets were mined with depth charges and heavy bombs. Naval guns were set up for anti-tank usage. Concrete buildings were turned into fortresses that had to be taken room by room. All bridges were blown up. Civilians were often forced to stay in the buildings along with the defenders. The buildings were usually mined so that they would blow up as the retreating enemy set them afire.

Our division moved rapidly into the city against ever-increasing resistance, pushing toward the Pasig river. That first day I remember well. We were set up on the grounds of a slaughterhouse. Our field kitchen promised something more than C rations. We had barely begun to eat our noonday meal when about fifty civilians appeared with buckets made from old tin cans and grabbed our garbage as fast as any appeared. There was nothing left to dispose of, nor would there be for the next month. The following morning I wanted to brush my teeth, but all the cans and my canteens were still full of Balintawak beer.

We moved deeper into the city. Ahead, we could see clouds of smoke rising. The enemy was setting buildings on fire as he was forced back. The fires set off the mines and ammunition he had planted in the buildings and streets. As a result whole sections were completely destroyed. Professor Ronald H. Spector, in his recent book, *Eagle Against the Sun*, blames us for much of the damage and resulting deaths of civilians by heavy use of artillery. The fact is we had strict orders, from MacArthur on down, that no artillery could be used against any building until all civilians were out. The result was that the infantry had to go in against fire and take a building room by room. The orders were not needed. Often our men found clusters of bayoneted civilians in buildings when they went in, but most of the time our men got in on time to rescue the civilians alive. When artillery was used it was against specific buildings or corner of a building, so as to have accuracy. There were no civilians in them.

The beginning of the battle for Manila found the 37th covering the city between the bay shore and a line running from the Chinese Cemetery on the north down to the railway and hence along the south easterly running tracks to the Pasig River. The 1st Cavalry had the rest of the city and suburbs to the east. The 40th was off in the western mountains aimed towards Bataan. Meanwhile, a new arrival, the 11th Airborne Division was working its way around the southern side of the bay. It too wanted a piece of the city. Ours was most of downtown Manila where most of the enemy waited. The battle for the city really began on February 4th and soon advanced to within a few blocks of the Pasig River.

Old Bilibid Prison was one of the first landmarks to fall. There, unexpectedly, were found 1275 American prisoners, both soldiers and civilians. The whole area was set afire by the enemy. The streets were mined. Buildings blew up as the fires set off mines planted within them. The enemy raked the area with artillery, machine guns, and sniper fire. Escaping civilians crowded the streets. When the unit head permitted, our infantry moved ahead building by building, floor by floor, room by room. Artillery support could only be used for clear spot targets.

The jungle fighters from the Solomons quickly learned to fight in a different kind of jungle. Acts of heroism on the part of men and officers and of Philippine civilians were common.

What are my memories of those first couple of weeks? It seemed I slept but little. Communications were vital. As section chief, I was on the jump day and night. I slept curled up in the front seat of my radio command car. Civilians were everywhere, sleeping under trees, in schoolhouses, public buildings, and all of them were hungry. We were officially not supposed to give them our rations, but once the food was in our mess kits the decision was ours. Crowds permanently stayed by our field kitchens cleaning up every scrap of garbage. As we got our mess kits filled at chow time we would walk away past those people. What could one do? We would hold out the kit. In seconds it would be grabbed by the handfuls and eaten. For some unknown reason there was a bakery battalion following us, and for the first time in three years we had bread. Fresh bread! We expressed our joy by keeping our slice of bread and munching it slowly as we sipped our huge canteen mug of coffee. For those first two weeks I never ate a meal, but after dark when no one could see me as I sat in the front seat of my car I would slowly eat a can of C rations. 'Till then I had never thought that eating food could be a sin.

We stayed in one spot for several days. A girl, about ten years old, along with her little brother, orphans I guess, never left our garbage can area by the kitchen. They exhibited all the worst signs of malnutrition and starvation. They were too weak to scramble with the others and grab at our handouts. They just stood there, eyes matted shut, running sores, bellies distended, pitiful, revolting. Yet in a few days, they improved immensely. As near as I could figure out, coffee grounds did it. When the mad fighting scramble would be over only coffee grounds would be left for the more feeble, all of which were eaten. Once, I held out my mess kit toward a young wild eyed mother with two small children. She made a grab and knocked everything, dehydrated potatoes and spam, into the dust at our feet. Instantly both children dove into the dirty mess and grabbed handfuls. She dove down knocked both kids aside and ate. The three of them fought over the last remnants, scraping up dirt, dust, and all. The sick, homeless, hungry, desperate people taught me that this civilization of ours is but a thin veneer that can vanish in a day. Those people included European, Philippine, American, Chinese, and others. I swore that I would never, as long as I live, willfully waste food.

Somehow food for Manila began to arrive from the States. It must have been flown in to Clark Field at first and later sent by boat. They must have emptied warehouses, in Hawaii maybe, of all canned foods. The craziest things began to appear: gourmet sardines in mustard sauce, expensive red salmon from Alaska. It made a big difference, but things were touch and go for six weeks.

On the lighter side, I remember our infantry liberating a house stuffed with cases of half pints of Canadian Club. Those little bottles fitted nicely into fatigue pockets and were a pleasant interlude.

I cannot forget our medics and aid men. From dawn till dark they never stopped treating civilians as well as our own people. There are many stories of their heroism of going after casualties under fire. Many Filipinos helped. I must tell one story from my division history.

The first crossing of the Pasig river was made by the 148th in the

Malacañang Palace area, all under heavy enemy fire. The medics were busy and there were many heroic acts of rescue of wounded men. "Chico", a little, 37 year old Filipino who had been a technical sergeant in the Philippine Army before the war, adopted the 148th aid station. He had fought in Bataan and had been interned along with the others, but being Filipino, had been released before our return. With our return to Manila he decided it was time to get back in harness. He dug up an ancient battered American soup bowl helmet and long hidden U.S. insignia and went looking for action. At the palace grounds he found it. Every time a man collapsed under the heavy fire, Chico spotted him and was usually the first to reach him. Dashing across the shell-swept ground with a borrowed medical kit, he rushed to the casualties one after another and gave them aid. Seemingly impervious to the shelling, he made many trips through the grounds to assist wounded men and saved many lives.

Later, after a pontoon bridge had been installed across the river and the heavier fighting had moved south of the river, civilians by the thousands began moving north across the pontoon bridge to the somewhat safer side. Crowding into the command post area in the Malacañang Gardens, on the south side, the civilians were in pitiful shape. With an unerring eye, Chico detected the most seriously wounded and ill and sidetracked them into a hastily prepared aid station while, with a strident voice and commanding gestures he kept the unending procession moving across the bridge, out of the way of men and vehicles moving south. Throughout the Manila campaign, Chico combined the best feature of aid man, traffic cop and dental technician, as he accompanied the regimental aid station and dogged the steps of Major John Gallen, the regimental surgeon. Only those who were genuinely sick or wounded received attention of that self-appointed arbiter. Chico was consequently cited by the regimental commander for, "exemplifying the highest traditions of his people in his courage, his devotion to duty, and his ability".

I remember crossing that bridge with its unending stream of civilians moving north. One of my battery mates was severely wounded by a mortar shell soon after the initial crossing.

South of the Pasig River

In those times the city south of the river surrounding Intramuros was more open-wide avenues, parks, large public buildings. The infantry found less cover, but we could use the artillery more often. The enemy was making his last stand. The mining of streets and open areas, the fortress-like barricades of the large buildings, and the use of heavy weapons far exceeded what had gone before. There were homes, schools, and churches, but the enemy favored defending public buildings. The General Post Office, Paco Railway Station, City Hall, Legislative Building, Agriculture Building, were all fortresses that had to be taken room by room before the area east of Taft Avenue was secure. Homes were burned, and civilians bayoneted and used as shields by the defenders. Our medics were swamped. The Philippine General Hospital and the University of the Philippines lay across Taft Avenue. Our troops had reached the bay below the hospital and had turned north thus completing the trap around the defenders.

The enemy had crowded over seven thousand civilians into the hospital complex; Americans, Europeans, and Orientals. Again the infantry had to get in by hand, before the defenders had time to turn on the civilians. It was touch and go under heavy fire through mined areas, but the people were rescued. It took several days to clear all the buildings; some were eventually destroyed. Other sites such as the post office building did not have civilians interned; hence, could be attacked with heavy artillery before the infantry went in, thus saving many lives. Those buildings with their cemented windows, sandbagged approaches, heavy weapons, surrounding mine fields of 500 pound bombs, and pillboxes in the hallways were indeed fortresses. They had to be demolished to get the enemy out. The University of the Philippines was pretty well destroyed.

All of the foregoing was but the preliminary to the final job: the taking of the walled city, Intramuros. While our infantry were cleaning out the General Hospital area, the 1st Cavalry having cleared out the eastern regions of the Manila area had swung around the south of us and had worked up along the beach taking the Manila Hotel, thus completing the encirclement of Intramuros. The moat area around the walled city had long been filled in and served as a golf course. The walls were about thirty feet high, medieval Spanish in design. The enemy had guns placed everywhere along the walls, pillboxes scattered throughout the streets, tunnels under the streets, trenches, barbed wire, obstacles, mines, tons of ammunition, and civilian prisoners held in strategic places. How to get him out? There was a weak area in the north wall facing the river. Across the river we placed artillery wheel to wheel and fired point blank into the wall area destroying the wall and making a ramp from the water to the top of the rubble. At the same time heavy shelling destroyed the north gate area in the east wall. As soon as the walls crumbled the 129th Infantry was boated across the river. They ran up the bank and rubble and were inside the wall before the enemy could react. At the same time the North Gate was entered by the 145th. Again it was building by building with Fort Santiago as the climax. Again, it was, "Get the civilians out." In the first six hours about 2000 were removed. The Cathedral was one of the defended points. As the infantry entered, about 200 refugees, mostly women and children accompanied by nuns and a few priests, came out, all part of the delaying action. Fort Santiago fell rather quickly, but in one of the dungeon-like ammunition rooms the bodies of 600 Filipino men were found, five layers deep, their bodies partially burned. Today a sign stands at the entrance to the dungeon, testifying to the event.

Three buildings remained just south of Intramuros: Legislative, Finance, and Agriculture. These were probably the strongest built modern earthquake proof structures in the city. Admiral Iwabuchi with seven hundred men were holed up in these, the most defensible in the city. The open park land around them was heavily mined. The 148th, the 1st Cavalry, and many corp units participated. Since there were no civilians, artillery and all possible weapons were used. Still the enemy had to be cleaned out room by concrete room. An attempt was made to get the enemy to surrender in the Legislative building. Our Nisei members spoke to the enemy by loud speakers during a ceasefire, but no enemy came out. The Finance building was next. This time 22 enemies came out, a record. Later, an officer and an enlisted man came out, but the man was picked off by one of his comrades. The destruction and fall of those buildings ended the battle for Manila.

The enemy lost 16,664 men of which the 37th accounted for 13,006. The 37th lost 461 men out of 3732 casualties. We bore the brunt of the city fighting, yet, at the time I remember tuning in the news from home on short wave and all one heard was how those dismounted horsemen were fighting in the streets. *Time* called us all Marines. We felt that *Time* and the radio people were currying favor with MacArthur and that cavalry sounded more glamorous. *Newsweek* was more honest and accurate. In the years since, I have preferred *Newsweek*.

The men of my division during the Luzon battles were often cited for gallantry in action, the battle for Manila accounting for most. There were five Medals of Honor, 65 Distinguished Service Crosses, 609 Silver Stars, plus over 9000 Purple Hearts and lesser awards.

Professor Spector in his book says that 100,000 civilians were killed out of a population of 800,000. That simply is not true. If one in eight people had been killed they would have been piled high in the streets and we would have all been on an incredible burying detail. It did not happen. Others have called the Philippine operation a needless waste. Hindsight and a total disregard for a starving ill people, or our own citizens, or any humanitarian feelings might cause one to agree. During all those weeks no one ever said to me, "You should not have come". And this time back I still am thanked.

After the fall of Manila my unit moved out to Quezon City, a suburb, where we stayed in empty mansions of a wealthy neighborhood. Soon boys, 10 to 15 years old, appeared and attached themselves to us, running errands, getting laundry done, and giving us excuses to give them food. An odd aspect of the occupation was that a twelve year old boy might be a better bread winner than his father, since adults were watched and their movements restricted whereas a boy could scurry about, barter, or earn a peso. Two boys with the help of a little 12 year old Chinese girl commandeered me. Food was still scarce but increasing and the people and the government were beginning to get things back to normal. We became acquainted with families, shared our food with them, invited them to our movies, and in return were invited into their homes. Friendships developed and an occasional romance. We soon got to know people who, before the war had been of successful middle class business and professional families. The war had destroyed their businesses, some never to be regained. What got to me was the demoralization of the men. For three years they were helpless in their efforts to support their families. They were literally prisoners in their homes or neighborhoods. I talked to those men. They felt emasculated, embarrassed in front of us. Men usually cannot help expressing their air of success or failure before one another. I guess we radiated our feeling of confidence and success since conversations with the older men were usually awkward. A lethargy seemed to prevail as the people slowly recovered.

There were exceptions. I remember one Filipino who, before the battle for Manila had ended was buying, trading, or collecting electrical equipment of all kinds, particularly motors. By the time I met him he had a shop going repairing equipment of all kinds that soon would be needed. Another exception was the father of one of my boys. His cigar manufacturing and exporting business was gone forever, but he was a rock on which his friends and neighbors seemed to lean. That family and I soon became good friends, and we have kept in touch over the years. My first move on this trip was to visit one of the family still living in Manila. He reminded me of the wonderful powdered eggs and dehyd-

rated potatoes I had sent home to his family with his little brother. Their main diet had been sweet potatoes grown in their backyard. I reminded him of the times his mother invited several of us to their home, our first in three years. With little to work with, she served delicious food, on china and linen. Came Easter Sunday, she managed a wonderful dinner. I couldn't believe all that was on the table. I sat at her right. It was good to see a degree of normalcy return to those people. Soon we knew we would be leaving for there were more Islands to take before the war would end. It was a pleasant time: parties, dances, basketball teams, girls, backed up mail, and packages from home. We even wore our chinos and left our weapons behind when out on pass.

Baguio

Baguio, the summer capital, sits a mile high in the mountains to the east of Lingayen Gulf. It is a small city set in beautiful surroundings with green grass and pine trees. The air is cool, a delightful contrast to tropical Manila. In those weeks of early '45 the area was strongly defended by the enemy. At the time of our landing in the Gulf other divisions had the task of driving inland to the east. The 33rd Division had been working east from Bauang and Naguilian and had gone maybe six miles by the end of March.

Our days of rest at Manila were over. The 129th went up first and passed through the 33rd. The 148th followed. Soon our infantry became experts at mountain warfare. The enemy dug in caves on the sides of steep mountains. Nearly every road cut had a cave or two. You never knew what was in them. They might be small or lead into a large room, be empty or full of explosives. All had to be blasted. The going was exceedingly rough; however, we could use artillery to the fullest and we had remarkably good cooperation from air support. I remember the campaign well. We had help from a Philippine unit of Igorot troops and the invaluable assistance of Igorot women working as pack carriers hauling supplies on their backs through the forests up the slopes, never tiring, absolutely fearless in the face of enemy fire. They were incredible little women.

The roads leading to Baguio involve many hairpin turns, steep grades, and breath-taking views. I remember approaching the city. We rounded a tight horse shoe curve in a valley. Scattered all about were the remains of an enemy artillery battery caught by our artillery fire as it was on the move. It looked like a WWI scene. The horsedrawn guns and caissons with their wooden spoked wheels, the men with their paucity of equipment and supplies seemed pathetically inadequate for our kind of warfare. We passed through and by the carnage unmoved, it was an old scene. Then I noticed, in the middle of the horse shoe, a little horse still alive. His legs were spread, his head hung low. His body was covered with little shrapnel wounds. He did not move. He seemed in total shock. Suddenly I felt overwhelmed with pity. I felt a great urge to put him out of his misery with my carbine, but I couldn't shoot from my moving vehicle since across the horse shoe more of our vehicles followed, and I might hit someone.

By the 26th our infantry had swept into Baguio as far as the cathedral in the center of the town where they were greeted by several thousand civilians. We pretty well controlled the area between Baguio and Trinidad, a town to the west.

Meanwhile the 33rd was working its way up from the south. We received orders from Corps: "Back out of Baguio and let the 33rd have the honors." We did; however, the 33rd was greeted by a large sign at the city limits that said, "You are now entering Baguio, courtesy of 37th Infantry Division." It was also fitting that our 129th should welcome them since way back, in earlier square division days, the 129th was part of the 33rd. We had a pleasant stay in Baguio. The evenings were cool, and we wore our jungle sweaters.

While the Baguio affair was going on, our third regiment, the 145th, was on another task. To the east of Manila, in the mountains, near Montalban and San Mateo lies the water shed for the city of Manila. It was essential that the enemy be driven out of that heavily defended region. The 6th division had the task, but was bogged down. On the 15th of April, the 145th was relieved of the job of policing Manila and was sent to join the 6th for what was expected to be a mopping up affair. As it turned out, that "Anticlimax to Manila" was the bitterest chapter of the regiment's fighting history, and for sheer obstacles of terrain and fortified positions it equalled nothing the division ever met. The 145th was given Mount Pacawagan to capture. The usual caves were full of ammunition, heavy guns, and fanatic troops. The mountain sides were steep. All attempts by the 6th against Mt. Pacawagan had failed. The 145th attacked at night led by heavy artillery fire. Then in daylight the mountain sides was blown up cave after cave. By late afternoon the southwest summit had been taken, but the fighting went on for 25 days. The 145th took three major mountains and thus secured the water supply of Manila. MacArthur in an official communique called the 145th struggle the bitterest of the Philippine war.

Soon after taking Baguio, we moved back down onto the plain where we expected to get ourselves in shape for the big one to come. While our recent action was under way, Iwo had occurred and Okinawa was in full blast. The main enemy home islands would be no picnic, hence, it was imperative that our division be reassembled, strengthened, and rested.

When each of our units had left Manila the farewells were tearful. The girls were sure that they would never see their true loves again. We were sent off with gifts of rum and mementoes. My two boys were determined to come with me, no matter where. And when I said no, and reassured the father and sister of one, they were broken-hearted. How could I not take them with me? My last memory of those two boys is of their tearful walking away, utterly crushed. The amazing thing was that we had barely got settled in our new rest areas when some of the girls did show up. Romance knows no obstacles.

Manila Today

On our first morning in Manila we were greeted by my old friend who took us to the office where he works in the Makati area. We were made most welcome by his associates. One had been at Santo Tomas back then and gave us a car and driver for the next day to take us wherever we wished to go. Another found us a delightful small inn nearby where we were warmly treated and got to meet people of different economic levels. One of my friend's first comments was, "Why don't you come and liberate us again? Why didn't MacArthur do for us

what he did for Japan? He went on to Japan and forgot us."

The next morning a young man picked us up at the "Swiss House" and we set out to discover the city. We found Manila to be a metropolitan area close to 10 million in size. Suburbs and open farmlands as I remember are lost to the urban sprawl. I had great difficulty finding points I remembered so well, but major places still stand. Santo Tomas University has grown, but the main building stands unchanged. We went inside, talked with a teacher, looked in on crowded classrooms of 70 students, and felt caught up in the fever for education. Education seems to be important everywhere. There are many colleges, trade schools, church schools, and universities as well as a public school system originally set up by our soldiers at the turn of the century. Everyone we talked to wanted all the schooling he could get. All education is in English. It is a land where Tagalog is spoken but English is the written tongue. Most seem to speak English to some degree and read it well. Tagalog has changed a bit; it has embraced many English words. Manila has more bookstores than I have ever seen in one city. They are full of books, all in English, and well patronized. Spanish remains only in place names and as nouns.

We drove down Rizal Avenue, found the Chinese Cemetery, the Jockey Club, and Bilibid Prison. The whole area is jammed with stores, workshops, and housing. Traffic is heavy and people are on the move everywhere, all trying to earn a living. The northern city seems crowded, the avenues narrow and fewer trees are found. Somewhat like in '45 I found people living in little makeshift shelters between buildings, in vacant areas, under bridges. They are the squatters who have come into the city to find work. Somehow they manage. They cook over a bucket of charcoal and always have a little clothes line up with some wash on it. They are dressed in neat clothing and look healthy. Invariably the mother is selling something.

The squatters come to Manila from the provinces to seek a better life. Making a living is a constant scramble for a large segment of the population. In fact labor is one of the country's exports. We saw long lines at special employment agencies hoping to be sent to work in Saudi Arabia. My old friend in Manila said sadly, "Human bodies are our current best export." We did notice that people were willing to spread the jobs and share the work.

South of the river the old landmarks still stand. The Post Office looks just the same, restored of course. The walled city patched up a bit, but the ruins in the Fort Santiago area have been preserved as memorials. In a way it is a museum. We walked over much of Intramuros. The Cathedral and the damaged gates have been rebuilt.

The Manila Hotel still stands with all its grandeur; MacArthur would be pleased, but it does have a new wing sticking out from its rear. South of Intramuros, the park-like area is still there with many public buildings and colleges. The University of the Philippines left its ruins behind and moved out. The area is rebuilt as public buildings. The Philippine General Hospital is going full blast, more buildings, all jammed. Students of all kinds are everywhere. Taft Avenue with its overhead elevated railway and jammed-in stores and shop buildings is as bad as anything in New York. Many of the street names have been changed.

The area south and east of the old city has been extended for miles. The new developments are modern tall buildings, spacious streets, park areas, fine hotels, department stores and nice residential areas. The Makati commercial

center epitomizes the new. Yet tucked into corners, between buildings, sometimes in plain view, are the little shelters of squatters. We watched one go up in a day on a site where new construction was in progress. The amazing thing is, most of them have a single light bulb, and sometimes a TV set.

Our little hotel on Pasay Road was accessible to all this area. Taxies were abundant, but we often rode the jeepneys. Those highly decorated little buses made on jeep chassis are fast and convenient, also cheap. Twice we rented a car and driver, quite economical. The young women at the desk of our hotel would quickly get us any service we needed. We had many restaurants to choose from: Philippine, Chinese, Japanese, Taiwanese, German, Swiss, and combinations. In the afternoon, after wandering around the city, we would return to our hotel for a San Miguel brew at the friendly little bar presided over by a young lady. Invariably we would meet and talk with local businessmen as well as other visitors. They were always much interested in my mission, and often volunteered help or memories of their own. One man, of German descent, was at Bilibid prison in '45 when we arrived. Our people put him to work on a delivery truck for that bakery unit we had. It meant that he ate regularly, but instead of sitting safely in the rear he was hauling bread to the front line kitchens. He said that it wasn't the enemy troops that set all the fires, but rather the Korean and Taiwanese enforced labor battalions. He should know. He was in the middle of it all. At any rate the fires served the enemy's purpose and spared his own men. We captured many of those poor unarmed labor people in the last weeks of the war. They had our complete sympathy.

At the end of our first day in Manila the young man took us to something I had no idea existed. It was a huge cemetery and memorial to those who died in the Pacific war. Apparently, our government brought the bodies from all over the Pacific for the crosses cover many acres. In the center of that beautifully landscaped park stands a huge circular building that resembles the rim of a large wheel. The building has no sides but is crossed by stone partitions that if extended would be the spokes of the wheel. Carved into those partitions are names of those lost at sea or unaccounted for. The names, from all our services, run into the thousands. Scattered throughout are the names of men who from their addresses are clearly Filipinos. Those stone walls bear testimony to the debt and obligation that our two peoples owe each other. Walking around that rim and gazing out over the sea of crosses I felt emotions I have never experienced before. I stopped at the little headquarters building and spoke to a man who appeared to be in charge. I told him that that park is the best laid out and cared for memorial I have ever seen. He thanked me and said that of all the thousands of visitors who have come over the years I was the first to express such sentiments.

We walked the streets of Manila, rode the jeepneys, buses, and taxies with a complete sense of safety, for no matter where we went, people talked to us, women and children were always about, much safer than in New York. Police were not much in evidence, but every building has a security guard on duty around the clock, at least at the front door. In a way the streets have more protection than other countries. The guards were always friendly and alert. It did not seem that they were necessary, but they were always helpful, would hail a cab, help with luggage, or give directions. The system does provide employment for thousands of people.

Another employment measure that this country could turn to is street sweepers. Everywhere we went, the streets and sidewalks were swept several times a day. Even along the highways and turnpikes people were picking up trash. We were taken to poor sections of the city where the municipal pick up isn't very good, but the trash and garbage was at least swept into piles. Manila is cleaner than Philadelphia or New York, and a certain percentage of its people have sweeping jobs rather than welfare.

I looked for native products that the Philippines might be exporting. An outstanding one is hardwood. We see a bit of Philippine mahogany in the U.S. and it costs less than our own white pine. However, I have not seen some of the varieties of harder woods that I saw there. Stores display beautifully carved furniture made of different kinds of wood. We were guests in a wealthy home of recent construction. The floors were of different woods in elaborate parquet. The panels of the doors were carved, different woods in each room. I met a man at our hotel bar who is in the wood exporting business. Despite costs that are low and would make his products competitive on the world or American markets, he is up against import quotas and other bureaucratic problems. Raw lumber exports easily, but finished doors or other crafted products are a problem. He is shipping semi-finished door frames and the like, but this rules out carved and other pieces that would provide jobs and income for more people. I keep thinking of all the expensive condominiums and the like going up here at home with plain painted doors and walls that could at little more cost have some of the beauty I saw in the Philippines. The people are also good at weaving and fabric working in general, but that activity appears to be only small operations. The bulk of our garments seems to be imported from the Orient. Why isn't a substantial amount from the Philippines? We also saw many examples of fine craftsmanship in metal working, jewelry, and all of the building trades.

I asked about food production. Since the people did not look hungry and food is available at every hand, I wondered if there are surpluses. To get some answers, we drove to Los Baños, about forty miles south of Manila. There we visited the International Rice Research Institute, a university-like place established by the Ford and Rockefeller Foundations after the war, for the purpose of improving rice culture for the world. We learned that although rice production in the rice eating countries has quadrupled, or at least doubled, the population growth had kept pace. The Philippines is no better off. In fact, while we were there the newspapers announced that agreements had been reached to import rice from California since this year's crop is a little below normal. Food for the Philippines, as for most of the world's people, is a touch and go matter. The fishing industry including both fishing the ocean and fish farming seems to provide most of the protein. The exportation of prawns to Japan is growing which is an encouraging sign. Shrimp and prawns are usually the lower priced items on a dinner menu. Needless to say, we ate them every day of our visit. Excellent fresh eggs are always available for breakfast. In fact one sees chickens being raised everywhere. Fresh fruit and vegetables seem plentiful. We drank a lot of mango juice.

We were given figures of 25% unemployment, which I don't doubt since many busy people are really on their own selling cigarettes or fruit on the street.

Their living has to be marginal. In Manila, despite the difficult times, we did not see beggars.

The ride from Manila to Baguio is a pleasant trip of about three hours with a stop for lunch. From the bus window one sees a changing panorama from the rice fields of the plains to the steep mountain sides of narrow valleys. Ancient terraces adorn the sides of many mountains, and as one approaches the city the evidence of gold mining appears. Baguio is a small city, but larger than I remember. We stayed at a small hotel overlooking Imelda Park, about a mile from the center of the city. The cool air blowing through the ubiquitous pine trees was a refreshing change from tropical Manila. Again everyone was most helpful, the girls behind the desk, the dining room waiter who insisted I take ten pesos to pay for our jeepney ride downtown since all I had were large notes, the high school teacher we met on the street who asked if she could help us and wound up taking us into her school where we met other teachers. The superintendent of schools happened to be present. He also was present when we arrived in '45. The two of us exchanged some memories. His parting thoughts were, "Please tell people that we really live quiet lives and our country by and large is a nice place to live." I assured him that I would. We met a young man named Tony who with his car drove us all over the Baguio area and down the Naguilian road to the gulf. Much of the city is given over to parks and many of the streets have a park-like atmosphere. Aside from climbing hills, walking is a pleasure, and we did much. The people seem better off than in Manila. They too have to hustle to make a living but the housing for the poor seemed a little better. Most of the young people seem to be in school, at least part time. Again there are numerous colleges and trade schools. Baguio was created by our people early in this century as R & R place for the military and government people. It remains such for both governments. Camp John Hay with its country club atmosphere has to be the nicest US military post anywhere. The Philippine West Point and various government buildings are all on the city's hill tops. We watched craftsmen producing beautiful silver jewelry. At the Eastern Weaving School we watched women create unusual fabrics. Some of the weavers were Igorot women on primitive looms. The town has excellent restaurants and all kinds of shops and stores. Food seem to be plentiful and cheap. The people appeared healthy except for some old Igorot women who frequent the parks and bus station. They were the only beggars we saw anywhere in Luzon. As I looked at those bent double, shriveled, toothless old women I wondered, "Could these be the same who as young stalwarts packed supplies into combat not many miles from here? The status of the Igorots bothered me. What about other tribes living deep in the mountains?"

My last question remains unanswered. We did not get deeper into the mountains, but returned to Manila to wrap up our visit. During the course of our stay we met many people and talked about the country's problems. My feeling over the years as I watched events in the Philippines and our government's behaviour is that really our government just has not given a damn. Most of our congressmen probably hardly know where the islands are.

On February 28, 1945 General MacArthur gave an address upon re-establishing the Commonwealth Government in Manila. His closing words were, "Your country thus is again at liberty to pursue its destiny to an honored position in the family of free nations. Your capital city, cruelly punished though it

be, has regained its rightful place — "Citadel of Democracy in the East." I have faith that during the coming elections the Filipino people will honor those last six words.

Despite our government's lack of real interest many Americans feel differently. We met an American by chance on the street in Baguio. He, as a sailor in our navy, had spent eighteen months in the Philippines right after the war. He has since then felt drawn to the Philippine people, and now that he is a retired college professor, he has come back. He was travelling about the Islands looking for a place where he could best serve in some way. He feels that he has come home. We met a young man on furlough from our navy who was spending it travelling about Luzon, his fourteenth time. He feels at home in Manila. One afternoon at the bar in our little hotel in Manila we met a man who after seventeen years in our air force and with the rank of brigadier general quit because he could not face another search and destroy mission. He felt that he must do something of value to human life. He was drawn to the Philippines where he has a close feeling for the people. He is working with an organization and his job is to develop low cost energy devices for the people from sources such as wind, sun, water. He was experiencing problems with the government bureaucracies not with the people or nature. He wondered if I could understand his attachment to those people and why he was doing what he was. I said, "Yes I could." I think about the many people down at the Rice Institute who come from many lands. It has to be a bit more than an interest in rice culture. My own feelings over the past forty years have not been changed, only reinforced by this visit. As our visit progressed I noticed my wife beginning to catch some of that feeling of attachment. She mentioned once that maybe after she retires from teaching we could do a year in the Peace Corps together in the Philippines. I didn't say no. The real reason behind all of these expressions of feeling goes back to my statement at the beginning of this narrative: the Filipino people are the friendliest on earth.

EPILOGUE: FRIENDS WE NEVER KNEW

Once with two friends, I climbed a Luzon peak, too small to appear in book or on map. Its conical sides were so smooth and steep that we often used hands as well as feet.

Sentry to a line of mountains that stood by a valley flat and wide, our mount looked north and south a hundred miles, and eastward, across the plain, it saw another distant range.

Perched up in that void, we heard no echoes or no noise. Words we spoke leaped away so fast that if a speaker turned his head no one could understand a word he said.

We huddled together on that eerie
tip, and as our gaze swept across the scene
we saw villages, farms, trees, and a stream,
miniscule and distant as in a dream.

Like a huge set the land below us lay,
a chess board of fields, demarked by roads
on which even sharp eyes could barely see
tiny vehicles creeping northerly.

We Olympians sat above that stage
whereon men played their destinies.
Unable to direct or change a line,
aloof, we watched them play in pantomime.

Suddenly! brilliant flashes spewed from those
silent toys, tanks engaged in deadly duels.
In thirty seconds the skirmish was done.
No narrator told us, "Who lost, who won."

Then, with a roar, the battle in our ears
replayed. Gun blasts from all those bright flashes
pounded about us, then cascaded on
another thirty seconds and were gone.

Stunned, our eyes fixed on that final scene.
Three pillars of black smoke from three bright pyres
rolled upward a mile into the blue
marking exits of friends we never knew.

STUDIES ON THE PHILIPPINE EAGLE: A PRELIMINARY REPORT¹

The Philippine Eagle Research and Nature Center (PERNC) is located within the Mt. Apo National Park at Upper Baracatan, Toril, Davao City. Although it lies within Davao City, it is 40 kilometers from the city proper. The Center is 1000 meters above sea level. It occupies an area of approximately one hectare just inside the National Park.

Studies on the Monkey-eating Eagle were started in 1963 by Rodolfo B. Gonzales under the guidance of Prof. Dioscoro S. Rabor who alerted the world to the Eagle's plight. Further Eagle conservation momentum was generated in 1965 when the Eagle was officially recognized as an endangered species at a conference in Bangkok, Thailand. In 1969 the Monkey-Eating Eagle Conservation Program was established. The program flourished under the guidance of Jesus B. Alvarez, former Director of the Autonomous Parks and Wildlife Office and now Assistant Director of the Bureau of Forest Development; Prof. Tom Harrison of Cornell University and General Charles Lindberg. Robert S. Kennedy who came in 1972 also displayed much interest in the program and was one of its first researchers.

In 1977 the Films and Research for an Endangered Environment, Ltd., (F.R.E.E.) filmed the life history of the Eagle and lobbied for the "Monkey-Eating Eagle" to become the Philippine Eagle in 1978. Robert S. Kennedy returned in 1980 armed with Project 1531 IUCN/ICBP, the finished F.R.E.E. Ltd. film, "To Live and Be Free" and considerable funds to add impetus and guidance to the now Philippine Eagle Conservation Program (PECP). When Kennedy left the program in 1983 he left Ronald E. Krupa, in-charge of the Eagle Project. Krupa was formerly the breeding project initiator in 1977 under F.R.E.E. Ltd. and breeding project manager under Kennedy.

Facilities for the eagles consist of three large breeding chambers and various holding cages. A one-storey house and office accommodates the project's staff and provides basic facilities for visitors wishing to stay at the Center. The house has complete cooking facilities with electricity supplied from a generator. Power generated at night at the same time charges a D.C. battery which provides day-time current. Water comes from a natural spring above the Center which feeds a holding reservoir leading to the breeding chamber's bathtubs and providing the house's water supply. A fishpond by the house supplies supplemental food and serves as a swimming pool for the more adventurous visitor.

To accommodate the extra captive Eagles that were handed over to the PECP, three cages were built in 1983 using native materials: round timbers for the skeleton; split erect bamboos, zigzag bamboos, and rattan for walling. Nipa palms were used for roofing. Two cages are single unit quarters for two birds: Junior and Pith-a. A permanent cage consisting of six compartments was later

¹This article is a condensation of two Annual Reports:
R.E. Krupa, D.O. Tadena, F.A. Andrión, M.R. Caleda, and R.E. Lewis. Philippine Eagle Conservation Program, First Annual Report. Davao City, 1984.
R.E. Krupa, D.O. Tadena, F.A. Andrión, F.B. Te, and N.R. Ingle. Philippine Eagle Conservation Program, Second Annual Report. Davao City 1985.

constructed. The compartments are open-sided except for the connecting walls between them. These walls are made of corrugated iron sheets, isolating the birds from one another to control any intra — and inter-specific aggression. A small window in each wall allows limited visual contact by the birds between adjoining compartments but without permitting physical contact. The chamber facilities are regularly refurnished and maintained for the coming breeding season. Non-eagle related improvements include repainting the house/office quarters and landscaping to enhance the surroundings.

The Philippine Eagle

The Philippine Eagle (*Pithecophaga jefferyi*) is a giant forest raptor and the primary predator of the Philippines in which it is endemic. The Eagle has a narrow highly-arched bill behind which are piercing grey-blue eyes beneath distinct eye ridges. A facial mask is formed of blue grey skin pock-marked by black pin feathers. The crown displays a crest of long lanceolated feathers. The back, wings, and tail feathers are colored deep brown cast with a reddish hue and margined in white. The chest of white flows down to the thighs, while the thigh feathers are finely streaked brown. The legs are scaled in yellow, the powerful talons resembling scimitars of ebony. The wings span nearly two meters and the total wing area is known to be the broadest among birds of prey. The eagle's body can tip the scale of six kilograms, while its height registers at about one meter.

The eagle preys on a wide variety of forest species including the monkey. No documentation of it preying on domestic livestock has so far been recorded. Dominant forest trees on steep mountain slopes are the preferred nesting sites; the nest itself is usually an epiphytic fern.

Forested habitats within the Philippine Eagle's known range are mostly fragmented, separated on all boundaries by large tracts of open land. These forest fragments make up a sizeable mosaic configuration on the large islands of Luzon and Mindanao. There are few forested fragments remaining on Samar and Leyte. The Mt. Apo National Park in Mindanao is the largest protected habitat fragment for the eagle in the Philippines with a total forest area of approximately 50,000 hectares. The estimated territory size for a pair of breeding Philippine Eagles ranges from 60 to 100 square kilometers. Accordingly, the Mt. Apo National Park can hold from five to eight breeding pairs.

The eagle produces one egg per cycle, rearing one offspring every two years, but it can lay yearly should the previous year's attempt fail. Incubation lasts 60 days; most of the duties during such a period being attended to by the female, while the male provides the food. The eaglet fledges in about 150 days and becomes independent in about 18 months, the parents presumably "pushing" the juvenile out of their 60-100 square kilometer territory.

The act of removing nestlings from the wild for use as reproductive subjects in captive breeding programs is a controversial subject, but for the Philippine Eagle the removal is justified for many reasons. Although the native habitat of the Philippine Eagle is still at "carrying capacity" throughout most of its known

range, the available nesting habitat zones are becoming increasingly restricted. There exist remote "belts" of lowland habitats for the eagles to nest but an increasing percentage of nesting eagles are being forced into very narrow and receding lands around the lower margins of crown forests found atop mountains in very secluded habitat regions. The altitudinal limit of the species' nesting range is not known but a pair was found nesting at about 1400 meters. It becomes increasingly clear that a large percentage of eagles are being pressured to accept abnormal nesting habitat areas. This places undue stress upon the bird populations in these restricted zones, a factor which could in turn alter the eagle's reproductive capacity.

Assessment of Eagle Areas

The following discussion is an appraisal of the areas visited by the PECP fieldwork team and the projected plans for these areas.

Kalian. Thrice during the 1984 breeding season, teams were sent to locate the new nesting site of the pair of eagles spotted in this area. The nest is believed to be situated farther up the valley, but whether the pair had successfully bred was not ascertained. Illegal farm clearings are steadily encroaching on the nesting valley of the eagles. Despite the fact that the nesting ground lies within the Mt. Apo, no protective measures to safeguard the nest and its surrounding areas have been noted. Somehow, the PECP's presence in the area has served as deterrent to further encroachments on the nesting valley by area residents. (It would be very helpful if the BFD personnel could accompany PECP personnel and help persuade the people to stop cutting trees in the nesting valley).

Paper Industries Corporation of the Philippines (PICOP) Concession. For lack of proper equipment, among other reasons, no team was sent to PICOP as was planned for October, 1984. A team was sent in late April 1985, but the result of this trip gave no indication as to how the previous year's breeding fared. There was no sighting and no report received. It is likely that the pair successfully fledged their 1983-84 offspring, which event could have precluded any nesting attempt in 1984. Because of the deteriorating peace-and-order situation within PICOP, security measures have intensified, and this hinders PECP activities within the concession.

There are indications that PICOP may reopen the area to logging. Hence, during the breeding season, a team should be sent to monitor the nest valley. If eagles are still using said area for nesting activities, the nest tree should be pinpointed so that when logging operation commences within the valley, the PICOP management can be notified by the BFD authorities for the proper implementation of the rules and regulations concerning the protection of the Philippine Eagle's nesting site. The PICOP nest is the only known and presently monitored nest within a logging concession.

Mt. Libadan (Mt. Talibasbas). This is a severely depleted forest area still inhabited by eagles. The uniqueness of the situation in which an eagle territory

is located in a deforested area will provide for an interesting research study on the adaptiveness of the bird under severely deprived habitat conditions.

Lagonglong. After the release of the eagle "Kys" in the mountains of Lagonglong, peace-and-order situation deteriorated to the point that the PECP/BFD research team was not allowed by armed groups to enter the area. The situation was made all the more difficult by the existence of three different groups operating within the same study area. The PECP team negotiated with one group to be allowed to work but was forced to "lend" equipment. This "tax" could not be tolerated by the PECP hence, work had to be restricted to safeguard personnel and equipment. The telemetry study has not produced the expected data because of the erratic schedule of data-gathering.

When the peace and order condition stabilizes, an intensive educational/awareness campaign should be conducted: a) to make the people aware of the PECP's conservation campaign and how it relates to them, b) to help locate possible eagle nesting zones, and c) to establish eagle population status within this mountain range.

Allah Valley Watershed Development (AVWDP). The AVWDP still retains a good virgin forest which probably supports a healthy population of eagles. The birds have been frequently sighted in some areas of the AVWDP and two nests have been found. One eagle was captured when it ditched into Lake Sebu. This was later released back to the wild with a radio transmitter attached to its tail.

The nest area lies within a remote section of the Allah Valley Watershed and is the only nest that appeared to be used in consecutive breeding cycles. Access is difficult, involving a hike over rough terrain. It is sparsely populated by T'boli natives. This means the nest area retains a good chance of remaining undisturbed. The site should be spot-checked during the breeding cycle.

The AVWDP site makes an ideal Philippine Eagle study ground for intensive habitat analysis and other biological assessments. It is strongly recommended that this area be sustained as a watershed, and that specific wildlife sanctuaries be developed therein. Such sites can be delineated for further ecological work carried out outside the watershed. The AVWDP is also a relatively safe area to work in as peace-and-order conditions have remained stable.

Some Morphometric Data

When handled, eagles are measured using the methods described in King (1975). Physical measurements are nearly complete for all captive Philippine Eagles and for the two eagles released back to the wild with radio transmitters attached. Measurements are recorded for sex determination and medical records. Eagles are measured whenever caught or retrieved from whatever source for medical treatment. Weights and temperatures provide information about the bird's condition. Measurements are taken by at least two personnel — one to hold the bird and the other to measure and record data. The instruments used are Vis and General calipers for culmen bill length and tarsus width; Butterfly brand tape measure and a metric straight ruler for tarsus length and circumference, wing chord, tail length, and total body length; a rectal Celsius thermo-

meter for body temperature; and a Homs 10 kilogram spring scale for body weight.

The female Philippine Eagle is normally larger than the male; sexual identification from visual examination can be supported by body measurements. In some cases, however, positive identification cannot be made because the eagle is in the grey area of size. Additional measurements from new captives will provide a better understanding of sexual characteristics. The measurement of the tarsus appears to be the most useful in sexing a Philippine Eagle. Body weight is likewise useful for sexing, although the eagle's physical condition must be taken into account.

From temperature readings taken of the birds (usually during an illness), there appears to be a diurnal fluctuation of about 10°C in body temperature: the morning temperatures being usually higher than those taken in the evening. Such is unusual. Diurnal cycles are known in raptors with the highest daily temperature occurring in the afternoon.

Some Preliminary Findings on Moulting

The population of captive Philippine Eagles remains unchanged at ten birds: four females, five males, and one unknown. Available data on individual birds indicate large variations of moulting habits. The birds seem to undergo an extremely irregular moulting and as yet there are no significant correlations as to the factors governing the times and rates of moulting.

For three birds -- Junior, Thor, and Jing-jing — there are some preliminary results. These results were made possible by the relatively large number of feathers collected from the tail of these birds. The number of feathers collected from Junior and Thor may be a result of their psychological state as imprint birds. As such they suffer relatively little stress from living in captive conditions, thus, allowing a more "normal" moult to occur.

JUNIOR

(Male imprint, 3 years old)

Junior arrived at Baracatan in April 1981 as a fledgling. He arrived with tail "stubs" only. The tail had been cut off by his captors while it was still being grown. Over the next few months, while still small, he moulted these stubs as well as "pinched off" some new feathers, but by the end of 1981 he had grown a full set of tail feathers.

In June 1982, he began his tail moult again. This took one year to complete. Although a full set of tail features was not available, it was assumed that a full set was moulted as the old set showed similar heavy fading while the present tail features are all of uniform shade with little fading. It cannot be ascertained if the right side of the tail was moulted symmetrically with the left.

THOR

(Adult female, about 16 years old)

Only two primaries were collected in 1981. Most of primaries seem to have begun in earnest in 1982 and are assumed to be still in progress but probably nearing completion. The tail moult began in mid-1982 and is not yet complete. For the secondaries, since 1981, a total of 26 (maximum of 30) has been collected suggesting a moult of secondaries during a period of two and a half to three years.

JING-JING

(Male Eagle, age unknown)

Jing-jing exhibits some kind of psychological stress which manifests itself in the form of tail biting and pulling. Jing-jing has never had a complete tail but at various times was observed to bite off his tail feathers. When the snapped feathers were collected and studied, most of it were bitten off at a distance of one-third to one-half feather length from the base. The feather stubs at the base cannot always be found. As yet, it is not known whether or not, when the tail feather snaps off, the base that is left is moulted within a short time to facilitate new feather growth. The fact that there is never a complete tail suggests that the base feathers stay in place for a longer length of time and are not necessarily pulled out. Newly-grown feathers are sometimes "pinched off" usually at around 30 centimeters length (the full length is about 50 centimeters).

Medical History

Five eagles that showed signs of illness underwent diagnostic investigation from 1983 to mid-1984. Individual sterile cotton swabs were inserted in the throat, glottis, and cloaca. Each swab was manipulated to collect fluid material from each orifice, after which, the swabs were placed in individual sterile vacuum tubes for transport. Fecal material was collected only for parasitology. Blood was collected from one live bird, but the blood sample did not figure significantly in any diagnostic assessment.

Samples were transported to diagnostic centers located 40 kilometers from the PERNC on the same day of collection.² Three birds succumbed to a viral disease in 1983. Two of these were subjected to a full necropsy in an attempt to determine the specific causes of death, the effects of the disease upon vital organs, and to gather data for future reference.

"Johnny Kid," a Grey-headed Fishing Eagle (*Ichthyophaga ichthyaetus*) died on June 27 1983. Findings indicated the probable cause of death to be

²The methods employed by the laboratories to analyze the samples were requested for this report. No animal laboratory facilities are available in Mindanao for diagnostic work; hence, the techniques used on the samples tested were those developed for humans.

avian tuberculosis or *aspergillosis*. Since no laboratory tests were performed, the results are inconclusive.

The most significant findings so far came from the case of "Philip", "a Philippine Eagle that underwent full necropsy after euthanasia, and the analysis of "Mao," an imprint owl (*Tyto capensis*) that became ill the first day after its confinement at the PERNC. Both had identical gross findings of white necrotic lesions in the oral cavity and each had been confined in the same holding facility prior to the onset of illness. The findings suggested the infection to be mycotic in origin.

The holding cage of "Philip" and "Mao" was the suspected source of infection of other raptors that were acquired by the PECP before 1983. The other raptors that were similarly infected included a Philippine Hawk Eagle (*Spizaetus philipensis*), a Grey Headed Fish Eagle (*Spilornis holospilus*). The holding cage and site were not immediately abandoned for the following reasons: a) funds were inadequate to construct another holding facility, and b) the disinfection of the suspected facility after a death and the subsequent introduction of an incoming captive with no ill effects had misled the staff to believe that they had resolved the problem.

After the deaths in 1983, the cage was torn down and burned on the site of construction. A perch system was worked out, and by using falconry techniques, birds were staked out in the open.³

One factor that could have contributed to the occurrence of the suspected mycosis is the high humidity (average 90-95%). The said environmental condition found at the PERNC favors the growth of pathogenic fungi in the soil and surrounding structures. Birds under stress and with low resistance can readily develop an environmentally-borne mycosis. On the other hand, birds in good condition are generally not susceptible to infections, though they may harbor the pathogen and hence, pose a danger by being carriers. Such a situation could pose a threat to the wild population in the area.

Water can be another source of infection. PERNC water supply comes from an underground spring that surfaces and empties into a concrete reservoir just above the project's location. The water is free-flowing with a good turnover rate. Water samples which had been sent to the Ministry of Health for analysis were found to contain *Klebsiella species* and *Citrobacter freundii*. These organisms have likewise been isolated from some of the captive eagles but there is no evidence of any significant role these microbes might have in the birds' illness. Humans, other animals, the food stock, and an array of different elements, could all harbor infectious organisms and be transmitters of disease.

It was suggested by international experts to retain all captive eagles. There is a concern that captives may be potential carriers of infectious diseases that can contaminate and endanger the wild population. Such an event, however, is believed to be quite unlikely.

³The PECP planned to release two of the latest captives added to the PERNC collection, Jag and Dawan but refrained from doing so because of lack of funds for monitoring releases, medical problems with both captives, and an inability to conduct a proper survey of release areas. In the case of Dawan, threats were given to personnel by the former holders of this Eagle. A return to that area was considered dangerous.

Until the problems are better understood the PECP will not consider releasing captives unless circumstances indicate that a captive is a wild-breeding adult. Other options for captives must be considered. A free-living bird will likely retain instincts for wild survival. Select, rehabilitated, and disease-free captives could be seeded into a previously extirpated forest fragment that now contains all elements necessary for reestablishing a new population. Or they could be released into a forest fragment containing a wild population to enhance the wild population's genetic viability.

It is clear that wild eagles are becoming increasingly vulnerable to capture. The eagle as an ecological health indicator tells us that its forest biotope is not wholly suitable for its survival. This is an ominous message.

Feeding the Eagles

The Bureau of Forest Development Office (BFD) allocates a budget specifically for the Eagle's foodstocks and it also takes charge of purchasing the food for the Eagles. The feeding regimen provides for the eagles to be fed on alternate days during the off-breeding season. When the breeding season begins in September, sexually active birds are put on a daily feeding schedule. Food requirements have been determined based on the formula of Kirkwood (1981):

$$F = MEm + D$$

Where F = food requirements kg
 MEm = metabolised Energy
 D = (ME value of diet, Kcal/g)

For a male of four kilograms, the estimated food required is 190 grams of chicken per day. For a female of five kilograms, the estimated food required is 220 grams of chicken per day.

Kirkwood points out that this should only be used to estimate baseline food requirements, higher food intake being needed for such activities as moulting (which is highly irregular in eagles, occurring throughout the year) and development of breeding condition. The estimates then, are modified according to observations of the behavior of the eagles. If the bird appears extremely hungry it is assumed that its weight is too low. Subsequently, the food intake is increased.

The eagles are fed a diet of chicken, rabbit, and occasionally, snakes and guinea pigs. Local chickens are bought from nearby barrios and towns. Sometimes they are hard to find, resulting in short-term delays in the feeding of the eagles. The said method of acquiring the eagle's food also poses some dangers. Firstly, it is possible to get chickens that are diseased. One measure that the PERNC staff have come up with to minimize the said danger is the evisceration of all chickens before feeding. Any fowl that is found to have internal and external abnormalities is not fed to the eagles. Secondly, since the chickens are free-living and rural-raised birds which are allowed to roam around farms where they occasionally feed from pesticide-sprayed fields, many of them are contaminated with pesticides. It is suspected that this kind of diet has been responsible for the thinning of the shells of the eggs laid by the captive birds.

As part of the development of a foodstock program for the captive eagles,

a rabbit farm was started in 1981. This program was started to provide the birds with disease — and pesticide-free food. The farm provided a continuous supply of rabbits which were fed to the eagles alternately with chicken. This rabbit project began when the Rotary Club of North Davao donated funds for a small rabbitry in September 1981. Jacinto Uchang, the former caretaker, was sent to the Mindanao Baptist Rural Center in Bansalan, Davao del Sur to attend a one-week rabbit-raising seminar and to purchase 12 rabbits (10 does, 2 bucks). The rabbit farm was initially built at the caretaker's residence, about three kilometers below the PERNC, under the agreement that he would be the owner of the stock once all expenses (including initial cash outlay) have been recovered by the profits from the rabbit sales.

The first rabbit shed was built in November 1981. This had a capacity of 34 hutches, one rabbit per hutch. Two rabbit sheds were added, as the stock increased to three times the original size.

A problem arose when the caretaker decided to move his residence. Money donated in May 1984 by the Rotary Clubs of North Davao and Toril was used to move the stock and to build a new shed 500 meters below the PERNC. At the same time a new caretaker was trained. Thus far, only one shed (34 hutches) has been built. All the sheds are built from locally-supplied materials using round timber for the frame and nipa leavers for roofing. However, special materials (screen, wire, plywood, good lumber) had to be purchased for the hutches and nesting boxes. The three original sheds were built by the previous caretaker while the new shed was built by local carpenters on a contract basis.

In 1984, the eagles were fed only 14% foodstock. This was due to the 16% decline in the program-produced rabbits. The decreased production of the rabbit farm started when the stock was transferred nearer the PERNC. The rabbit population had to be culled owing to reduced housing facilities for the animals. Disease problems for the rabbits also started cropping up. The infection was *coccidiosis* which causes fatal inflammation of the liver and stomach. Young rabbits were much more vulnerable to the disease. The disease had broken out three times. During the first outbreak, it was thought that the rabbits had come into contact with the disease through an intermediate host, chicken mites. In the second outbreak, 80% of all the young rabbits died, mature rabbits moulted their fur and pregnant females aborted. During the latter outbreak, rabbit pellets were suspected as the source of the infection; however, laboratory tests failed to confirm this. Even when the pellet supply was eliminated another outbreak occurred, almost finishing off the remaining young. Presently, the rabbits are given antibiotic as a prophylactic.

Meanwhile, expansion plans to fulfill the birds' nutritional requirements do not seem possible at the time. Hence, at present, a dietary supplement containing dicalcium phosphate, vitamins D and E, and mineral is added to the meat fed to the breeding pairs at the onset of the breeding season in September to December. Birds that are fed every other day are rescheduled to daily feeding to reduce intraspecific aggression that occurs when eagles without food have visual contact with those that are eating. The birds without food attempt to get at the ones which have food.

A Historical Index of the Eagles

Djola was captured in February, 1969, at the age of about six weeks and has been at the PERNC since July, 1971. She was paired with Diver from June 12-23, 1980, and, from June 23, 1980 to September 25, 1982, with Muslim, whom she seriously injured. It was then that her sexual relationship to her caretaker, Goneforte Culiao was hypothesized and subsequently tested. This surrogate relationship proved successful.

Thor has been at the PERNC since April, 1974. Her aggressive behavior towards Bader, her chambermate from May 12 – June 1, 1980, suggests that she may be imprinted to humans.

In May 1981, while still a fledgling, Junior was captured in a logging concession, kept caged for two weeks, and then brought to the PERNC. His captors had cut off his tail feathers while they were still growing, and these were all pinched off and moulted by the end of 1981. He moulted a set of tail feathers in 1982-83. The moulted feathers collected were obtained from two moulting periods: one in 1982-83 and another in 1984-85. The first feather moulted from a juvenile eagle is usually smaller, both in length of feather and of emargination (with the exception of left primary number 6 in which the older feather moulted is slightly bigger).

Pith-a was about 17 days old when she was taken from the nest on January 3, 1984. Since then she has been in custody. She is being developed as an imprint to humans.

Pith-a's physical and psychological development was closely monitored from January 3 to March 14, 1984, at the PECP Office, downtown Davao City, and from March 14 to May 31, 1984, at the PERNC. The data included food intake plus dietary supplements, undigested casting materials, behavioral development, some miscellaneous physical characteristics, and growth measurements.

Pith-a's first year "casting" of undigested material occurred on January 20, 1984 and this weighed 50.5 grams. The smallest casting recorded during the eaglet's growth period was 9.8 grams and the largest was 75 grams. The longest interval between castings was 12 days, between January 30 and February 12 and between February 3 and 25, 1984. A minimal amount of casting material was given during these long intervals. The average interval between castings was 5.27 days.

From the day Pith-a was removed from the wild nest on January 3, 1984, a good part of her formative life was spent inside the Davao Office. During the day a couch served as Pith-a's aerie and at night a sizable basket of 90 centimeters by 30 centimeter replaced the couch as the nest. Branches with leaves, formed the base of the nest inside the basket. An airconditioning unit controlled environmental conditions. Sunlight through a glazed window furnished diffused daytime light. At night, fluorescent ceiling lamps lighted for office work, seemed to have no ill effect on the developing eaglet. Pith-a was under a 24-hour surveillance during this time.

Pith-a was moved to the PERNC by motor vehicle on March 14, 1984 travelling inside the nest basket. On arrival at the center, she was placed inside a newly-constructed native-material aviary, in which was prepared a nest platform elevated 127 centimeters from ground level. Pith-a fledged from this plat-

form on March 21, 1984. Specific behavioral traits emerged during the continued surveillance of Pith-a. Each response was recorded as it occurred for the first time.

Pith-a's dark contour feathers were already emerging at the time of her removal from the nest in January 3, 1984. On January 8, 1984 color charts were used to determine Pith-a's soft-part colors. The bill color registered between 146-basic olive green and 147-auxilliary olive green; eye color registered 78-plumbous and legs and feet color registered 56-straw yellow.

It was important that non-essential handling (grabbing, physically forcing a limb open) of the eaglet was kept to a minimum. For this reason, only those measurements that could be taken with little physical manipulation were recorded at convenient time intervals. The exception was weight development, which was recorded daily from January 3, 1984 to March 13, 1984.

Weighing Pith-a was accomplished using three techniques, which were dependent on the capacity of the scale used. The first technique involved placing Pith-a inside a prefabricated box, which was weighted on the Ohaus triple beam balance scale. Later, Pith-a was carefully hand-lifted from the basket into the box and weighted first thing in the morning. The box was placed on the couch nest and Pith-a would scramble by herself out of the box onto the couch. The second technique involved tying the box corners with a sturdy twine. The box with the eaglet would be dangled from a Hons Model 20 instrument and laboratory type spring scale to ascertain weight. The third technique involved sewing the nest basket with twine and dangled again from the Hons scale to get the weight. For each technique, the weights of the box and the basket were subtracted from the gross weight to get the eaglet's weight.

Sporadic measurements were recorded for tarsometatarsus length, metatarsus circumference, and middle-toe length. Tarsometatarsus length measurements were determined using the technique described in King (1975). For metatarsus circumference, a string was wound around the smallest width of the matatarsus then this was dye-marked at the point of the string-end intersect. Middle-toe length was measured from scute number 15 (out of 17 scutes scales) found from the claw base to the lower ridge of the undivided scute fold to the end scute line before the emerging claw.

Pith-a is the first recorded Philippine Eagle to be raised under captive conditions. The information gained from this eaglet's development to maturity will help in determining pertinent nutritional requirements, growth characteristics, and miscellaneous behavioral and physical traits as references in the future rearing of this species in captivity. In later studies, it will be possible to determine sex from specific aspects of our acquired data. More importantly, behavioral abnormalities can be checked and corrective measures applied to limit if not eliminate any emerging problems. Should wild nestlings show maladaptive traits, intervention and life-saving techniques could be applied and probable causes of nestling mortality identified.

Jag was caught in March, 1984, after he crashed into the sea 50 meters offshore. He was kept leashed to a bamboo cross beam for a month before he was brought to the PERNC on May 5, 1984. Jag had a series of illnesses from May-August, 1984. He recovered though.

Dawan also crashed into the sea. Dawan's sex has not been ascertained.

It was first kept in a 3m x 3m x 1m cage in Davao Oriental for 3½ months. Then it was brought to the PERNC on March 11, 1984. All its moulted and collected tail and primary feathers were damaged in the cage in Davao Oriental save for the short outermost primary. This made identification of the primaries difficult and of the tail feathers impossible. Dawan acquired a mouth infection in March, 1984, and fractured its left fibular/tibia in February, 1985. It recovered satisfactorily from both problems.

Some Behavior Patterns of the Eagles

Like any other kind of organism, eagles exhibit characteristic patterns of response to changes in their environment. A behavior pattern may start in response to a definite external change or it may originate from internal stimuli. From hours of observation of both wild and captive eagles specific behavior patterns have been identified:

"Nest-building" is the act of arranging sticks, springs, and other materials into a nest. The related activity of randomly biting, pulling, or picking up nesting materials without any attempt to arrange them is termed "stick-play."

"Food transfer" is a courtship behavior in which the male leaves food on the nest, which the female then eats. Food transfer started in October and ended by February. It started later this year than it did last year.

"Brooding" is that in which the bird lies prone on the nest. The purpose of this could be to form a bowl in the nesting materials.

"Incubation" is sitting on an egg and was only performed on the night of December 10, 1984.

Aggression is defined as an antagonistic response to an external threat. Eagle aggression has been divided into two classes:

Type A — Eagle to Eagle

Type B — Eagle to screen/observation window/other objects

There appears to be no clear pattern in aggressive behavior. Although the male is much more active than the female and initiates aggressive incidents, he maintains the more subordinate role.

Chamber 1

This breeding chamber measures 12.2m x 5.9m x 6m. Two walls (one side facing the housing/office quarters) are of corrugated iron sheets while the other two (facing the forest) and the roof are interlink wire. Two nest platforms are provided but the eagles have always used the large platform, positioned near the observation window for nesting. A trap door is situated in the wall next to the nest platform where nest materials (tree springs) are put during the night. In the breeding season, nesting materials are placed on the nest platform every third night.

Food is put through a small hutch at ground level. The food is always divided in half to allow both birds to feed at the same time.

Observations are conducted through a one-way window. Sometimes, the eagles attack the glass, probably due to a combination of some kind of noise disturbance and the effect of the glass on the Eagles. As the mirror reflects

their image, they see another eagle present.

Two types of aggressions were recorded: those between the eagles (Type A) and those of an eagle attacking the observation window (Type B). An encounter under Type A was carefully recorded as follows:

Jing-jing (the male) showed high aggression (eight encounters) against Luyag (the female) in February of 1983 which then declined but resumed during the breeding season (September), reaching a peak of three encounters in October up to the first egg. The frequency of the male's aggressions then declined only to rise again in February 1984 (one incident). After this no more aggressions were recorded. Luyag instigated an encounter against Jing-Jing in January, June, July, and another in October. She showed much less aggressions (in terms of actual bodily contact) than the male. These aggressive encounters are still being analyzed in an attempt to understand the underlying causes triggering the attacks.

Another recorded encounter was thought to be a form of territorial behavior whereby Jing-Jing and Luyag attack the screen as a defensive reaction against a perceived intruder. These encounters are more frequent than intraspecific encounters. Jing-jing attacked the window in January and February only to stop completely in the next few months, resuming in June, and peaking in August. Following this is a rapid decline throughout September, October, and November, increasing again in February through May. Luyag, on the other hand, showed no window aggression until October when the egg was laid. Presumably when she began to stay around the nest prior to the egg laying, her defensive reaction was increased; however, between the first and second egg-laying, she showed no window aggression. In April and May 1984, one and three encounters respectively were recorded.

"Stick-Play" Stick-play was exhibited by Jing-Jing and Luyag during both the breeding and the non-breeding seasons. Luyag began in May and continued until the first egg was laid, beginning again after the second egg and ceasing the activity early in February 1984.

The male stick play began slower than the female but the frequency was much higher (the male peak in September was 117 times compared to the female peak in June 25 times). As with the female, the frequency dropped off at the time of the first egg laying only to peak after the second egg and decline in the New Year.

The male and female showed a similar pattern of stick play but the male's (Jing-jing) frequency was much higher suggesting a much greater time spent on the nest. It should be noted that only one eagle "worked" on the nest at any one time. The presence of one precluded the other.

Nest-Building. Male and female behavior showed a similar pattern to stick play behavior with again Jing-jing (174 times) exhibiting it more frequently than Luyag (170 times). Both eagles, though exhibited much more nest-building behavior than stick-play. After the first egg, the female began to spend more time nest building but the activity rapidly dropped after the second egg was laid.

Incubation. It was observed that Jing-jing never incubated an egg. All incubations recorded in July and September were for bowl formation only. October and November included incubation of the egg itself. Both eggs laid in Chamber 1

were removed while Luyag was still incubating following initial laying. The sudden increase in incubation activity by this female bird is accounted for by the time spent following the egg laying.

Food transfer. The observations suggest that this is not just a one-way process stimulated by the male. During the breeding season when food was placed in the chamber, Luyag became reluctant to go down and feed as she did during the non-breeding season. Jing-jing would go to the ground and feed while the female continued to roost. After feeding himself, he could carry food to the nest platform. Once on the platform, chirping vocals by the female were usually heard which were interpreted as regressions to an infantile type. These are "food-begging" signals similar to those used by nestlings to their parents. The vocals encouraged the male to leave the food for the female. Normally, the female did not come to the platform until the male had left the food and moved off to a nearby perch.

Food transfers as observed in Chamber 1 occurred twice in May, once in July, three times in August, and then rapidly picking up to 11 times in September and a peak of 16 transfers in October. After the egg laying, food transfers rapidly declined ending completely in December. It appears that many behaviors peaked for the October egg laying. Although Luyag physiologically recycled for a December egg laying, there was a decline in breeding-related behaviors.

The above activities show both birds developing behavior patterns which can lead to a mating condition. There was, however, no copulation although Luyag appeared to have solicited copulation a few days before egg laying. Nor was there any observable reaction from Jing-jing. Over the years it was observed that related breeding behavior has increased in frequency while aggression has declined. If the present trend continues, copulation is expected to occur and complete the breeding cycle.

Chamber II

This is the largest breeding chamber (13.3m x 15m x 3m) built around a central tree. In the first fork of the tree, a platform was built and this is used as the nesting area. As with the chamber 1, the sides are enclosed (facing house/office quarters) but this time using white plastic corrugated sheets, while the other two sides (facing the forest) and the roof are interlink wires.

This chamber houses Diola (Female) who is imprinted upon, and has a pair-bond with her human handler, Geneforte "Goning" Culiao.⁴ Some of the behavioral patterns exhibited by the eagle are similar to those observed in the birds in Chamber 1.

Dual Imprinting. The eaglet is removed from its natural parents early enough to disrupt any firm association the eaglet may be developing with its parents. Some members who participate in this experiment assume roles in the "familiar situation" and "become" the parents and later social companions of the birds. When the eagle sexually matures, they assume the role of a mate.

⁴ "Imprinting" is the process of a young animal forming an association with another animal, object, or class of items.

Environmental imprinting is as important as developing imprint characteristics between eagle and man. The eagle must feel comfortable in captivity; accordingly, it is essential to provide the human-imprinted eagle with a captive environment conducive to its development and later reproductive activity. It is important to provide a microsystem acceptable to eagles.

The young developing eaglet has needs which must be attended to. Those who assume the role of parent surrogates mimic the techniques of parent eagles in raising the young eagles. Like all birds of prey, eagles do not understand or tolerate punishment of any kind. They cannot be manhandled. A single mistake, an impatient grab, or hitting the animal can seriously alter the imprint process and lead ultimately to reproductive failure. Physical handling of any sort must be kept to a minimum.

Type A aggression had never been noted between the Diola and her handler. What had been commonly observed in Chamber II was the type B. The said female eagle, showed an extreme reaction to any kind of disturbance either auditory or visual. It is assumed that she is highly sensitive to human disturbance. In her present psychological condition, humans represent an intra-specific rather than an inter-specific threat. On seeing a human outside the cage, she would repeatedly attack the dividing interlink wire walls until the human disappeared. During the breeding season, various forest trails are therefore closed to ensure as little disturbance as possible. Diola's aggression was observed from January through March. None was observed in April but it increased in May and June only to decline over the period of the three-egg layings (July-October). It peaked to 40 attacks in November and remained high in December. This was the period when the female was incubating the dummy egg (made of plaster of Paris.) It was observed to be extremely sensitive to any human disturbance. There was a sharp decline in aggressive behavior in January, 1984, but it gradually increased again in May.

Goning, the human male surrogate did some stick-play in June and July, and this was later on taken over by Diola. It increased to a peak in November and dropped off in January 1984. Since the male human surrogate showed very little nesting activity, limited as he was by the difficulty of a human building a bird nest, the female eagle made up for the shortcoming. Diola began nest-building in June and then maintained this throughout her three egg layings and the subsequent incubation period (July-December), but after she deserted the dummy egg, she rapidly lost interest in any nesting activity.

Both Diola (eagle) and Goning (human) incubated the dummy egg. The first two real eggs were removed immediately on being found. The third egg was replaced by a dummy which was put in the nesting bowl. The female incubated this as a wild bird would and in fact only deserted the egg after 67 days (normal incubation period is approximately 60 days). The human handler simulated wild-type behavior by bringing food for the female and then incubating the egg himself while Diola fed.

Food transfer was initiated by Goning entering the chamber and climbing (a ladder is positioned from the ground to the nest) to the nest with the food. The female eagle would fly to the nest and await him, uttering "infantile type" vocals. Usually, he would hide the food at this point causing an increase in the intensity of vocalizations. Prior to the egg laying, Diola voluntarily overtook her

oviduct and a simulated copulation was initiated by Goning stroking her down the back with one hand and pressing on her cloaca with his other hand to give her the impression of mounting. It was generally felt by the human handler that some stimulation had to be given as appeasement. When Diola solicited copulation and no stimulation was given, she would generally be fidgety the next day. Following is an excerpt from Goning's report of sexual impression with Diola:

Nineteenth of August. A day after Diola laid her second egg for the year, I re-started the ritual of touching Diola's cloaca whenever she solicited copulation which was almost every time I brought in food. With a little difference this time: I allowed three rhythmic contractions or "winking" of the cloaca before I took the pressure of my four fingers pressed over the cloaca. Diola had stopped her light pecking of me which she had been doing before when I allowed only one contraction of the cloaca and immediately removed my fingers. I estimate that for 2-3 seconds the oviduct was overt, closed for a second, then opened up again two more times. After the third rhythmic contraction, I sensed that the bird relaxed physically.

Diola also noticeably ate and solicited copulation less as the day of the egg laying drew near. She actually did not eat nor solicited copulation the day before the egg was laid.

It should be noted that once the food had been given to the female, she would eat alone. The number of "food transfers" was directly related to the number of times the handler entered the chamber. On purpose, whenever he brought food in, a "food transfer" was always effected. Goning began food transfer low in January and February, increased in March, and declined in April. He gradually increased the frequency of food transfer to a peak in October (16 times). Although this is the same figure as in Chamber 1, the difference lies in that all the food transfers in Chamber II were made directly from the male to the female, whereas in Chamber 1, the male brought the food and left it on the nest platform, and subsequently the female ate.

All the behavior in Chamber II indicate that successful breeding is now only dependent on one factor, availability of semen. Even the incubation period of the female on the dummy egg was almost of the same duration as that of a female in the wild.

Concluding Remarks

The eagle as the primary predator of the forest is the best indicator of the overall state of health of the forest environment. Conserving the Philippine eagle by protecting its habitat, the forest, should be a concern for all. It should also be the focal point in environmental education in the Philippines. Most people have yet to understand the crucial role of a balanced environment in the prevention of floods, droughts, soil erosion and eventually famine. In all these, the Philippine Eagle as part of the forest environment, needs to be protected. Now that it is an endangered species, no effort should be spared towards helping preserve the eagle.