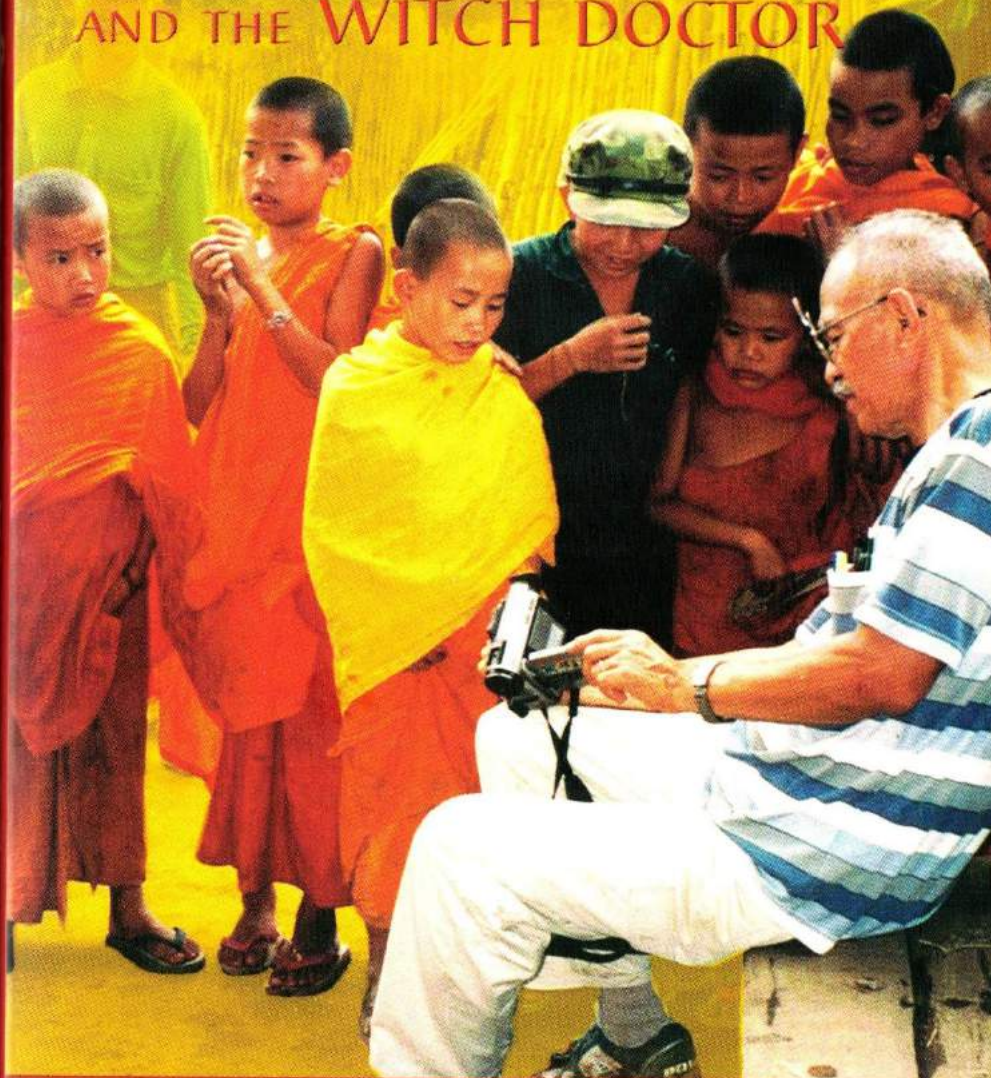


THE PIGEONS AND THE WITCH DOCTOR



ADVENTURES OF A MODERN MAPMAKER
-HENG THUNG-

The Pigeons and the Witch Doctor

Adventures of a Modern Mapmaker



Heng Thung

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Not to forget Professor Storrs Cole, who started it all, and Duncan Campbell, who thought that there would be people who would read about the adventures of his crazy friend “Hank.”

Also, thanks to Hugh Fincher, who kept encouraging me to put these stories on paper and then introduced me to Janice Phelps and her sister Joan, the editors and publishers, who had faith in taking a chance with me and publishing this book of adventures.

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• Preface •

This book is the story of the many people for whom I have worked and those who have worked for me. Those last I called “the pigeons.” I heard that at one time an agency was training pigeons to recognize battleships on aerial photos. This was accomplished by feeding the birds kernels of corn that had been placed atop the images of battleships. After these birds got into the routine of picking the corn on top of the images, one kernel was removed and, in response to the bird’s demand by pecking on the empty space, it was given a piece of corn. Then, by slowly removing all the kernels, the birds would be trained to pick out the images of battleships and be awarded a kernel of corn for a job well done.

The adventures described in these pages would not have become a reality without the help of many people and institutions who have helped me throughout my life and career. Unfortunately, at times I have had to move on without even being able to say thank you.

This book would not have become a reality if my professor, W. Storrs Cole of the Geology Department at Cornell University, did not insist that I write these stories down for my daughters. My eldest daughter befriended him during her studies at Cornell and told him about the adventures she experienced while moving from

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country to country with her father, who was making maps to help in the development of these countries. He pointed out that it would be easy to document my adventures if I would simply narrate the stories to my daughters. So, in essence this book was written for them. Of course, these adventures would not have happened if my wife, Yvonne, had not been willing to sacrifice a comfortable, suburban life and pack up to follow me into the unknown. Then, there was a friend, Hugh Fincher, who worked with me in Laos, and pushed me and found me a publisher willing to take a chance on the publication of this collection of stories about experiences that often occurred as a side show to the real work, which was tedious and boring. To them I owe the publishing of this book.

Of course, my teachers at Cornell inspired me, and a chapter is dedicated to them.

Also, I have to thank all those pigeons who suffered my lectures and harangues to improve their work. So often, they were the people who did all the work, while others of us took credit for their labor. We must not forget that they also were my teachers because, oftentimes, they knew their land best.

There was Joshua, who was my first photo interpreter in Kenya, then several pigeons in Tanzania, from Nicolas to Luhende. The latter received a scholarship and I had to drag him to the railway station so that he could go to school instead working like a pigeon for the rest of his life.

Then, there was the Pathet Lao Officer working for me in Laos . . . he was the best interpreter I had ever had. He was supposed to be the “enemy,” but it was also his country, and the rest of the

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pigeons accepted him as one of them. Now there are hundreds of interpreters in Cambodia, all working toward making resource maps to help rehabilitate their country. Slowly, they are moving toward more responsible jobs, albeit without the remuneration they deserve. Unfortunately, many sank back to the unknown niche from where they came because nobody cared about them in the rush for progress — progress to which they contributed much, without any recognition. They are too numerous to name, yet here and there are some shining stars who moved on to succeed and to carve a niche for themselves.

To see the world was my life’s ambition. At the age of four I scanned my grandfather’s atlas with the many blank and uncolored spots. My mother explained to me that those were the unexplored lands. I told her then that I wanted to be the one who would put color on those blank spots. In fact now, three-score and five years later, I think I have fulfilled that wish.

The Pigeons and the Witch Doctor is, in some way, my thank you to all the people who helped me, with whom I have worked, and who have put up with me.

Thank you.

Heng Thung
February, 2003
Asheville, North Carolina



Professor Belcher at the October 2000 ceremony initiating a scholarship and celebrating his 90th birthday at Cornell University. With him is one of his past student assistants, now Dr. Linda Zall.

1 • A Lifelong Fascination with Aerial Photography Begins

Looking back over four and a half decades as a photo interpreter, it has been a very exciting life. It was a life of traveling all over the globe, sometimes seeing things so far away and documenting land I was never to set foot on. There were no limits and no borders to cross. Aerial photographs have no frontiers. Visits to the actual sites to field check the data, however, took me to many continents: from East Africa to Asia and from the Arctic to the Pacific. It was one hell of a great adventure, although it has not made me wealthy.

My career as a photo interpreter began one midwinter evening in a creaky old classroom of the ivy-covered McGraw Hall at Cornell. A gathering of geologists had invited the famous photo interpreter D.J. Belcher, or fondly called DJ by his students, to expound on the secrets of the Earth from the air. This science was called "that airplane geology stuff" by one famous geologist,

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Professor Charles C. Nevin. To let a non-geologist lecture in their sacred halls was an unusual event, and the lecture was met with great skepticism, a trait of earth scientists, who are certain they know it all.

For a young freshman majoring in geology the images on the screen were like magic. It suddenly seemed that all these wrinkles on the face of the Earth had a real expression. This armchair geology seemed so easy, so logical and simple. It was like flying. The pictures gave a three-dimensional image of things on the ground. It was better than a map. It was like flying on a magic carpet over the Earth.

For me, aerial photography was love at first sight. It also afforded an opportunity of seeing the world sitting in a chair. Since early childhood I had scanned the photos of *National Geographic*, because my grandfather used to be a life member of the Society at the turn of the century. His influence and my fascination with the magazine led to my selecting geology. Actually geography seemed much more interesting to me, but Cornell did not offer a degree in geography. Maybe they would have if I'd pressed for it, but when you are offered a scholarship . . . beggars can't be choosers.

There were two aerial photo interpreters, who were like father and son; I was the last of the generation, like a grandson wobbling on his first legs. One was Donald J. Belcher, or DJ as he is affectionately called, and the other was Ta Liang, who worked with Belcher. While DJ worked in the Pacific locating landing sites of the Pacific Islands for the Allied troops to recapture the route to Japan, Ta Liang helped build the Burma Road into China.

I would have never known about aerial photography if I had

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not attended that lecture during that cold winter night.

I remember trotting over to D. J. Belcher, a famous man in aerial photo interpretation, after the lecture. I asked whether I could enroll in his class.

He looked me over and said: "Why not?"

"I am a freshman," I said.

"Why not, come and see my secretary."

That I did, my career was determined, and I began a relationship that lasted a lifetime.

For three years at Cornell I flew an imaginary airplane as I looked over the aerial photos in class. Everything seemed so easy in this introductory course. There seemed to be no limit to expanding the horizon, until the next series, when we were told that the Earth was not as simple as we had been told in the course before. There were different seasons, there were different climates, it could have rained just before the photos were taken, or it could have been dry for a long spell. The land, which was so simple to understand, had many secrets. Yet, perhaps aerial photo interpretation was not exactly what I had expected. After all, it was not such a breezy course, when you were called on to identify the granite hills from the drumlins, and the lake beds from the flood plains.

It took some time to sort out the differences and then to wrench the secret cover of Mother Earth, but in the end she gave them to you. It was important to know the rule: that you only interpret and that your interpretation may not be the very truth. You needed to touch the ground and see whether it was what you thought it was. Field checking was sometimes necessary, unless you

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had seen thousands of samples so that things looked familiar. It is like having a library of images stashed away somewhere in your memory. Although DJ claimed that few people have the sixth sense and the fourth dimension; I guess he had it, and perhaps I had a little bit of it, too.

The advantages of aerial photographs are that you can cover large areas and distant countries in a short time. You can identify objects, buildings, and landscapes without setting foot on the ground. The secret is not in the photographs.

The great wisdom given by DJ is that the first thing you do in analyzing aerial photos is to make a run to the library and read all about the area you are studying. It is an error to think you can recognize everything on the ground from the aerial photos alone. Other people may have touched the ground before or seen little parts of it and then described it in detail within books. You can try to locate these descriptions and use them as keys to expand the area to be mapped.

It is by looking and studying thousands of photographs that one comes to know much of the Earth's surface.

In the aerial photo library of Cornell some hundreds of thousands of photographs are stored. Many a heritage of the work of DJ when he assisted General MacArthur in the Pacific and Korea. There were pictures of New Guinea, the Solomon Islands . . .

There were thousands of other photographs of the hundreds of projects he worked on, from Baffin Island in northern Canada to the tropical central highland of Brazil, where he located the site of Brasilia. (That Brasilia was a failure is not the fault of the analysis,

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but the fact that President Dutra of Brazil failed to build a road first and flew every piece of material by air. It was a great idea, which turned into an economic nightmare from which Brazil is still digging itself out.)

The real story about the art of aerial photography lies in the memories of these great people. It was such a privilege to work with them. It was a journey through the planet Earth, where the masters tell you about the land below. They pointed out the little things, the little anecdotes about these places to make them remain in your memory. It was a lucky thing to work alongside these living libraries who had explanations on their fingertips. Four years of this exposure was like gaining the knowledge of a lifetime.

But I would really not have chosen the career if my advisor in geology, Professor Nevin, had not refused to allow me to continue graduate school in geology without one year of experience in the field. In 1959, he told me he was not sure that I wanted to be a geologist, but he had observed my obsession to study "airplane stuff," as he called it. He said then that it was something of the future, and if I wanted to continue this work, and if Professor Belcher would take me, he would give me his recommendation. So, I embarked into the field of aerial photo studies at one of the few universities in the world, which, at the time, granted a degree in this field.

Instead of the casual relationship of listening to the professor three times a week, I ended up living, breathing, and examining every single aerial photograph in Cornell's collection. The end result was my thesis on the aerial photo identification of diamond pipes, which was a project DJ was working on. So, I saw South Africa from

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the air, the land I read about in the books of the Boer War by Penning. I read again about the diamond fields of Witwatersrand, and many others. I saw the images of the desolated savannah covered by grass with a row of trees indicating a fault line, because it stored some of the water in the cracks.

I learned from the lectures, but I learned a thousand times more when I was working as a teaching assistant, sorting the photographs and making laboratory sets for the students. We had to be right and there was hell to pay if we did not have the proper answer. This intimate teaching environment was a rare opportunity for any student. It meant having a real mentor like in the old days of Socrates, when students were disciples. Because some forty-five years ago I wandered into a lecture that fascinated me, I now have to give tribute to my teachers.

I was even more fortunate, because there was not only Belcher, there was Ta Liang, and then Arthur MacNair, the photogrammetrist. I admired them and just about kissed the ground they walked on, until one day Ta Liang called me in. He said to me that it was really nice that I admired my professors, but that is not the way toward progress. It is a great flaw in the Chinese philosophy, the precept that "father knows best." The fact is that over-deference meant that there would be a decrease of knowledge, a degeneration of it. I had the great opportunity to work under a few talented people; I should learn from all of them, and collectively they should provide me with more knowledge than one of them alone. He told me to stop following the Chinese philosophy, and start being myself.

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All my professors in the field of aerial photographs were civil engineers. Their specialty was building roads, dams and the like. For that reason they specialized in the physical environment, of which the land-form analysis of Cornell University is one of the most famous concepts. It has often been copied and often derided by many a geologist and geomorphologist. But to this day, it is the only system that can be used to train a variety of students and scientists alike to study land forms with a minimal background in geology.

Land forms might have been a vast and interesting subject, but to move out from under the shadow of the giant trees, my three professors, I needed to find another niche. I found it by accident, when a professor in rural sociology became interested in aerial photo interpretation for measuring sociological values. One famous professor was interested in applying it to the measurement of the sociological order of the rural villages. While this exercise was interesting from the point of academic studies, it was not very practical. As it was, however, it opened up a whole world of possibilities in rural development and population census, tools that I applied in the following years. It was such fun to find new applications for this simple method.

I ventured from the shadow of the great trees and carved myself a little piece left by these great men, and had a good time doing it all the while seeing the world we lived in.

2 • The Art of Aerial Photo Interpretation

Aerial photo interpretation remains an art, in spite of all attempts to give it a scientific aura. The science of collecting the photos or imagery has advanced very rapidly, and now it is possible to see many things previously not witnessed by the human eye. But to read the face of the Earth requires more than just science. Maybe it is not really the problem of man himself trying to be able to see and explain what he sees, but maybe it is his environment, which keeps its ever-changing prerogative.

This land, our Earth, as we look from higher and higher perches, appears to become more like an atlas with continents and seas, with forest, land, mountains, and with rivers snaking over the landscape. These images are familiar scenes from our daily vision. We zoom in and we zoom out, and soon familiar sights are slowly fading and the colors seem to change. Soon the colors sparkle like dots of fireworks brightening the sky. Lo and behold they *are* dots; we call them pixels and millions of dots create a picture. Now we

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can mix them and turn them around, shake them, multiply them and you name it. A whole array of computers can make a pretty picture out of these little dots. Suddenly our drab little world of greens, grays, blues and whites become images of red, green, yellow and purples and all the colorful array of the rainbow.

Our scientists are now telling us that the green trees are red and the brown soils are gray or blue. It is a totally different world from the days when Mr. Gaspar Felix Tournamond in 1858 ascended a balloon to take the first aerial photograph of the little village of Petit Bicetre near Paris. The old grainy pictures showed clearly the houses along the village streets, but there was no doubt that we could recognize the scene below.

Taking pictures from a balloon became vogue. It was not that we did not like airplanes, but at that time the Wright Brothers had not yet made their famous flight, an event that was to change our attitude toward Earth in many ways.

It was not until World War One, when soldiers got hold of the idea of taking pictures of the enemy lines, that aerial photography became more than just an adventurous hobby. It was serious business, and during World War One the art of taking pictures became fully established as a way of looking down into the neighbors' backyards. In the years after the war we were satisfied to fly over and peek across the rooftops to take photos of scantily-clad pretty young things lying in the sun to change their delightful fair skin to a brown tan. Now-a-days we do not peek into backyards, but we take pictures of huge chunks of real estate belonging to the other "tribes" across the border or even across the oceans. This art has become very complicated for all of us, and at times a sobering endeavor. The "Spy in the Sky" became the nickname of those involved in aerial photography.

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Whatever peeking we do seems to be something someone else does not like, even though they are peeking down at us; that is until this looking down becomes great business. Little planes become bigger planes. They go higher and higher. Soon it is not high enough. Rockets and satellites circle the Earth, looking down on all of us. It has become crowded in space; there are so many little and not-so-little vehicles streaking along the dark sky in the evenings, passing each other at lightning speed.

With all this looking down on the Earth a whole community of scientists came into existence. Their business was to study all those colorful images. Some of these reveal the bountiful resources of the Earth; while others draw us scary pictures of the destruction of the environment. Others scanned the images for strange activities in neighboring or distant states and nations. One does not have to be a gutsy pilot anymore, who wings away and dashes across continents to click away with his camera to record the scenes below on rolls of silvered plastic, photographic film. It is now mechanical peeping Toms that send arrays of signals to Earth, making pretty pictures on a TV screen.

People sitting in nice air-conditioned rooms, and those working in little cubicles, are what the public likes to think about this secretive world of remote sensing. They once scanned the pictures in black and white, but now the scenes are documented in amazing colors. It seems that everybody likes to see trees in red rather than green. It may have started with those guys in World War Two, who thought that changing the colors of healthy trees allowed them to see the tanks and canons underneath. True it was a success, and we used to call it camouflage detection, or CD film for short.

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Soon, they discovered that dead trees appear the same as sick trees, and so we could determine the sick orchards from the healthy orchards, and from then on it seems that people seem to be infatuated with the analysis of a world turned red. Give me some natural color, to which I can relate, like green is green and yellow is yellow. Looking at the world in a different color is like speaking another language and I am too old to learn all these conversions.

Many eyes became crossed from looking through those stereoscopes. In the old days we read simple aerial photographs using ten-dollar stereoscopes. I still have the one I bought when I took my first aerial photo course in 1956. Well-worn and beaten down, it still works. I used to say: "Have stereoscope, will travel." Now photo-interpreters require special reading glasses, because they stare too long at TV screens.

At one time there were just a few guys who had the brains to interpret aerial photographs. Some claimed it was the eyes, but others claimed it was a sixth sense; they could feel it and not just see it.

One of those famous interpreters once ask me to look at a small black spot on an aerial photo. It was the size of a pin hole. I was not even sure whether it was part of the image or maybe someone had just splashed some water or developer on the paper in the darkroom. Perhaps a fly was so uncouth as to leave his dirty message behind. Of course it was not a fly dropping and not a spot from a careless darkroom technician. It was a diamond pipe somewhere in the midst of the savannah in South Africa. I guess it was

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not the eyesight, but the interpretation, that separated the men from the boys.

Looking at three-dimensional aerial photographs is a great substitute for flying as you are sitting in your easy chair behind a table and do not get air-sick, although a few people have been known to have a bit of a headache in the beginning, and some cannot adjust to the stereo vision as their brain refuses to cooperate with their eyes.

If you look around in your grandfather's attic or at a flea market, you may see some funny eyeglasses or that look more like scuba-diving goggles. There should be a stack of those brown-faded double pictures nearby. Usually they show scenery like Niagara Falls or simple caricatures of people or pictures of mountains. You may not at first know why you need to have two pictures, as if one photo was not good enough; but if you have ever looked through a View-Master with fascination, you will understand why we have two eyes instead of one, to judge distance. It gives you three-dimension, thus a depth to the image.

It was great to look at aerial photographs, skimming my eyes over mountains, lakes and forests, seeing villages and meadows, seeing ancient cities and dense jungles. I was like a balloonist floating quietly over the land . . .

These days I am not sure that the work of photo interpretation is as it once was. The glamour is gone. Cities look like gray blobs, villages as smaller gray blobs, the forest is red and bare lands are in all shades of gray and blue. It seems so hard to recognize the world below. I once saw Mount Everest in its glory on stereo aerial photos.

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Perhaps we may be going backward in science, but forward in gathering information.

In the end it is the man behind the machine and the man behind the stereoscope. It is not what we see, but often what we know. Maybe in the race for technological advancement we have failed to recognize the weakest link, namely, that human beings with our intuitive cognitive capabilities are difficult to replicate with a computer.

3 • A Quarter Million Little Pictures

People talk about remote sensing as if it is something sinister, some mysterious technology. The fact is that it is a technique designed to make the interpretation of aerial photographs simpler, for it is really a lot of work to interpret hundreds of photos. Once I was going blind looking at mile after mile of arctic tundra and evergreen forest: the corridor of the famous Alaska pipeline; before me was a two-foot stack of photographs. First, they were on my left side, then the piles became even, then the stack grew on the right. For hours, it was tundra, clay and sand, then more clay and permafrost everywhere, photo after photo and days on end . . .

There is very little glamour to real aerial photo interpretation. Today we play with the keyboard of the computer, changing colors and hoping that these will turn out to be significant. After twenty years, we are still tweaking the imagery to force the Earth to release some more of its secrets.

A QUARTER MILLION LITTLE PICTURES

Most remote sensing today is for the purpose of mapping resources, to monitor the environment. Thirty years ago, when the first Earth Resources Technology Satellite (ERTS) was launched, it was magic. We promised the world that we could map and, therefore, rapidly monitor changes in the landscape. But, thirty years later, the Earth's resources have been exploited by other technological advances. The environment has degraded to a point that it threatens life on Earth, in other words you . . . and me.

When my telephone rang one day years ago, at Cornell, I had no idea I was going to work on one of the most advance technologies in remote sensing, then called simply multi-spectral aerial photography. Previously, I had complained about a few hundred photographs. I did not know what I was in for. A year later we were to have a quarter million little pictures on 70-millimeter film. It was simple economics that led us to use these miserable little photos.

There were seventeen cameras in the experimental plane. Twelve pointing downward, cutting the spectrum in eight different narrow bands, four with differing focal lengths rotated in different directions hoping to discover that you can see other things under these varied angles. One large camera went through a half circle trying to do the same thing these other four little cameras were doing. I could swear that the airplane almost shuddered when these twelve shutters went off simultaneously. Sometimes we would not have twelve because some of the cameras would balk and the shutters got stuck or in some cases somebody had simply forgotten the lens cap. It does happen.

There were no push-button systems twenty-seven years ago.

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We experimented, eye-balled and documented scientific measurements to see whether we would obtain good results and whether these could be replicated if we were successful.

Until then I never realized how different the world looked in the various spectral bands. In some, you could see the objects as clearly as day, and in others they simply vanished. For every scene we had twelve identical pictures. That means that twelve identical cameras with different film and filters took photographs of the same scene, of the ground.

Many of us think that we can make the Earth a simple phenomena, where all the grasslands look the same, and all the forests have the same color. The wheat fields should be different from the corn fields, or the corn fields should be different from the barley. The large acreage of the U.S. Midwest seemed to promise that there was a chance to get all this land-use mapping settled, and with a lot of manipulation the reflectance, or colors, of the world tend to cluster together.

In the tropics, however, where we did our experiments, most of the fields are small and varied. It seemed that it was just like a leopard skin, even worse because many of the dots were multi-colors.

We took pictures in the morning, in the evening and during the middle of the day when typical human beings in the tropics tend to take a nap. We took them in the tropical rain, during the dry season and when the weather does not know how to turn. It was not that easy, because land that was green in the rainy season turned brown-yellow during the harvest and brown when the rice was harvested and ground was bare. It was white again when the dry

A QUARTER MILLION LITTLE PICTURES

dust settled on everything. It was all the same spot, but it was constantly changing during the different seasons.

The land looked different from one angle and showed a different hue when the sun was setting. It did not seem to us that the Earth was a simple thing. It had its whims and it had its changes. Therefore, to look at satellite imagery now, we have to know so many things because today we can only use color to identify things. The stereoscopic photos showed three dimensions, which indicate shapes. The resolution gave us patterns and indicated the texture of very small things. Today the color, or tone, confirms what we could once see easier in the three dimensions of the stereoscopic photos.

Then the process of identifying these features on the stereoscopic photos took some work. A quarter of a million frames, or about twenty thousand sets of twelve pictures each was tedious, to say the least. Day in and day out, we looked at the rice fields, rain forests, clay, buffaloes, houses, and also our targets. After some months of this same monotony the pictures became a blur.

Some of the photos were the same and other were not, and basically we found that we really did not need all those cameras and four would suffice. As it turned out, later the satellites required reducing the number of cameras from twelve to eight — eight to four was even better for everybody concerned.

When we were through with our research we realized that there were at least twenty-seven variables that could seriously determine the differences of the same surface of the Earth. With the entrance of computer-aided image processing (manipulating the colors of the objects), the game was changed and we were able to rectify some of

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the variances, but in the end there were still too many changes. For that simple reason, there have been very few remote sensing mapping projects that proved successful operationally, meaning the maps were able to be made automatically using computer-generated images of large areas or entire countries. It is still the image interpreter, the old photo interpreter, who saves the day and makes sense of the maps by eye-balling that which the computer failed to do.

What we see is not necessarily what is. Not only are the physical aspects of remote sensing variable, but often the land below is affected by human occupants. They have the habit of changing the landscape.

4 • Going to the U.S.A. (1956)

I was on my way to the interior of Borneo, when I received a cable, which told me that I was awarded a scholarship to Cornell University and to report as soon as possible to the United States Information Office.

My first inclination was not to report, for I was about to embark on an expedition as staff photographer for a trip on the Mahakam River with Dr. Kostermans, the famous botanist — a young man's dream. I had a container filled with the trinkets I was going to trade in the interior. I had dreams of being a famous traveler.

It was not so easy to go to America. In those days we had to obtain permission to travel abroad. First, I needed money to pay for my ticket because the grant did not have any travel funds. But Mr. James Brandon had received a cancellation of a scholarship and transferred the funds for my travel, a Fullbright travel grant. That settled, he suggested to Dr. Kostermans that I should go into Borneo alone for two months and then leave for school, so that I had the benefit of both. They arranged that I was to come back from the interior of Borneo in a dugout canoe. However, the

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bureaucracy decided I could not go because I had a private grant. Since I could not get my travel papers, Jim told me to wait in Jakarta for this issue to be resolved.

I was prepared to choose the expedition over America, but I did not go. Dr. Kostermans decided that my education should come first. He told me I was too young to make the decision and therefore he was making it for me; I was off the list. I was upset and sad. America did not really appeal to me as much as the adventure traveling to the jungle of Borneo and visiting the Dajaks, the head hunters.

I was given some money by my dad, who, although at first upset about my leaving, in the end perhaps decided it would be better not to have a son close at hand who would quarrel with him every day. I thought he was going to miss me. My great-aunt Tan Tjoen Lee gave me three hundred fifty dollars as a starter kit. She thought I was the greatest kid in the world. She also gave me the address of one of her husband's friends, the Chairman of the Canadian Pacific Railway. I never called him; maybe I should have. . .

An old suit of Dad's was cut down to size by a friend of the family, and I also took my dad's old jacket. It was not in fashion then but would be now. All the goods I took with me fit into a small cardboard suitcase.

I was given a letter and schedule and told how to travel to Bennington College in Vermont. I was also provided with a thick air ticket and twenty-five dollars in two ten-dollar American Express traveler's checks and five singles. That was all I had in the world. The rest of the money would come later.

GOING TO THE U.S.A.

When the day arrived, which was August 1, 1956, the whole family gathered at the Kemajoran International Airport, a shack with a veranda. Mr. Brandon was there to see me off and took a picture that was sent to me later. I waved goodbye to everybody and climbed into the plane. In those days you could see people off easily, and they were waving at me from the open veranda.

I strapped myself in and pretty soon the plane took off. I was already engrossed in my travel and did not feel any sadness at all. I guess I was a born traveler. I looked out at the people and sat back. It was the first time I had sat in a plane. It was one of those big four-engine Lockheed Constellations of KLM. That was the beginning of a trip that has never ended. I am still traveling.

Bangkok: 1 August 1956.

In those days we did not fly nonstop. The first stop was Singapore, where we refueled, and then went on to Thailand. I ended up at Don Muang Airport late in the morning. It was not much of an airport then, but I sure remember the large restaurant. There was a circular restaurant at the north end of the terminal building. The airline put me in a rickety old bus, and off we went to downtown Bangkok. We trundled down Paholyothin Road; a narrow road with rain trees along the side and the *klong* (canal) on both sides, from which the soil was dug to build the road. They dropped me off at the old Princess Hotel; it was not much from the outside, but was rather comfortable inside. There was no air-conditioning and there were double doors to keep the noise out. Everything was colored green.

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I met a professor of Southeast Asian studies from Texas, who treated me to my first ice cream soda. I had a long chat with him. He invited me to visit him, and I accepted not realizing that Texas was on the opposite side of the country from Cornell.

I wandered round the area that was New Road and Silom. It was just a small road then, but there were already souvenir shops. I saw the Nihlo silverware, but did not think much of it compared to the silver from the towns of Makassar and Yogja in Indonesia. I hung onto the money I had. In those days everything was paid by the airlines, including meals and hotel rooms.

The bus came to fetch me in the evening. Again, I was the only passenger. I was to catch the plane coming from Karachi as the plane I came on went back to Amsterdam. When it arrived I got back into this cavern, and off we went to Manila to pick up passengers and refuel. They were always refueling the plane. I did not see much of Manila as it was raining, and we were there just a couple of hours while the baggage and the new passengers were installed. Then we took off to Tokyo.

Tokyo: 2 August 1956.

I really do not remember much of Tokyo, except that I was dumped into a very nice modern hotel. There was a wide avenue. Here I spent the first part of one dollar to buy two beautiful peaches.

The rest of the time I walked around looking over the neighborhood near the hotel. In the evening, I was brought back to the airport. This time we changed airlines and airplanes. It was one of those famous PAN AM Globemasters, which had two floors.

GOING TO THE U.S.A.

Honolulu: 2 August 1956.

We had crossed the dateline, and so I got an extra day. I slept until we got to Honolulu. There I spent the rest of my dollar on a hot dog, one thing that looked familiar.

I was picked up to leave in the evening for San Francisco. The only real excitement came when a first-class passenger invited me to the lower deck to see the Golden Gate Bridge on arrival. Unfortunately, it was shrouded in clouds. I saw it thirty years later, though, when I drove through San Francisco.

I still remember being picked up by a volunteer of the Institute of International Education. There were half a dozen of us who arrived in that same plane. The volunteer was a beautiful, black-haired green-eyed girl. She took us all to lunch at a cafeteria. It must have been the university's. The food looked so strange. I decided to play it safe and selected the same items she was picking. She turned around and looked over at my tray and asked whether I liked that stuff. I said yes. But I did not know she had a diet menu of salads and cottage cheese. Horrible!

Then the whole group of foreign students followed her into her car and went to visit the sites of San Francisco. All I remember was that we visited the radio tower, but after that it was a blank. I guess I fell asleep in the back of the car. The next thing I remember was being woken up at the airport and sent off with many good wishes toward Bennington. However, the flight first landed in Detroit. I waited another few hours and then got into a milk run, landing first in Buffalo, New York, then in Rochester, Syracuse, and finally I arrived in Albany.

I had my instruction sheet to take a taxi to the Greyhound

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terminal in the center of town. I had an argument with the taxi driver, who was going to overcharge me. I knew it because the instructions were very clear and stated the fare. I almost pulled out my big hunting knife, not realizing that I could have ended up in jail.

After getting my ticket, I had another wait for the Trailways bus to take me to Bennington, Vermont, a place I have fond memories of and until today still have friends from those bygone days. It was a nice ride, and for the first time I saw the countryside. I was so amazed about the wooden houses, not realizing that most of the houses in America were made out of wood. At home, most respectable houses were made out of brick and stone, although our own house was a simple wooden house. The houses in America were just like the cottages we stayed in when visiting the mountain resorts in Java and were called bungalows.

After two hours through the winding road from Albany to Bennington, I ended up in a small bus terminal. It was amazing that forty years later, when I came for a reunion, the same structure stood there, unaltered. Next to the bus station was a large Victorian guest-house. Mr. Raw, an elderly retired gentleman, was recruited by the school to function as the reception committee. He was waiting for me at the door of the bus, and took me up the stairs to his guest-house and fed me dinner. At that point I was barely awake.

Then we had a taxi ride to Bennington College. I checked in and was taken to my room, which I shared with a tall Mexican student. I was asleep in a wink, and was told that I did not wake up until morning . . . two days later.

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So that was my travel to the United States and to Bennington, my new home away from home for a while. It was there that I met Mr. Parry, who took care of me like a father.

We had a very interesting program designed to help us adjust to life in the United States. We had been very privileged students in our native country, but had to be taught simple things like how to run a washing machine. We watched TV for the first time, and we learned how to handle a knife and fork the American way. Then, we watched the election campaign. We read American history and received lessons in English to prepare us for college.

The people of Bennington were gracious hosts. They invited us to their homes to share dinners and help wash dishes. We went on trips around Bennington and visited historical sites. It was a real vacation and a treat.

At the end of five weeks, a family invited us to stay in their home so that we could really experience family life in America. A Finnish student, Reijo, and I were invited to stay with the McCulloughs. We had never met them before and were curious as to who they were. We decided to check out the house beforehand and found this huge house sitting in the middle of a park along with some other buildings. We followed the stone wall that surrounded the property, for miles, and decided that we must have been given the wrong address. We were later told that they lived in the small farmhouse next to the mansion.

We later learned the McCulloughs were the richest people in town, and that Mr. McCullough's father had been the governor of the State of Vermont. A highway was named after him. The farm-

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house turned out to be much larger than it first appeared from the outside. There were about half a dozen bedrooms on the second floor with private baths. The McCulloughs lived on the ground floor.

Our first dinner was a bit formal. We appeared in our Hawaiian shirts for dinner, while our hosts were in an evening gown and suit. We froze in the doorway, but were waved in. Food was served by the maid. We soon realized that we were not experiencing a home stay with a typical American family. Still, the McCulloughs were the greatest hosts. When the time came to say goodbye, we assembled back at Bennington College and bid farewell to our fellow students who would be scattered throughout the U.S. We had reunions twenty and forty years later and some of the hosts joined us, too. We remembered the wonderful town and its people who welcomed us into their homes and hearts. The McCulloughs remained special to me. After I graduated from Cornell, I was told by the foreign student advisor that the McCulloughs had written to him four years earlier guaranteeing my education if the need arose.

This was the beginning of my many travels and adventures.

5 • Oil Exploration in Pakan Baru Sumatra

(1960)

I landed at noon on the airstrip of Pakan Baru in Central Sumatra, the lonely outpost carved out of the jungle by Caltex Pacific in its quest for oil. After four years of civilization at a U.S. college and two months roaming through Europe after graduation, it seemed that all fun came to an abrupt halt. Work!

The weather was hot and moist, red lateritic soils everywhere and the jungle just at the edge of the runway, although paddy fields reflected some effort by the residents to carve out a living.

The old silver DC 3 airplane, a relic of World War Two, rumbled to a stop in front of a shack and the cargo doors swung open. Below me among the crowd stood a casual-looking fellow smoking a pipe. He would be my supervisor for the duration of my stay in Sumatra. He was a good teacher and made sure that I learned the ropes involved in being a petroleum geologist, transferring me from one type of exploration to another, so that by the end of the year I had gone through one of the best practical training courses in the oil exploration business. I started with drilling, because that was a good job for single men. Those who were married stayed at the headquarters sharpening pencils rather than slugging through the mud.

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"Welcome!" my boss said with a big smile. His expression betrayed his thoughts: I have the next victim to send into the jungle.

I looked around and tried to see whether this place was even livable. It seemed barely so. There was not even an airport, unless you considered the shack at the edge of the "runway."

I walked down the rickety steps and shook hands with my welcoming committee.

"Do you have your field clothes with you?" he asked. On my affirmative answer he replied, "Well, get it together . . . we have a Land Rover for you ready to leave for the field. You are to replace the geologist on site at the Sebang Well Number 3."

It was a very no-nonsense welcome, and I was to learn that checking in at an oil company does not take much time. They really believed in the concept: time is money. It took me about thirty minutes to go through the whole procedure.

I was assigned a Land Rover, but would have a driver with me on the first trip so that I wouldn't get lost in the jungle. There were not many road signs.

I received a slip to go to the commissary with the instruction that as a geologist I could requisition any food that the shop could supply for my stay at the well site. Anything I liked to eat, anything I thought I needed. I realized that in the exploration of oil the companies spoiled their geologists. After all, they were the ones who found the oil, and the rest of the employees were there to support them in their quest for this precious black gold.

So, I proceeded to get my supplies in the well-stocked commissary, and off we went into the wilderness of the flooded lowland of

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Drilling a stratigraphic well in the jungle of Sumatra

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Sumatra. It was marshland from one end to the other, and only the dry, red hills stuck out alongside the road. Ironically, these hills were the oil domes sticking out above the swampland.

I was to remember this road forever. It was a winding road of red laterite soil, just stabilized with oil fresh out of the nearest well, slippery in the hot sun and slippery when it rained. I was taught later how to maneuver under these conditions, but I was glad that I had a driver showing me the tricks during this first trip.

The road stayed on top of the ridge and therefore snaked through the landscape. The gullies were very steep and deeply cut into the tropical red soil. At both sides, the trees stood straight and tall like bars of a jail cell. For some people it seemed to be a jail. One night, I was told, one of our staff disappeared in the jungle, because he could not stand life in the camp, although it had all the modern facilities imaginable. The search for him began, before a tiger could get him. He was shipped back to the States.

The road became less winding and eventually we ended our journey on the swampy lowland. The road was built on logs, which were laid down on the soft wet soil, and then layers and layers of lateritic soils were deposited on top of these logs. These were called "corduroy roads," as the parallel ridges of the logs were still felt through the road surface. At both sides the jungle was growing back and reaching down to the road. Ferns were already crawling along the edge of the track. The day was getting late, the canopy of trees closed over the passageway, and a little bit of sky was visible between the treetops. It was like traveling in subdued twilight.

We arrived at the clearing and found the oil rig situated in the middle of a muddy pool. The lights seemed like a Christmas tree. It

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was a strange monstrosity in the middle of the jungle. Equipment was scattered all over the place and two trailers were stationed at the edge of the clearance. One of these would end up as my home for the next three to four months.

I received a rousing welcome from the geologist on site, who was glad that his replacement had arrived and happy to be on his way home. He took me into the trailer, which had all the conveniences: kitchen, refrigerator, and couple of bunks. There were desks to work on, and I knew I would spend months staring through the microscope that was on the table, identifying rock samples to determine the rock strata we were penetrating to find the oil-producing layer.

"The first rule of working for an oil company is to forget what you learned at school, except to use it as a guiding principle," was the start of a two-day transfer of the work. "The rest is in these guidebooks of the company, which you should follow closely. It is very simple, and you will know all you need to by the time I leave."

I thought I had gone to college to become a geologist. Well, he exaggerated it a bit, but when it came to procedures he was right. They were the same, however, but with a different format, which was much better than the ones we used at school. Things had improved since my professor at Cornell had been in the oil fields some forty years earlier.

There were additional things I needed to know, such as how to get the staff working properly. They would always try to simplify their work and not get you the proper rock samples. It was necessary that the drilling chips of rocks coming out of the hole were washed and sampled every five feet, so that a geologic stratigraphic column (these are the rock strata) could be produced to correlate the

different wells and identify the location of the oil-bearing sands. The sample collectors often fell asleep at night and then took a sample after many sections had passed. They would distribute these findings over the number of sections missed, and you would find to your chagrin that a whole section would be noted as identical.

The drilling continued throughout the night and would only stop when they added a drill stem (a piece of pipe thirty feet long), when the rig had some mechanical problems, or when they had to replace a bit or something special. For the well-site geologist such interruptions would be a real break, because he did not have to watch the samples pouring out every few minutes. He usually took a nap, because during the drilling there was hardly any time at all to rest.

At the start of the well, called "spudding," it was not so critical to get the correct sample. But when you got closer to the pay-zone, where the oil was, it was important, because you needed to stop drilling just above this layer of sand so that a core sample could be collected. In this manner you got the actual piece of rock with the oil in it and could then study to see how much oil was between the grains of sand and thus calculate the oil reserve in the sand layer. There would also be some drill stem testing, which required the measuring equipment to sit on a shoulder in the drilled hole to seal the oil layer so that the proper measurements could be taken of the pressure. The petroleum engineers could then do a lot of magic with numbers and tell how much oil there was underground.

Drilling a core is an expensive proposition and involved taking a whole day to remove the string (all the drill pipes together) out of the hole, change the bit from a regular drill bit to a diamond core

bit. Then it would take a whole day to drill the core (this is a piece of rock, which the drill cuts around). Then it took another day to pull the core out of the hole, then another day to lower the test gear and another day to test the oil-bearing capacity. That was like a vacation for the well-site geologist.

After two days my experienced colleague left the site, assuring me that help was only a radio call away. He stressed the point that I was to call in every morning at eight to report the status of the well to the office. I was left alone as the man in charge of the drilling operation. It was up to me to apply the things I had learned at school to the reality of the job in the field.

Of course I was not in charge of the actual drilling, but I would determine when the drilling for the core took place and schedule the testing and all the special events. There was a drilling supervisor who was in charge of the mechanics of the operation. Many of these came from Texas, because Caltex Pacific was partially owned by TEXACO. They were called the "tool pushers." (I guess in the old days they would push the tools down the drill hole.)

Thus, there I was deep in the jungle and beside me the rumbling of the drilling rig continued hour after hour and day after day. The monotony was only broken when they added another drill stem. I sat there in air-conditioned comfort — it was a luxury in the jungle but when the electricity failed the paper got wet and it was not possible to write notes anymore, as the paper simply became too soggy.

Carefully, I built a stratigraphic column of the rock strata on paper out of the samples and compared it with some of the nearby drill record of an older well to see where I would expect to get to the pay-zone. That is where the oil was. I duly reported the status every

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morning. Then one day I was near the oil and I asked the drilling to be slowed down, and reported the pay-zone to be found at exactly 1743 feet. My boss had told me to round off the figure to the nearest five. I told him I wanted it recorded according to my calculation. He sputtered a bit, but did so. My argument was that I spent many hours studying the records and decided that it was at that depth that we would find the oil. I also asked him what I should do because I was approaching that testing depth of the hole. I will never forget his reply, "You are there and I am hundreds of miles away, so you decide." I told him I had never been on an oil well before and was not very sure of things. He assured me that I was the man in charge and hung up.

So, that was it. I stopped the operation five feet above my estimated pay-zone and ordered a core to be drilled. The tool pusher sputtered, not trusting my judgment. I advised the petroleum engineers to be ready for a drill-stem test forty-eight hours later. This didn't come at a convenient time because that would be the morning after the Halloween party in the oil town of Duri. They also celebrated it in the oil fields. (Remember it was an American oil company and it was a good excuse to have fun and break the monotony of living in an oil camp in the middle of the jungle. The term oil camp was a misnomer, because it was actually a modern village with nice houses, a canteen and a place to eat.)

Well, I had my forty-eight-hour rest, and I drove into Duri, where the sub-office was located. I planned to have a real bath, and some food at the canteen and a more comfortable place to rest than my bunk bed in the trailer in the jungle.

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In the meantime at headquarters, they had second thoughts of letting a novice geologist make decisions on the drilling operation and sent a senior geologist in to assist and advise me. He arrived just in time to study the rock core coming out of the hole and give me advice.

The drillers laid out the core, which was completely covered in the mud they used during the drilling. This mud was heavy mud so that any pressure from below would be held in check. (Otherwise the oil or gas could blow out of the hole and you get a nice picture of oil spewing out in a great black fountain like in a Hollywood movie.)

The senior geologist said that there was no oil, that it was a dry hole. It would be a disappointment, he assured me. I studied the bubbles coming out of the mud sheeting of the rock core, however, and decided that it was gas. Thus, we needed to test the hole. The senior geologist disagreed with me, but the rule was that the well-site geologist was responsible, so my decision prevailed.

First, they put a seal down to make sure that the oil did not leak. Then they put in the valve that opened and closed the hole in the bottom, so that they could measure the pressure in the actual oil zone of the hole. Then they all trooped back to town (for the big Halloween party) and left me in the jungle. The next morning a hostile crowd of hung-over engineers greeted me.

They proceeded with the test. I saw them fiddling at the top of the well, and attaching a rubber hose to the valve. I asked them the purpose of that set-up. They told me they wanted to make sure that the few bubbles of gas did not go unnoticed, so that they could look into the pail of clear water for the miserably few bubbles coming out

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of the rubber hose. I knew they were pulling my leg. So, I bet them that I would find gas. They were very generous and offered me twenty-to-one odds, including the geologist. I bet my whole month's salary, not much really.

One of the drillers opened the top valve and dropped a steel cylinder down the center of the drill stem, or pipe, and closed it. Then we heard a ping and the steel bar opened the valve at the bottom of the hole. All of a sudden there was a great hiss, the rubber hose flew into the jungle, and a lot of air came out of the hole. I innocently asked them whether it was gas because I have never seen a gas well. In response, the engineers grabbed me and threw me in the mud. They were all laughing, because we had indeed hit a big gas well. They paid off the bet and I was suddenly rich. My nickname became "Gas Hole Henry."

It took three holes for me to finally hit oil. It was an experience. It was at night and the sample catcher alerted me that some oil was showing in the rock samples. I rushed to the place where the rock chips were collected and, indeed, the spots of black oil showed and at the same time the fragrant of virgin oil hit me. It was sweet as if thousand flowers blooming. It was not the dirty oil smell you encounter in a car garage. Then suddenly the few spots got bigger and then the samples were floating in the oil and the fragrance overwhelmed you. Thus, I graduated and my new nickname was "Oil Well Henry."

6 • The Arctic Islands of Spitzbergen, North of Norway

(1962)

After working in the humid tropics of Sumatra, I was lucky to land a summer job with American Overseas Oil Company, or AMOSEAS for short. I would be working in Spitzbergen, above the Polar Circle, north of Norway, for the summer.

Oil companies are serious when they tell you to report on the job at a certain date. Six geologists from all over the world were assigned to Spitzbergen. There were two from the Libyan Desert, one from Turkey, one from the New York office and another one from Paris, plus myself from Cornell University in Ithaca, New York. We all arrived in Oslo between the second and fourth of June, and our passports were stamped with a work visa. Then we were off to Tromsø in the north.

We started off at the Holmenkollen Hotel on top of the hill above the famous ski jump of the same name. It was a great place, but I had trouble getting use to the daylight hours. The sun would rise at three in the morning and go down at eleven at night. So,

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during the first morning I woke up with the birds chirping away. There was not a soul around. I looked at my watch and noticed that it was still very early, although the sun must have been up a while.

In spite of it being summer, the air was still chilly. So we were provided with down blankets, which kept us warm and toasty. (Eider down is a very expensive commodity, and I later learned that the ship crew would divert the route to gather down on an Arctic island.)

Later, we were moved to the Grand Hotel downtown because the project manager found that this hotel in the hills was great for tourists, but not very handy for us doing business. In those days (the summer of 1962), things were still cheap and the dollar was king. My allowance was twenty-five dollars a day. I was told at the office, before departure, that they did not want any money back, and that I had to spend my entire allowance. I was told that it was too expensive and too much work to return small amounts of currency. The hotel, in spite of being the most expensive, was only twelve dollars a night. For that I had a large room fit for a king.

Downtown Oslo is a quaint place, more like a large village with many things to see. Of course, besides the modern city hall, the most famous landmarks in town were the statues by Vigeland — columns of naked people. (I was told he thought the Norwegians such prudish people that he decided to shock the city fathers. I guess he was paid in advance.) A whole park was dedicated to these piles of humanity.

The other interesting thing in Oslo was the people. They would sit, stand or whatever they were doing facing the sun. They

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were like sunflowers. The scene was very amazing for someone like me coming from a warm climate, where one would stay in the shade. Later when we took a trip to Helsingfors in the countryside, we found every little patch of grass along the road occupied with people in lawn chairs facing the sun.

In those days things were still very cheap. I bought a watch that showed the date because I was afraid that I would forget what day it was. Above the Polar Circle one would lose track of the days because the sun travels in a circle above your head. I bought a nice clock (which I still have) made by Le Coultre in France.

Lunch was actually the main meal in Norway, while in the evenings you usually had a sandwich with fish. Only for special occasions people would go out and have dinner in the many restaurants. When they did go out for dinner they really had a grand time. We were told that the *Konneginen*, or Queen's, was the best place for dinner. It was overlooking the water. So, there we were, the six of us, trying to use up our expense money. Most of us still had almost ten dollars left — so we bought the most expensive wine. Some of us had two main courses.

What was most amazing was the time it took to get served. We started at seven, and by eight we had just had our soup, by nine the appetizer, and by ten the main course. The Norwegians were enjoying themselves drinking the evening away and dancing between every course. We, on the other hand, were hungry and behaved as very boorish fellows, calling to the waiter to hurry. We finally finished eating at about eleven at night and meandered down to the harbor where the fishing ships had just come in. We started

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another meal eating raw shrimp, which was served simply in a paper cone like peanuts. (The way to eat these was to squeeze the shrimp into your mouth. They were really very sweet.)

Finally we were off to the Arctic. We got into a local SAS flight to Tromsø above the Arctic Circle. However, the weather was bad and we were diverted to Bodo. It was a long trip by bus to connect to Tromsø, where the boat was waiting to take us into the Arctic. It seemed to go on forever. The only good thing was that the sun never set. I did see real Laplanders in colorful clothing with reindeer, however. It was sort of misty all the way, but we could see mountains on the right and we traveled along the fjords for hours.

We finally made it to Tromsø and checked in at the hotel. The next day we wandered around Tromsø, which was a very picturesque town on both sides of the river. The houses were all in pastel colors, which turned out to be the custom in the north. Perhaps this was to give some brightness to the drab environment of dark green spruce-covered mountains and the drab-colored sea of the fjord.

The project manager went to inspect the ship that was to take us north. It was taking in the last cargo, and we were all asked to sign some papers. It turned out later that I had signed for a consignment of liquor. My allotment, along with the others', was loaded onto the ship. They were taken to the tax-free port of Longyearbyen in Spitzbergen and later returned to Norway by way of a little quiet cove on the coast where they unloaded the liquor and sold it for a good profit without taxes. I was temporarily the owner of about two dozen cases of whisky.

Finally we set sail. In bright sunlight we cast the lines. We went through the fjord and slowly set course to open water. Then we

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turned north into the northern Atlantic Ocean and on to the Arctic.

In the beginning it was very dull traveling. The ship was a seal boat, which was on this summer charter to make extra money. It had a crew of about five: the captain, the mate, two sailors and the cook. We had added two more staff consisting of two geology students from Oslo University as trainees. They were very opinionated, with a great dislike for the Americans, except for their money.

Seagulls followed the ship and scanned the wake for fish, which were churned up by the ship's passage. Later they were joined by the petrels, beautiful flyers. They soared and skirted the water with their wing tips touching and rippling the surface of the sea.

The first icebergs were small. The crew would hack pieces of them to replenish the water supply. These chunks of ice were so beautiful and ice-blue in color. Here and there we saw gulls sitting on the ice, and once in a while we saw some seals sunning.

We spent the four days of travel to Spitzbergen either sleeping or telling jokes. We kept cases of beer on some oil drums on the deck to cool. One day, we were wondering why the sailors were wandering to the back of the ship where our beer was cooling. We found out when we came out of the cabin, thinking to have some cold drinks, and discovered the case was just half full.

Halfway to Spitzbergen we met the mail boat, which was a converted fjord ferry with a flat bottom. The flat bottom was not built for the waves of the open seas and would even make an able seaman sick from the constant wobbling it did. A little later we saw another ship, which had sails out; it turned out to be a tourist boat for hunting polar bears. The brochure describing this boat said that

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they guaranteed the tourist a polar bear. The cost at that time was twenty-five hundred dollars for a two-week trip into the Arctic Archipelago. They would prepare the bearskin and send it home by mail. These days such hunting expeditions are frowned upon — cameras have replaced guns.

The weather was alternatively misty or bright sunshine. It turned out later that this is the weather of the Arctic. For three days the sun shines on the ocean and evaporates the water, forming huge cloud-banks. The clouds then shade the sea and stop the evaporation, and then the wind moves the whole mass easterly, covering the sea and land for three days. We would work in the field when the clouds had disappeared, and came back to headquarters when the clouds moved in.

Finally, after four days of avoiding icebergs, we sighted land. We followed the coast and found the fjord we were looking for. The town of Longyearbyen was located halfway into the fjord. It was named after an American adventurer, and became the headquarters of one of the Norwegian coal mines. Our arrival was an event of some sort, and everybody was on the quay waving at us. Even the Norwegian governor was there to welcome us. We moved into our quarters, which was like a large dormitory overlooking the harbor. Then we visited the governor and had tea. It was only three in the morning, but in the Arctic time does not matter. The sun does not go down in the summer and does not rise in the winter. You do what you are doing until you are ready to go to bed. For us it was the weather that dictated our schedules. It was good that I bought the watch that indicated the date.

The next day we went to the coal company store to buy some

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gear. I was told to get equipment consisting of rubber boots, an orange parka and another sweater. I had brought some fancy leather hunting boots, but they were soaking wet within a few hours and my toes almost froze off.

When I interviewed for the job I had asked the project manager about the working conditions and the temperature, knowing that it was in the Arctic. He had told me the temperature would be between 32 and 65 degrees. What he meant was the condition at headquarters, which was located at sea level where he was staying most of the time. He was not thinking of us working along the mountain ranges at one thousand to two thousand feet, where the snowline was visible on the Fourth of July.

Since we already had aerial photographs of most of the island, our time was spent mapping in the field. We needed to get the field information during the "warm" days.

Helicopters, three in total, were being assembled for our use. They had been sent up on a coal ship two weeks earlier. Thus, the day we arrived they were ready for test flying. Off we went. It was just breathtaking. The glaciers and the fjords were magnificent. We had the greatest view from three thousand feet looking down on the land. We went in and out of the valleys and over the glaciers. Later in the season, that ended up being the routine view on my way to a field site. My longest working day was seventy-two hours, which was to take advantage of the good weather. Usually we were back at base to have dinner and sleep, then out again for just the allotted two to three days that the sky was clear for the helicopters to fly us to our sites and retrieve us.

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The helicopter carried glucose tablets for emergencies, and we always carried a few with us. These were important in case we were left stranded. They would provide energy and warmth. We also had packages of chocolates for the same reason. We needed supplies for three days in case we were caught in the fog. I now understood the reason for wearing orange windbreakers. They were visible to the pilot from miles away. It was important that he could locate us immediately, because we were often working at the limit of fuel capacity. The aircraft had only a few minutes time to get us out.

One of the things we also carried was Coca-Cola as an alternative to drinking melted ice water. The helicopter always dropped us at the highest point of the survey, as it was easier for us to come down than it would have been to climb up the gravelly slopes. So, as a habit, I would drink one bottle of Coca-Cola, then take out a sample tag and write on it: "Heng was here, not Killdare." I stuffed the note in the bottle and built a cairn above it. There should be many cairns still sitting on the ridges of Spitzbergen with my bottles.

Sitting on top of the mountain, we would look over the wide undisturbed expanse in front of us, glaciers running into valleys. Some would terminate into the fjord. Once I was witness to the "calving" of an iceberg, which means a piece of ice breaking free of the glacier when it had reached the water. You would hear a loud roar reverberating like a sonic boom. The ice would slowly break away, dip into the water and disappear, a huge wave of water would spout up, and then the ice popped up and continued the bobbing motion until it was stabilized. Thus, an iceberg was born, eventually floating south and threatening the sea-lanes.

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Measuring geologic sections was a very boring affair. You find a section of rock. Describe it, and then have your partner go down the slope with a tape measure. You sight the direction and the angle, and he will call off the distance. Later this will all be converted to a vertical section of rock. The only time it was interesting was when James, the senior geologist, allowed the daughter of the minister of the local church of Longyearbyen to come along. I guess she was well endowed. He had her take the tape and walk ahead. All the way I could hear him mumble: "What an ass, what an ass!" Indeed, she had a very feminine sway to her hips, which made the job far more interesting than just measuring the rock sections.

Once, during a hurried landing on a ledge, the helicopter had just enough fuel to drop us and take off. But we found out that he had dropped us on a "dead" ledge. This meant that we could not get up or get down. We tried to go down, but got stuck, and finally we cut a path in the ice with our geology picks. We took it one step at a time. One slip and we could have disappeared down the slope. I still have a picture of our precarious climb along the ice-covered slope. It was pure survival to get out of a tight spot. It took us almost half a day to climb to safety. After that we would insist on circling once around the landing zone, and the pilot's excuse of no fuel at the maximum range of the helicopter was no longer acceptable.

To get the flying range improved we would either ferry the fuel to a dump, or we would take the ship and drop fuel at the other side of the island where we worked a second team. However, getting the ship to the other side was no fun either. We tried several times to circle the main island to set up another camp at Edge Øye. First we

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The author writing notes overlooking a glacier and end moraine of Kvalvagen in Spitzbergen.

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went with the boat from the south and got stuck in the ice floats, and then we traveled through the north and got stuck again.

I was on the boat during one of those attempts, and soon discovered that the Norwegian crew could not let go of their hunting instincts. They would shoot every living creature they encountered, namely seals and polar bears. Neither animal had a good pelt during the summer, however it was the great ambition of every Norwegian male to kill a polar bear, no matter the season.

I could recognize a polar bear pursuit from a deep sleep in my cabin, by the maneuvering of the ship chasing the poor creature from one ice floe to another. It was not a hunt, but pure butchery. There was a rule that the polar bear could not be hunted on land. However, many hunters just shoed them from the land and then a free-for-all ensued.

The boat would run into the ice floes and try to cut them with the steel-reinforced bow of the ship. It was very rare that the bear could outrun the ship. It was disgusting. There was no way to talk the crew out of this frenzy. Finally they would get the bear within shooting range, about twenty yards from the ship. Even at close range they did not get the job done properly, if you can call it that. One time it took almost ten shots to kill the bear. The ice was red from the blood spewing from the poor animal.

Shooting seals was an art, because you needed to hit the vertebrate, otherwise the seal would manage to jump into the water and sink. The first mate was the best shot and the seal would simply drop his head. These seals look so fat and cuddly, but not when they are skinned. The carcasses were rather skinny like a dog. During most occasions these were dropped overboard. I asked the crew to

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at least drop these carcasses on ice floes so that the birds could feast on them. They did so once or twice, but it was easier just to dump them overboard. What a waste! I guess the fish fed on them.

The seals were harvested for the blubber and the skin. The ship had a special hold for the blubber, the meat was rarely used. Only once did they save a piece of tenderloin, which they let age in front of the bridge on top of a drum. I saw the animal skinned and saw the meat lying there for days. It finally showed up on my plate. It was like a piece of black meat with a very fishy taste. The crew watched me face this delicious piece of steak. I cut a piece off and stuck it in my mouth, and they all clapped their hands in approval when I managed to swallow it. It wasn't my favorite dish.

Nothing rots in the Arctic, and so the food supplies were sitting in the hold and a side of beef and pork would just hang on the side of the cabin wall. Once in a while the cook would cut a piece off the carcass. The blood would drip for a moment and that was it. In town I saw the carcass of a bear hanging in a shed, and I was told that it was killed two seasons ago. They also told me that the bodies of people who had been buried would not rot at all and some of the corpses would surface. What a macabre situation. They just take some picks and bury them again.

There also was a great need to eat fat in the Arctic. Once we had a fresh ham and the crew cut the pieces of fat and stuck them straight in their mouths.

Eventually the ship broke through the ice and we went on shore to assemble the Texas Cabin, which was a bright red-colored hut about twenty-by-twenty feet. It was a simple job of matching

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the sides and the numbers and bolting the whole structure together. At the end it required some christening. A bottle of cognac was found and the crew finished it in record time. When we transferred the supplies to the cabin, the captain was shaking his head. The small whaler was filled from gunwale to gunwale with food. He told me that there was enough food for his crew for two winter seasons. We loaded the fresh grapes, bags of oranges, and half a side of beef and tons of canned food. The surplus food would remain in these cabins. By tradition anybody could help himself and if possible replenish the supply when he had a chance to do so. It seems that these rules of the Arctic were made to take into account emergencies. In such instances, anyone finding our cabin would be feasting during the winter.

It was on the way back from this supply trip that some excitement occurred. There was an SOS signal from another seal boat. It had been chartered by *Life* magazine to photograph polar bears in the water. The team would locate the bear and then force it into the water while the camera man would get into a cage to try to photograph the bear swimming. They were trying to prove that the polar bear swam like a whale or dolphin. I am still not sure what the result of the expedition was. I know for sure, though, that they pitched overboard about five hundred cases of liquor that the crew had stashed away in the hold of the ship. The sailors could not wait for the loot to be brought back to Norway and started a huge drinking binge. Not a single crewmember was left sober. The passengers were petrified. They hated throwing the liquor overboard, but they thought it was the only way they could get the ship's crew sober again.

Our ship got into some other trouble. We got into a tight spot, literally, between some ice floes. The helicopter came to find a way out for us. However, when the pilot saw a polar bear while looking for a passage, he decided to kill it first. In the meantime, the ice floes had moved and closed the little area of open water we were sitting in, jamming the ship between two floes. The impact pushed the ship out of the water and it started to heel over. Finally, the captain tied some sticks of dynamite to bamboo poles in order to blow holes in the ice. Thus, he got the boat straightened out. (Obviously, hunting bears had greater priority than finding a safe route for the ship.)

The Arctic was so prolific in animal life during the summer. Millions of birds would cloud the sky. One day, when I was stuck on a rock shelf under a cliff, I watched the waterfowl coming and going. These were auks, the little flying penguin-like birds with colorful bills. They would come from their feeding grounds, fluttering their wings rapidly. They did not appear to be the best flyers, but froze in flight, curving their wings and gliding to a spot on the cliff. It was amazing how they could find their nest among the millions of them on the cliff. I was always wondering whether one would make a mistake or whether one would miscalculate his speed and splatter onto the rock wall. I am sure that it must have happened once in a while.

There were also a lot of foxes. Another animal of interest was the musk ox. They were imported from Greenland and were protected by law. When we flew over a herd of musk ox, they would form a semi-circle facing the danger. It was good that they were protected, because otherwise they would have been hunted enthusi-

astically. I always wondered when the total ban on the hunting of polar bears would be introduced. It should have been by now.

One time we were crossing a fjord and below us was a herd of witfisk, or white Baluga whales. They looked beautiful. Unfortunately my camera was empty. However, a few weeks later I encountered one while I was on the ship, and, of course, the crew immediately set up to hunt it. This was a real old-fashioned hunt. The mate had a long stick with a steel-barbed point. The crew jumped into the small whaleboat and pursued the whale into the shallow fjord. They managed to harpoon it. What amazed me was that all this killing was just for the layer of fat, which probably would have sold for a few dollars.

I noticed that people from the Nordic countries tend to keep their traditional habits of living off nature. While in Sweden recently, we gathered berries; and I understood that the men went hunting seriously in the fall to fill up the larder. It was the same. Hunting is the way of life for Norwegians, and so was gathering Nature's produce.

The Norwegian crew kept telling me of an interesting geologic formation, namely a circular island a bit off our course. So I relented, but realizing that there must be an ulterior motive behind this all. Sure enough, we barely had dropped the anchor when the crew lowered the whaleboat and jumped into it, bags over their shoulder. Of course, it was the famous island where the eider ducks were nesting. For half a day they were gathering the down from the nests, leaving enough for the ducks to keep the eggs warm. Eider down was worth more than gold by weight.

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On July Fourth, summer in Spitzbergen, it snowed in the mountains; you could see a white top over the entire range. I guess the boundary was governed by the frost line. It was not as warm as I was told, either. In the hills where we worked the temperature dropped and the wind could be biting. Our standard outfit was thermal underwear, a shirt with pockets, a sweater, orange wind-breaker, woolen socks and hat, and gloves (with a hole for your pencil so that you could write in the cold weather). Then, a pair of rubber boots. These rubber galoshes were amazingly comfortable.

There were anxious moments when the helicopter did not show up. We would wait and nibble on our candy. It was a good thing that we had these chocolate bars. They would be eaten first and then the glucose bars. We never forgot our candy bars, as it meant life or death if the helicopter failed to show up on time.

Helicopters rarely ascend vertically as one might think. They usually lift off the ground a few feet and then shoot forward and upward. In the beginning you had to get use to these maneuvers. They were three-seaters with a large bubble, making the aircraft look like a monstrous dragonfly. There were two situations that were scary. One was the auto-gyro exercise. The pilot was required to practice, once in a while, emergency landings. The regulation stipulated that they should not have passengers during these tests. But the pilots did not think it was fun doing this without passengers. The greatest fun for the pilots was to suddenly turn off the engine, pretend to panic, feather the rotors and make an "emergency landing." When the engine cut off, your heart would jump up your throat.

The other scary maneuver was to fly a few feet over the ground

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and then, literally, go over a cliff. When the ground suddenly disappeared below you, the adrenaline surged through your body.

One day our pilot did not appear to be very alert — indeed, he had been drinking the night before. So, when the party chief told him to land the plane on top of a hill, he simply went down without checking the wind direction. We had a rather hard landing and bounced three times over the hill. At the last bounce we thought we were not going to make it because the chopper was standing with its nose down and the tail up. The chief geologist looked at me and shook his head. I looked at him and did the same.

We were lucky — during the last bump we scraped the soil and did not bounce back up. We slid over the back slope of the hill and slowly rose. When we finally landed, we noticed that our landing gear was totally bent out of proportion. We got out of the plane and looked toward our headquarters a few valleys further. The pilot looked around the plane, declared it flyable, and we went back home. We found out later that one of the rotor controls was broken, and we could have cut our tail off and gone down in one big spiral.

When you see beautiful photographs of glaciers, remember that they are not so smooth. We once landed on top of a glacier and the next thing we knew the pilot, who had stepped on top of a thin covering above a crevasse, disappeared. He was lucky; it was not so deep and he was able to hold onto the edges and climb out.

In the summer the Arctic could be rather warm, if the wind did not blow. We had to work with our shirts off at times, because we would be hot in our gear. Once the wind blew, however, things were very different.

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I was probably the first Indonesian who visited Spitzbergen at that time. So, I went to the post office to ask the postmaster to stamp my passport, because on the stamp it said: "Longyearbyen 78 degrees North Latitude." I still have that passport. It was proof that I was near the Arctic Circle.

Eventually, the summer came to a close. The birds were getting ready for their migration south. The miners of the coal company came back from their summer holiday to spend the winter digging coal. The sun was getting lower on the horizon and finally it just dipped below the horizon. It was about the longest twilight I have experienced.

The ship had to wait for the helicopter crew and so the geologists opted to go back with the flat-bottomed mail boat. It was not the greatest choice because it wobbled and made us sick, but the food was much better than we had had in a long time.

As the glacier-lined coast disappeared on the horizon, the ice floats took over the landscape. The seagulls kept us company again, catching fish thrown to the surface by the wake of the ship. I left a very exciting summer behind and felt privileged to have worked in the Arctic. It was hauntingly beautiful and isolated: the jagged barren mountain, in the summer covered by beautiful flowers, and the glaciers majestically flowing down to the sea.

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*The Spitzbergen (pointed mountains) across Isfjorden in Arctic.
Named by early Dutch whalers who used the island
to bring up whales for slaughter*

7 • Aerial Photo Research in Thailand (1965)

It seemed that nothing in my life would follow the simple path. In the spring of 1964, the paperwork on my student status at Cornell was held up because the Aerial Photo Studies Center was implementing a program for the Agency for International Development (AID) to train an international group of students. Therefore, my status was changed from student assistant to instructor with my visa changed accordingly.

The program did not get off the ground, however, and as the bureaucracy in the Immigration and Naturalization Service could not resolve this situation, I became "without status." I was no longer a student, and I did not become an instructor. I had to leave the U.S., reapply for a visa, and then re-enter as a student. It was ridiculous that I had to make such a trip because of some bureaucratic snafu. There probably was a way to resolve it, but I guess I was not important enough to appeal such a decision. My passport was stamped VD (Voluntary Departure). The nearest country I could visit without a visa was West Germany, so I booked myself on an

Icelandic flight on a Tuesday, preparing to leave behind my wife (we were newlyweds) for an indefinite time. We were not even sure that I would be able to get a re-entry into the United States.

Suddenly, before my departure, Professor McNair contacted me and said Cornell Laboratory in Buffalo, New York, was looking for someone with my qualifications, a specialist in aerial photo interpretation. I told him my predicament. He contacted the people at the lab, and they phoned me. I explained to them the situation, but assured them that I would love to work on their project. They called the project sponsor, the ARPA Office of the Pentagon. A day later I was told they were doing whatever they could to secure the permission for me to stay.

I was a prime candidate for this particular job because most of the other qualified people were already working on similar activities related to the Vietnam War. In addition, I was a teaching assistant at the famous Aerial Photo Center of Cornell University, and at that time Cornell Lab was part of the University. A fact they later regretted, because a similar project on counter-insurgency, that I was also attached to in 1968, caused an uproar and the separation of the two institutes.

I waited in the office as per instruction that Tuesday morning, my suitcase packed, my ticket in my pocket. At ten o'clock the telephone rang. I was told I could unpack my suitcase and relax. The caller assured me she had secured my new status as permanent resident so I could partake in this important project in Thailand. She told me if there was any other problem I should call her without hesitation. (I never realized how important this woman was until I met her a year later, but that is another story.)

When the school term ended I went to the laboratory to start work. I had to fill many forms, most related to the security application, so that I was allowed to have access to classified documents.

Cornell Laboratory was a great place. It was originally a wind tunnel built, I believe, by Martin Aircraft during World War Two. After the war it was sold for one dollar to Cornell University. It became a center for research, like seatbelts, rockets, aircraft simulators and other sophisticated developments. A huge computer occupied two stories of the center of one of the buildings, and then there was research in many activities. I was assigned to work on the development of multi-spectral photography for detecting insurgents in the jungles of Southeast Asia. This project, AMPIRT, was the frontrunner of the multi-spectral work that was the core of the remote sensing activities that were part of satellite technology. Today, we map the world using the technology we developed so long ago, and have almost forgotten the steps to development.

The initial assignment was to find an easy way to locate insurgents under different tropical environments and climatic conditions. So we installed twelve 70 mm cameras with different filters into the belly of a C-47 aircraft, plus four cameras with different lenses, plus one panoramic camera placed forward and backward. We were trying to determine the best angle to see a person in the forest and other environments. (To be honest there was no good angle, and we could have predicted that from ground observations. It just depended on how dense the canopy was, and that was common knowledge.)

Today, it may seem like a very basic project, but in those days when you did not have scanners and small computers this was cutting-edge technology. Many of the tests were simple, but rather meticulously planned and executed. Of course there were flaws, but that was to be expected.

The test area we were headed to was in Thailand. We could simulate the environment of South Vietnam there, without being in the actual war zone. We had located a site along a canal north of Bangkok in the Delta area, a very similar environment as the Mekong Delta. This was supposed to mimic a road with houses on both sides. Another site was in a jungle environment in the northeast (a site now denuded of forest, by the way). The last was in a rubber plantation in Chantaburi in southeast Thailand along the Cambodian border to simulate the rubber estates between South Vietnam and Cambodia, where the Vietcong were very active and had built complex tunnel.

My job was to conduct the field test and run up and down the trails or the canals to check the targets and make spectral readings. These were to be correlated with the readings from the aircraft. Our field team consisted of three people on the ground with a half dozen Thai engineers, who supported our effort and conducted the communications with the local targets on the ground. These were either soldiers or villagers from the surrounding settlements.

After Christmas we were assembled to leave for Bangkok by Northwest Airlines via Alaska to Tokyo, which in those days was more of a freight carrier rather than a passenger-carrying aircraft. It took ages to load the plane in Anchorage. We would have a layover in Tokyo and then continue on Pan Am to Bangkok.

We were very fortunate to have been booked in the old Imperial Hotel in Tokyo, which was impressive. I did not realize at the time how famous that hotel was (Frank Lloyd Wright designed it) and thus did not take any pictures. It had wonderful Japanese-style sliding doors, and staircases, leading nowhere. There were false doors at the end of these corridors, just like the ones of the Buddhist temples in Angkor, Cambodia. (It is a shame that they later tore the Imperial Hotel down for the sake of progress.)

A small store stood across from the hotel. This small, almost dilapidated, wooden structure sold Japanese block prints, which today would fetch a fortune. I wish I had taken a photograph of the building, a weathered shack a bit slanted. I also wished that I had spent all my money on the block prints. I spent an afternoon looking over the huge collection of prints stored in boxes once used to ship canned food. Rows and rows of these boxes. I finally selected a few; one was an old print from the early seventeenth century. It cost me ten dollars as it had a seal proving its authenticity. Then I bought a beautiful print of a temple scene and also a simple black and white print for a couple of dollars, and finally I bought a print of a beautiful curling blue wave for which I paid just five dollars.

This print, which I found in this dilapidated shack in 1965, turned out to be famous. It was a copy of the "Great Wave off the Coast of Kanagawa" (part of "The Thirty-Six Views of Fuji" series, 1823–29), by the famed Japanese artist Hokusai. There have been many opinions about its authenticity . . .

Decades later, I went in search of the successor of the print shop and found a small modern store in the Ginza arcade. It so happened that they had a whole stack of these prints. I asked the

owner why he had so many copies of this print. He told me that it was the most famous block print done by the most famous of artists, Hokusai. I mentioned that I had a copy of it, but mine was much larger. I told him that I was trying to find out whether that small store I bought the painting from still existed. He was familiar with the store, now long gone. Then he asked about my painting. I told him that it was just a copy. But he wanted to know when I bought it. "In 1965, in that little shop," I said. I must have an original, he assured me. I told him that it was surely a copy because I had paid next to nothing for it. He said that was exactly why he knows that mine was one of the many originals, because there was no interest in those days in old Japanese things and nobody would even have been interested in buying such a print unless they were a crazy tourist like me. He said the fact that I paid five dollars is proof of the little value that was attached to these block prints back then.

Well, I was curious and went to see the people in Sotheby, who told me that mine was just a copy, because it did not have the red hue of the one they had in a reference book. They also told me that mine was too perfect, as the frame around the nameplate was unbroken, while the same item in the reference book showed the frame a bit broken. I was a bit disappointed but remembered the opinion of the owner of the shopkeeper in Tokyo, who even offered, sight unseen, two million yen for the print. So, who was right? Then a few days later I was at the Metropolitan Museum and lo and behold, there was another copy of this print. This one had the same colors as mine and the same perfect nameplate, which was the cause of rejection by the expert of Sotheby. My wife and I decided to keep our print, just in case. . .

The day after purchasing the wave print, we took off from Tokyo to Bangkok to arrive there at midnight. This was the west-bound round-the-world flight, Pan Am One, for which Pan Am was famous. Pan Am Two was the eastbound flight over Europe. Both had Bangkok as the midpoint. The flight was uneventful until we landed at the Bangkok Airport. In 1965 it was just a chicken coop compared to the huge modern facility of today. There we were: John in front, then Bryce, then the two Rogers, with Fred and me at the end. Everyone got checked through immigration. When it was my turn, they looked at my Indonesian passport and at my U.S. military orders. A conference ensued. I knew I was in trouble. My orders said that I was going to be in Thailand for a few months, but my Indonesian passport allowed me just twenty-four hours. Perhaps I was a mercenary soldier. The Pan Am clerk did not help matters when he pointed out the discrepancy. We could not get help from people in the office as it was around midnight.

I found myself in the same predicament I had been in once before. I was marched back into the plane with a ticket that read "Deportee." The other passengers looked at me with great annoyance for holding the plane up. It was embarrassing. The rest of the team waved at me and told me that they would get me back soon.

I was not looking forward to the flight back to New York. Our next refueling stop was in Karachi, Pakistan. After landing, the door opened and the Pan Am station manager stuck his head through the door and called my name. I was escorted down the aisle of the plane ahead of the rest of the passengers and into the terminal before any

of the other passengers got ready to disembark. It was explained to me that they would get me a Thai visa to return to Bangkok on the next flight. Great, I thought sarcastically, when the immigration officer confiscated my passport and military orders. I was sure they would be making copies and keeping me in jail. I protested and remarked to them that if my passport was at immigration how was I to get a Thai visa. I was told not to worry. But I was worried.

Thankfully, the Pan Am manager showed up with my passport at the hotel a few hours later. He said, "Let's go," and off we went to the Thai Embassy where we were greeted as old friends. My escort did some whispering with the Pakistani clerks, then came back to me and asked whether I had ten dollars. I gave him the money. Then they all started to fill out forms, stamped the visa in the passport and then one of them walked back to have the Thai consul sign the visa. Within five minutes I was out the door, ready to depart later that day, or so I thought.

While we were preoccupied with my visa, a riot had broken out in the slum area between the city and the airport. It turned out to be a rather common occurrence in Karachi. I was stuck in the city for several days. There was nothing else for me to do but walk around and, as it turned out, I had a great time. While walking I was followed by a young Pakistani. After a few blocks I decided to grab the issue by the horn, and I crossed the road and addressed this young man and introduced myself. It turned out that he had a day off, had spotted me and wanted to practice his English. Well, we talked and talked. So we decided to see the town together. I gave

him a few dollars and told him to pay all expenses out of it. That he did and it was a wonderful experience. We rode in the streetcar shouting at the passersby, then raced the camel on the beach and drove around the mosque where the founding father was buried. Then, finally, he took me home to meet his whole family.

Finally the riots were subdued, and I was allowed to depart and join my friends in Bangkok. It was good to be in the security of friends.

On arrival in Don Muang, I got a seat next to the driver of the Volkswagen bus rented for the project. I thought it was the place of honor. I was soon to discover that driving habits in Thailand in those days — and now still — were not the greatest. They like to play “chicken” and many times an oncoming car would refuse to yield. At the last minute our driver would move aside and drive on the shoulder, telling us casually that the other driver was crazy. Thus my reaction was to put my head behind the dashboard to everyone’s amusement, as it was the expected reaction of all newcomers.

At the Office of the Military Research and Development Center, my passport was again kept, and I was issued an Air Force ID card. I was told that from that time on I was not from Indonesia. We decided I would identify myself as either Sioux or Seminole Indian to save embarrassing questions of an Indonesian citizen serving the U.S. military in Thailand. This was not, however, the end of my quest for a visa to Thailand.

We were housed in very comfortable quarters of the KLM

guesthouse at the end of the runway on a side street. That was equivalent to living next to the elevated section of the subway in Bronx, New York. However, it was close to the airport where our aircraft was parked, and where our offices and laboratories were located in a hangar of the Thai Flying Club. The noise was overwhelming, especially at six in the morning when several Boeing C135 tankers would take off fully loaded at one-minute intervals. They were so overloaded that we swore they were barely clearing the roof of our building. If one did not make it, we knew that it would be all over in a second, but we got used to it.

The guesthouse was also used for the rest and recreation of the KLM crew. Thus there was a well-stocked bar, which we even improved by our purchases from the military PX at the Don Muang Military Base at the east side of the airfield. The interesting thing about being housed with the airline crew was the beautiful stewardesses basking in the sun next to the pool.

The other interesting thing about living near the flight crews was that we listened to the landing discussions of the crew after arrival. We found out that a rough landing was often a dangerous error on some part of the crew. There were often heated discussions about whose fault it was to pull the flap up too soon or step on the brakes too late, etc.

While we were there, the first divided highway in Thailand was partially opened between the airport and the first intersection with the road we were on. The signboards were not erected immediately, however, and every morning we would observe the wreckage of

head-on collisions because they had played chicken at night. It lasted about a week before they decided to have a policeman direct the traffic at either end of this first divided highway.

The airport and the guesthouse were some twenty miles out of town. It was not the ten-lane superhighway we now have connecting the airport with the city. In those days the divided highway ended on our road, and then turned east along a small road on top of a dike with two canals alongside. It would pass our guesthouse and end up on a traffic circle with a *chedi* or *stupa* in the middle of it. This structure was part of the temple on the corner of the intersection, which was in the domain of the air force. (It is where my old friend and counterpart was cremated some twenty years later.)

The main highway continued onto the old highway connection to the hinterland or what they called "up-country" into Bangkok. These old roads were built by raising the highway with clay from alongside the road. The result was that canals ran parallel to all the roads. Along the road grew large rain trees and some would hang over the canals creating a very rustic scenery. These same trees still line Wireless Road in the city. In the old days they stood along the same small strip of land between the road and the canal. Now the canals have been covered to add additional lanes for the increased traffic. When the city tried to cut the trees down the British Embassy located next to these lanes, and perhaps the U.S. Embassy located on that road, stopped the cutting of these wonderful trees. But they do not reflect in the water of the canals anymore.

In those days there were no traffic jams like today, although we complained about traffic as one always does. There were only a few reasons for us to go into Bangkok: to go sightseeing, shopping, and have a meal at a good Chinese restaurant or to visit the post exchange (PX) where we could get inexpensive items. For most people that meant liquor and cigarettes: gin was just ninety cents a quart and cigarettes were the same. As I was not a smoker nor a drinker; I just spent my time nosing around the city.

Most visited a tailor before ending up in a bar, but Bryce, Roger Haas and I were not the drinking type — we went shopping and sightseeing. I usually went in search of artwork, paintings were my specialty. I am not sure why I bought some of the paintings I did, but then others turned out to be very nice ones. They hang in my house to this day.

In those days we would haggle for hours with the proprietor of the jewelry shop, sipping a Coke while negotiating a good deal — a game enjoyed by both the buyers and the sellers, a social activity. There was no hard sell and we all had time on our hands. Well, compared to today those prices were a steal. Star sapphires in those days cost just a few dollars per carat. One of us got a real deal when he was offered a perfect natural blue star sapphire for just a few hundred dollars. Today that same stone would cost thousands of dollars.

One day I ventured farther than the usual hangout of Silom Road and Rajprasong with their little shops. I ended up ten blocks away on Soi Asoke at the Bangkok Gallery. There were a lot of

paintings including two unique color prints of women's faces. They were ugly, but very expressive. I studied them a long time, but decided that perhaps they would clutter up my office at home. I wandered back to the street and noticed that I was being followed.

Soon, the young fellow following me introduced himself as Ronnarong, the artist who drew those two paintings. He asked if I liked them. I said yes. So he told me to wait at the noodle shop around the corner and after ten minutes he showed up with the two paintings. He said that they were his good paintings, and I could get them cheap directly from him. I still have these two paintings. I did not realize how famous this young painter was. Later, I was to find out that he was a policeman and a member of the SWAT team. He was also commander of the fire brigade. When he was at home, however, he was not the straight-laced policeman he was in uniform. Instead he became an artist and wore beads around his neck. We became great friends after I gave him my Polaroid camera, and in return generously gave me many paintings. I used to visit him at home to spend a leisurely Sunday in the shadow of the fruit trees. During the rainy season his yard used to be inundated, because he lived just a hundred yards from the Chao Praya River. Our kids used to swim in the murky water.

Bangkok is a very colorful city studded with temples. Their orange-red roofs would peak through the greenery and the golden naga head at the end of each tier would rise to the sky. The canals lined the streets and trees were plentiful along these roads. Small bridges crossed the canals into the individual houses, while shop-houses standing in rows lined the streets with their wares standing and hanging visible like banners of colors in front of the stores.

There would be bales of cloth, smelly dried fish and shrimp, vegetables and hardware . . . the different stores all mixed together. At the same time the vendors used to call to each other. It was, and still is, the sight, smell and sound which make Bangkok and most of the Orient such a colorful place to visit.

There was an interesting incident at the guesthouse. We discovered that during our stay in 1965 refugees from Indonesia would pass through the KLM guesthouse. They were the Eurasian population, who were repatriated from Indonesia to the Netherlands. They went by KLM as space was available. Many of them came with just a single suitcase in which they kept their worldly possessions. None of them had ever been outside Indonesia, nor had any of them been in an airplane, and they had never seen any snow. We felt sorry for these people, and often we would buy them candy and cigarettes at the PX. We played Santa Claus. I did not realize until later that while I was working in the field away from Bangkok, my wife's family also had passed through this guesthouse on the way to the Netherlands, a new home and a new life.

These poor people were given a small amount of pocket money. We found out that the Dutch refugee officer arranged a tour of the city for refugees and then charged them a fee that equaled whatever pocket money they carried. These people were tired and had many worries. A tour of Bangkok was not what they needed. The money could have been used upon arrival in Holland. It was a nasty racket because they were forced to take the tours and charged about ten times the cost. Some of us made an issue of it that put an end to this racket. Criminal activities like this were common in developing countries.

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My stay in Thailand was a very crazy time for me. My wife was at Cornell, my house was in Buffalo, New York, I was paying for a room in Bangkok and at times I was sleeping in a tent in the jungle's edge attending the field experiments.

8 • Return to Thailand

(1968)

In 1967, Cornell Laboratory organized a new project for Thailand. This project was to become the cause of the break-up of the Cornell Laboratory and Cornell University, as the students in those days would vocally object to anything, even if they did not even know what the issue was. I thought in my day that we had demonstrated for good causes, even when it meant throwing eggs at the university president.

Cornell, in 1958, had the honor of having hosted the first demonstration in the States covered by television. In those days it was not war nor environmental issues, but the curtailment of our partisan campus. The reason why the administration was so closely monitoring our activities was because a few students got so drunk that they literally fell off the balconies. Poor publicity for our great institution.

While the team went off to Thailand to start up the project, I had to stay behind to ensure that this time I was not going to have

immigration problems. The Pentagon decided that I should become a citizen, and to expedite my citizenship a special law was introduced for that purpose in Congress. It was unfortunate that I was attached as a rider to one or another bill, which did not make it to the floor. Yet after a few long months I was duly sworn in as a citizen and finally allowed to travel to Bangkok. My wife, Yvonne, was parked in Holland with her mother, but eventually she made it to Thailand with our little three-year-old daughter Cintha. Yvonne still had a hitch getting her visa. As permanent resident she had what was called a white "passport" or resident permit, which was not a recognized travel document in many countries then, including the Thai consul in the Hague who refused to stamp a visa in this strange-looking document. He finally gave in when his Dutch secretary pleaded with him while my wife cried on his lap.

Most of my colleagues were temporarily quartered at the Siam Intercontinental Hotel, but I found myself a nice, cozy apartment at an art gallery, which I had frequented during my earlier trip to Thailand when I had met the painter Ronnarong. I had my own little pond with water lilies and one big snakehead fish staring at me through the picture window. In Thailand this fish is considered a prized delicacy.

In the beginning, before I had my own car, I was picked up from the house and delivered back by the office car. But I had noticed that it was a continuous argument of who was to be picked up first and who last. So finally I decided to avail myself of public transportation. The buses were crowded but not impossibly so. I enjoyed traveling among these common people, although with my

suit and a briefcase I looked like a fish out of water. But never mind, the people were always very nice and accommodating.

The only thing that I did not understand in the beginning was the system of going and stopping of the bus. When someone wanted to get out they would say "Phay!" When the conductor wanted the bus to start again he would shout to the driver "Phay?" To me it sounded the same and in the beginning I got a bit panicked when I approached my bus stop, but people understood me and they all shouted "Phay?" for me. The Thai language was a tonal language and my ear was not quite attuned to it. Later, I found out the Thai word for "stop" had a falling tone, and "go" had a rising tone. I thought that there was some magic to all of this stopping and going process of the bus to which I was not privy.

In the early days there were many bus companies which crisscrossed the city. There was the white bus, the green bus, the orange bus, the blue bus, which was considered one of the most dangerous ones to ride in as the drivers would race them as if they were sport cars and careened on two wheels around the corners. Later, all these buses were consolidated into one bus company and were all painted red and yellow. However, the bus routes were not changed and they remained as competitive as when they were separate bus lines as before. Soon the buses were covered with all kinds of advertisements; then later new buses appeared with different colors according to their type. The air-conditioned buses were blue. Then, they were colored according to the fare.

What they were never able to do, however, was raise the fare. If a 3-½ baht bus had its fare raised, there would be demonstrations.

Thus the practice of raising a fare was simply done by either getting new busses or by painting them into another fare bracket. That is the gentle, Thai way of doing things.

Our office was located at the sixth floor of the Sirinee Building. On the ground floor near the entrance was the Maneeya Room, where every evening Thai classical dances were performed for the tourists. Then, also near the front, was a Thai silk store, where you could buy silk in all colors of the rainbow. The U.S. Consulate was temporarily on the fourth floor, as they were renovating their new facilities. There was always a swarm of young GIs at the Consulate. They brought in their girlfriends or new wives to get their papers processed to go to the States. The kids were always so mistreated, not just by the American personnel, but usually by the Thai petty officials who wielded a lot of power; one had to go through them before being able to say a word to an American official. We knew this from personal experience, because Yvonne and I physically looked like locals, and often Yvonne had to put up with discrimination until, one day, she implied that I was working "upstairs" as a senior official.

There were no malls in 1969, but the conglomeration of shops selling anything under the sun was actually more fun to shop in than the sterile plazas and malls of today. There were a hundred small eating stalls and fancy hotel restaurants within a ten-minute radius of the office building I worked in during the late sixties. There was the President Hotel at the northeast side of the main intersection between Ploenchit Road and Rajdamnoen Avenue. The Erawan Hotel sat across from it. It was known for the gilded Erawan

statue or the three-headed god sitting at the corner of the lot. People brought offerings to it. I was told the statue was erected after many mishaps occurred during the construction of the hotel. Then, the rumor went, someone asked for help and was granted many blessings. Since then, people flocked to bring offerings to the statue. Later, the Erawan Hotel was torn down and now an ugly Hyatt stands in its place, looking like a truncated Angkor Wat.

Bangkok has always been, to me, a great eating paradise. There is no city on Earth that gives you the choice of delicious and inexpensive Chinese noodles and fried rice, also steaks and other fancy European dishes, from French cuisine to Danish meatballs.

We also were able to purchase items from the PX, which was like the huge Wal-Marts of today. The result was that the USA was called "the land of the grand PX." Things were very cheap, especially liquor and cigarettes. For the U.S. military and diplomatic community that was the place to buy U.S.-grade beef. Of course, it was said that the U.S. community always evolves around trips to the office, the PX and the cocktail parties in the evening. We used to call it the triangle of living overseas.

I developed the habit of having lunch two or three times a week with my American colleagues and the other days with the Thai staff. That way I was able to straddle two cultures and at the same time listen to the rumors of what was happening in town. Thai noodles in those days were about two bahts (ten cents) a bowl, and with the nice per diem I received, I could afford to be generous and paid for the meals of my Thai counterparts. (Not anymore, because

in the process of modernization they have advanced financially beyond me.) Actually, most of the Thai staff working at these international establishments did not need to work at all, because they were comparatively rich and took jobs to be busy and circulate among foreigners, making use of their advanced educations.

When my family joined me in Bangkok we had to find a place to stay. We were lucky to locate an apartment for two hundred dollars a month on Wireless Road and had the U.S. ambassador across the street and the Vietnamese ambassador as a next-door neighbor. Wireless Road was a very nice avenue with raintrees along the main road. But it was about the same time that they started to cover the *klongs* or canals. The charming and romantic atmosphere was slowly disappearing.

The canals were actually built to borrow the soil to raise the roadbed. Thus, they were there out of necessity rather than aesthetic value, but still, they made Bangkok a pretty city, often called the Venice of the East. However, Wireless Road kept its trees, because the British at one end of the road, and I am sure the Dutch and American embassies, also, protested against the city's plan to cut them down. They were there since the time the English built their embassy in the middle of the rice fields a century ago.

Yvonne and our daughter arrived and now we were a family again. Cintha was a small child, and we put her in a kindergarten. She was very self-assured and on the first day she just walked up to the school, left us at the gate and never looked back. Every morning the school bus came by to pick her up, and the maids watched the scene. At the age of three she had a little boyfriend who faithfully

gave her a kiss when she got on and off the bus. Everybody would then cheer. One day she came back and told us that one of the bigger girls had pinched her. Well, almost everybody else was bigger than she was, but I told her to defend herself. The next day we got down to the parking lot, and Cintha walked toward one of the small kids in the apartment compound and gave her wallop. We asked why she did that and she said that she needed "practice." Later, we received a note from the teacher that Cintha had given the bigger girl a punch. We were told that when the girl pinched her again, little Cintha got on her stool to be bigger, raised her hand, and when she had the teacher's attention she just took a good swing. Nothing was done behind the teacher's back.

Since this was my second time working in Thailand, having been there in 1965, I knew quite a few people and they took us out to see the countryside. They also visited our apartment, and we had to get used to the visits of the Thai women. They would go through the whole house, opening and looking into all the closets chattering the whole time. We also had to get used to the hospitality and kindness of the Thai people. We found out that one should never ask one's Thai friends about where to purchase something, because we would soon find the item delivered to our door. Yvonne once asked a friend of ours, Colonel Cherd, where she could buy a sewing machine. Of course, that week an air force truck drove up to deliver a full-size sewing machine.

There was such kindness, and it took us a lot of effort to make sure that our Thai friends did not over-extend themselves on our behalf. For instance, it was very difficult for us to pay the food bills

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in view of our friends. There was no such thing as a Dutch treat. You either had to be faster or make an agreement. So, after being invited for dinner so many times and finding the bills paid, we decided that we would devise a plan to outwit them. Well, it backfired. With care, Yvonne kept some bills on top of her pocketbook so that could be faster in paying the bill. Well, she did, but just at that moment our host turned around to see the transaction and shouted at the waiter, who took off like a scared rabbit, our friend racing after him. Yvonne sat there with her head in her hands and said "Never again." We then agreed that when he invited us he would pay and when I invited him we would pay.

Life in Thailand in the sixties was very charming. Bangkok was a city of canals and slow-moving, though chaotic, traffic. In those days people did not really know how to drive, because those who had cars either had a driver or bought their driver's license. For instance, my officemate Pris could only drive her car forward, and when it was time to go home she had one of us back her car out of the parking slot.

There were never any short tempers on the roads of Thailand. Everybody was always smiling. It was the only place in the world where you could edge your car into the dense traffic and make it into the flow. All you had to do was make sure the driver saw you and then smile nicely. He or she would stop and let you in. (In Holland you would lose the front of your car if you tried to do this.)

One did not take an exam to procure a driver's license, but simply bought a license. I had the experience of trying to obtain my driver's license, and it took me three or four trips with harassment

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over one thing after another. I noticed that there were a lot of people filling out forms, the same ones I had filled out. It turned out that these were the go-betweens. The people applying through them got their papers in no time. Well, I was told that I could have my application expedited for the price of one hundred bahts (five dollars). So, I gave in and got my driver's license, all the while realizing that all these people got their permit without having a clue about driving a car. Driving in Thailand could be rather dangerous.

Little did I realize, only a decade later the traffic in Bangkok would become almost impossible. The elevated sky train was completed, and the underground was finished and the people of Bangkok found it easier to negotiate some of the traffic in town.

The introduction of air-conditioned taxis with taxi-meters, has also helped the traffic situation. In the old days you flagged down the taxis, stuck your head into an open window and bargained for the fare. This would inevitably cause a traffic jam behind the taxi. But the introduction of the taximeter helped the situation. It calculated the first two kilometers as the most expensive, and the next two slightly cheaper; thereafter it was a flat rate of two bahts a kilometer. Thus, it was never to the advantage of the taxi driver to drive you around. The taxi fare to the airport used to be 200 bahts or ten dollars, when you had to bargain, and often it was even more. Today that ride is only 150 bahts by taximeter, which is really not fair to the taxi driver. So I continue to pay the 200 bahts, which is even a bargain now as the baht was devaluated by half. Where can you get taxi service for five dollars for 26 kilometers or fifteen miles?

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After I got my driver's license just like everybody else by paying my "special fee," I decided to try out driving in Thailand. I was a bit apprehensive so we rented a car and early in the morning we got out of town and drove happily in the surrounding countryside. Rice fields surrounded Bangkok, the roads were raised with canals at either side, and here and there a raintree leaned out over the water. Water lilies grew in the ponds along the roads, and every so often there would be a raised piece of land with a house sitting on stilts. Ducks, dogs and pigs would be roaming on the dry piece of land in the middle of the rice fields. Here and there the small boats would ply the canals along the roads. In those days boats were still a major means of transport to go to the market or visit neighbors. It was such idyllic scenery. We would stop somewhere for lunch in a small shack and enjoy a great meal of noodles or fried rice, fried vegetables and perhaps some fish. Then in the afternoon when we thought traffic had abated, we returned to the city, carefully making our way back to the car rental office. After a few such trips I gained experience and courage negotiating the traffic.

Some of our team had opted to bring their dilapidated, monstrous cars of the sixties from the U.S. They were too big to negotiate the narrow lanes. But, on the other hand, other drivers in smaller cars would get out of the way of these huge lumbering vehicles. At the time that I arrived there was some dispute about importing these used cars, with the result being that some of my colleagues had their cars impounded at the quay in the harbor. When it came time for me to purchase a car I simply went to the Toyota dealer and bought the car in the showroom. It was a small

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Toyota Corolla. At the advice of some of my staff I got a white one, because it was supposed to be the most popular color, perhaps because it reflected the sun. It was delivered to my office with the new license plate and insurance and ready to be driven. So, I was able to move around while some of my friends did not have their cars. It took another six months to have the issue of the big U.S. cars settled.

My car was smaller than a Volkswagen Bug in those days, but it was nimble and great in traffic. There was a little problem with the car because it was built for local consumption, namely it did not have a blower and when it rained the windows would fog up. Tubes hung loosely behind the dashboard and the whole blower contraption was absent. Still, the car was just right for our small family of three. We visited the ancient sites of Sukhothai and Sawangkalok.

We also drove to Chiangmai, the northern capital. There were not many tourists and we were almost the only visitors around. We visited the temples by walking or riding a tricycle. It was dusty in the dry, but cool, season.

We complained to friends about the terrible road we took to get to this northern city and asked whether there was an alternative road. Yes, indeed there was one over the mountains to the south. So, we followed the instructions and drove down to Lampoon, the silk town, and the town of the most beautiful girls we were told. Part of the road went in between rows of tall trees. Then we continued on a dirt road. It was made of laterite, which made a good roadbed as it consisted of low-grade iron and aluminum ore, a very stable substance. The road was a bit dusty but very smooth.

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We noticed that there was no traffic besides the few lumber trucks, and one car that came racing from the opposite side. It was a great drive and there were teak forests on both sides of the road. So we just hummed along, until we came to a boom across the road and a sandbagged sentry house with the police manning it. Yvonne had a chat with the policeman, who inquired where we were going and then lifted the boom, and wished us "*Chock dee*," good luck. I hesitated briefly because it was not the standard greeting of farewell. But, without a worry, we continued the wonderful drive along the mountain ridge and finally joined the original good highway in the valley we had taken earlier.

When we got back I mentioned this great road to my colleagues. They were a bit shocked because it seemed that I had driven straight through Communist terrorist territory. I guess it was the luck of the innocent. It did explain our parting greeting from the policeman.

Of course, I had come to Thailand to work, not simply enjoy the scenery. Thailand was threatened by a Communist invasion and a lot of guerilla activities took place in the northeastern provinces along the Laos border. Thailand allowed the U.S. to build airfields from which to launch attacks on Vietnam and the Ho Chi Minh Trail in Laos. We belonged to a large group of socio-economic researchers and were looking into the counter-insurgency from the grass-root point of view rather than the shooting and killing in Vietnam. Or, better said, we were looking at solving the problem from the long-term perspective.

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We may say that in that aspect we were successful, because Thailand was saved from the tragedy which happened to Vietnam. The U.S. poured millions of dollars worth of aid into Thailand. We built roads, bridges, and improved the rural life and agricultural development. In short, we avoided a shooting war. We defied the domino theory and Thailand did not follow Vietnam and Laos, but instead, it became the most prosperous country in Southeast Asia as it did not had to go through the trauma of war.

Of course, my other research led me into some very anecdotal situations, and I was able to listen in to some embarrassing stories. For instance, the story about "unidentified flying objects."

The rumor went that insurgents infiltrated into Thailand from Vietnam via Laos using helicopters. I did not believe that story and said so. I insisted that they would choose the easier route of taking the road and crossing the Mekong River by the many hundreds of small boats plying the river. While the arguments raged, a news item caught our eye. It told the story of the opening of new radar equipment at the Nakhom Phanom Airbase. The story said that while a VIP pushed the button to start the radar, a small blimp showed on the radar screen in front of all the important people. According to procedure, two F-4 fighters scrambled into the air to intercept this intruder, which turned out to be a World War One-era biplane. When the poor little plane landed, the MPs came rushing out with arms drawn. It was said that one of the local dignitaries recognized the airplane, and started telling everybody that it was nothing but a plane delivering tea.

In fact, the pilot was the Corsican car mechanic from Vietiane,

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Laos, and when the MPs unloaded the cargo, packages of opium came rolling out of the airplane. Thus, accordingly, our observation of UFOs ended.

Another memorable event was the impact of the gift of a bulldozer to the villagers of an isolated area to build a road by themselves. A huge helicopter was diverted from Vietnam to airlift this bulldozer as if it was a gift from heaven. The villagers enthusiastically got on the bulldozer and cleared the area for the road. The only problem was that six months later, when I went on an inspection tour, the vehicle was sitting under a tree, stuck. The villagers did not know anything about maintenance and did not know that it required oil and grease besides the diesel oil.

Somehow my work shifted from the northeast of Thailand to the north, where the hill tribes roam and the poppies grow. I ended looking into the distribution of villages, the lay of the land. I visited a couple of anthropologists who were doing studies there. They introduced me to the last frontier of the Golden Triangle, where the colorful hill tribe villages dotted the mountainsides, while the emerald green poppy fields sparkle against the dark green forest. We plotted every hill tribe village we knew on a huge map, and filled several cabinets with information about these villages. It was called "The Hill Tribe Data Files," and became a heated topic of the SDS (Students for a Democratic Society) making the centerfold of their publication. Of course, this innocuous project was funded by the Pentagon, and therefore must have been "bad." It ended and I went back to Cornell.

9 • An Introduction to the Golden Triangle (1968)

The hills of northern Thailand in the sixties did not hold much fascination. It seemed just a land of many mountains. The action was in the northeastern provinces of Thailand, where an insurgency was claiming its victims and where great interest was concentrated on how to contain this threat.

Many letters inviting me to join a small anthropological team of professors Jane and Lucien Hanks in Chiangrai eventually tempted me to see northern Thailand for myself. They were from Bennington College in Vermont, and I had met them during my orientation session in 1956. I guess when you cannot go there for work-related reasons, you find a nice vacation. It was Easter 1969 and, at the same time Songkran, the wonderful Thai New Year, which in the northern parts of the country is celebrated with a lot of water. The Thais made a great effort to get you wet, and painted your face with fragrant powder.

In the late sixties traveling to Chiangrai was not simple. It was easy enough to visit Chiangmai; we could take Thai Airways. But to

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The author (center) with the guide, Lao San, and Susan.

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go farther north into the Golden Triangle, as it is called now, was a journey to remember. First of all the buses were primitive. There were two rows of wooden benches, very narrow with hardly any padding or space between them. A wooden board connected the two sides of the benches so that an additional passenger could find a seat in the aisle.

I was accompanied by a pretty Thai woman from my research group, Susan, whose famous family was friends of the anthropologists inviting me to join them for an Easter holiday in northern Thailand. When she found out that I was going into the hills of northern Thailand, she managed to get the approval of the Hanks to join me to climb the hills with them. They agreed on the condition that she practiced walking on the beach, a quick way to strengthen the leg muscles, because, as it turned out, it was going to be a very rough climb.

Being pretty and popular, Susan was brought to the airport by the chief of her company, an old guy. I was told he eventually became her husband, although they were later separated. A younger suitor, a colleague of mine, also showed up to make sure that I was going to behave. He was gritting his teeth because she was going with me up in the mountains for a week, while he had dreamt of plans to take her to the beach. Finding her escorted by the older fellow at the airport, however, made me an innocent third party. The scene at the airport became a bit embarrassing. Two suitors eyeing each other suspiciously, while I waited patiently on the sideline for her to say goodbye to both of her admirers.

The flight to Chiang Mai, the northern cultural capital of

Thailand, was uneventful. We booked ourselves into a small hotel and went out to visit an old friend of mine who was working in the area to set up the Lanna Thai Institute, an organization to coordinate the research activities of northern Thai. Lanna Thai was the name of the ancient kingdom, which flourished about a thousand years ago. After that we had a delicious Chinese dinner, which I remember to this day because we were served a vegetable dish, called Cap Cai in Indonesia, which I have never found in Thailand before and would never find it again.

The next day we departed for Chiangrai. We took an old rickety bus that first snaked southward to the city of Lampang, and then back northward to Chiangrai. To be comfortable in the crowded bus, I thought I was smart by buying two tickets each, so that we could stretch our legs. That was a great idea for about a quarter of the journey. The problem with this idea was that the bus was picking up more passengers along the route. It became very crowded and eventually the aisle was filled with sitting and standing people. The passengers were very polite, because the bus driver explained that we both had two tickets each. But after a while it became a rather embarrassing situation, us hoarding two seats each while the rest of the people were packed like sardines. Thus we finally released the two seats and traveled like everybody else for the next few hundred miles cramped together in the small seats, which left very little room for the knees. I could not understand how the people could travel that way, because at the end of the trip I was not able to move for a few minutes as I waited for circulation to return to my legs.

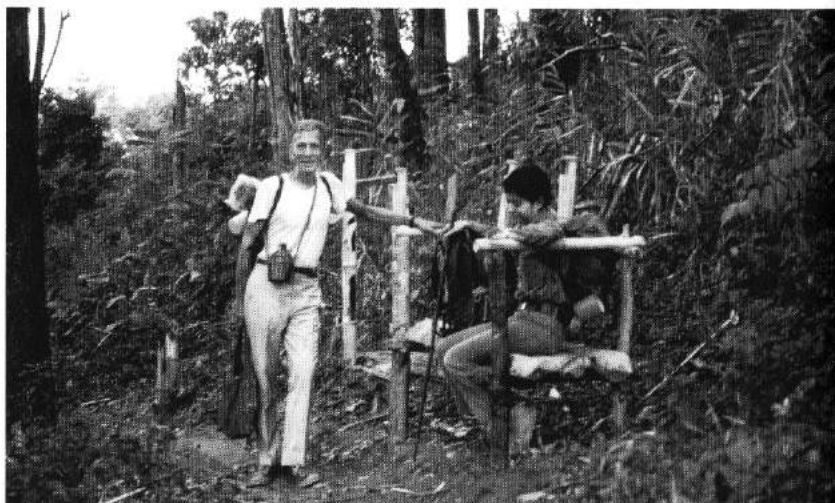
Chiangrai was a smallish town, but one of the earliest capitals of the expanding Thai kingdom a millenium ago. I was grateful that our hosts were at the bus stop waiting for us. A very serious looking but smiling elderly couple. He in wrinkled tan slacks and she in a light blue outfit with a spilt skirt for horseback riding. Both were wearing comfortable sneakers. They gave us such a warm welcome and embraced Susan. Lucien gave me a big pat on my back.

The Hanks felt that I should come to the northern hills, because that is where the future activities would take place. They wanted me to move my work from counter insurgency in Northeast Thailand to research in the worthy cause of the hill tribes, who were being persecuted by the various governments.

Thus my curiosity was piqued, and I decided to see what anthropologists do on the ground. I wanted to evaluate the field procedures, and see whether it could possibly be improved using an aerial survey method. That was the excuse of this venture. I did not realize that this trip would permanently influence my future, and that I would be tied to the Golden Triangle and its people until my dying days. Neither did I realize that this small adventure eventually would become a rather important connection for me. Today, I am perhaps the only person who has conducted surveys of poppy fields in all three countries of the Golden Triangle (Thailand, Burma, and Laos).

This anthropological field survey was to determine the population structure and the mobility of every village located in the area between the Ping River in the south and the Burmese border in the north and the west, while the main road running north-south from Chiangrai, the provincial capital, forms the easterly boundary.

THE PIGEONS AND THE WITCH DOCTOR



*Professor Lucien Hanks and Susan resting along a mountain trail,
North Thailand.*

AN INTRODUCTION TO THE GOLDEN TRIANGLE



*Dr. Jane Hanks crossing a mountain stream in Chiangrai Province,
North Thailand*

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The mapping system was very simple. The anthropologist had made a map four years before in 1964. They were very interested to see whether these villages had moved; so now, in 1968, they had returned to visit the same villages, plotted the villages again, and then compared the two maps. In the end, I did discover a serious flaw in their method.

The anthropologists would select an area to be surveyed. Then they located the lowland village nearest to the hills and drove to it. They arranged to leave their vehicle there and then proceeded to climb the mountain to the lowest and closest village. Often this climb would take all morning.

The guide of the team was the son of the Yao Chief (the Yao were one of the tribes in the area), by the name of Lao San. He was conversant in almost all the hill languages. Thus besides our guide he was also the translator. Having work for these anthropologists during the first survey, he knew the questionnaire almost by heart.

It was always amazing how he would walk straight to the chief's house with absolute infallibility. There the introductions were made. It would take some time to get warmed up, usually by late afternoon the men folk would dribble in from their hunting trips or other forest activities. The interview would begin when the village chief arrived. In one of the Lahu (another tribe) villages, the chief decided that he needed a pipe of opium before he was going to be subjected to the interview, because he claimed that the smoke would make him very bright and thus he could answer the questions with greater clarity. He would offer us a smoke also, just as we would offer our guest a drink at home in the States.

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These climbs were tough. It seemed that the slopes were almost vertical. Professor Belcher, my mentor, always told his students that by using pocket stereoscopes to study aerial photos, the slopes of the terrain in three-dimension would be exaggerated. He always said, however, that they appear as steep as when you have to climb them. I will agree with that because I had a lot of trouble getting to the first village. Of course, being young and eager, I had with me two cameras and four lenses, plus all kinds of junk and my quota of canned food to share with our hill tribe hosts.

I was always the last in the climb because of this stupid load of equipment. The local porter would keep me company. He would trot up the hill past me and then lean against a tree so that he did not need to unload his heavy pack, which was much bigger than mine. He would listen to his little radio and smile at me when my head would show up above the dirt of the trail. Yes, I was bent over so low that my nose was about the height of the path in front of me. Susan was just a few hundred feet farther above me. She did not have much to carry, but apparently she did not do her beach exercises as advised. By that time the Hanks (who were both in their sixties) had disappeared over the crest and probably entered the village behind Lao San. When I finally arrived, they were all chatting away. With a puff I unloaded my genuine Bergan rucksack, which I inherited from my other expedition to Spitzbergen, the Norwegian Arctic, a few years earlier.

While I rested I listened in on the interview. Then professor Hanks proceeded to locate the village, which was more my can of worms. Locating the village was one of the instances that made the

use of aerial photographs a real help, but they were not always available. The scientists took along with them an altimeter, and thus on arrival he would read the meter and try to locate the village at the elevation given on the meter. They were not aware of the principle that one would need two altimeters, one carried with them and one stationary, which calibrated the reading in the field to compensate for the change of barometric pressure, or weather. As a result many of the villages were not mapped properly. As I suspected later, this error had dire consequences on the hill tribes. In the official report it was noted that they moved frequently. But it was later verified on an aerial photo survey, that many of these original locations had been incorrectly plotted on the maps.

The interviews with the tribal chief would often last until late in the evening, and in the meantime the women cooked food and we would proceed to have a great meal. The canned food and other ingredients we brought were mixed with the local staples. Then came the process of arranging our sleeping corner. It was usually the place of honor above the pigsty. These pigs were very unruly, and all night they would snort. Nights at this altitude were rather frisky. In all the junk I carried on my back was my wonderful down sleeping bag. We would line up on the left: Susan, then Professor Jane Hanks, then Professor Hanks and at the far end was my little self. It was very nice and proper. While I was toasty in my down sleeping bag, the others were sometimes a bit cold. Susan was so very cold under her single army blanket. So, during a very cold night, she asked me whether I was warm under my down bag. I said yes. She then mumbled, "I do not care what you think Mrs. Hanks, but

Heng has the warmest cover, and I am going to be warm too." And, with that, walked across the professors and told me to make a place for her under my spread-out sleeping bag. We were sure very comfortable and warm under the down cover that night.

The rice was always husked the same morning it was going to be cooked and the thumping of the pestle into the hollowed-out wooden trunk created our wake-up call. Of course, by that time the cock had crowed a few times and the pigs had been pretty unruly below us.

In the morning, I was taught another custom because these places did not have any comfort stations. Visiting the bushes surrounding the village, put one at risk of being attacked by a bunch of pigs. A good twig helped defend one's back from the impatient customers.

One of the traditions of the Yao tribe was that they were always welcoming and sending us off with a drink. When I asked Lao San how much alcohol was in the "fire water" as I called it, he simply took his chopstick, dipped it in the cup, and stuck it in the fire. A big *poof* proved the point. While a sip of this horrible stuff was acceptable, in the morning as a sendoff was a bit too much. The men sat in a circle around the fire. Then the chief got up and gave a speech. Then he put a drop of fire water in each of our cups; we all took a big sip (or pretended to) while he finished his entire cup. Although the cups were rather small, after a while the alcohol consumption was enough to make us waddle out of the village; literally, like a bunch of drunks.

Well, that first week we visited only a few villages, because

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Susan's legs sort of gave up. Mrs. Hanks gave her a real sermon, and I got the end of it for taking a girl along on this trip. I had had nothing to do with it, except somehow mentioning that I was going up the hills with the Hanks. Anyhow, the descent was a bit rough on her, because then she had to exercise even more control over her leg muscles going downhill. Once into camp she disappeared for the evening and the night. By the next morning she could not stand. I had the pleasant duty of massaging her legs, while the Hanks went to town to do some shopping and pick up the mail. I was a bit sadistic, I'll admit, but I had been instructed to massage the ointment properly, which I did. I must say that she had beautiful legs, and she walked the next day to assault another hill.

It was amazing to me that many social scientists are not very interested in the physical appearance of the villages and the housing structures. These factors are important for an aerial survey to identify the tribe occupying a village. So when I asked the Hanks on the way down what the Yao or Lahu villages looked like they had only a faint idea about it. There was only one book I had found that gave a detailed description of the houses and all the things that came with them. That book was produced by one of the associates of the Hanks during an earlier venture in the 1950s, who had studied a village near Bangkok, called Bangkuad.

I was interested in knowing the way the houses were built and how they were arranged, and I found out that there was a great difference in some of the dwelling construction and shapes. The Akha Tribe, for instance, would almost always build their village on the crest of a ridge, and had an open space in the middle of the

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settlement and a swing at the end of the open space. The Lahu preferred the slope of the hills, and their houses were usually small and miserable. Not a place to sleep for the night.

It was fortunate, yet coincidental, that at the same time that the sociological research was conducted an aerial survey took place. A very accurate correlation could be made between the two sources, as there was no time gap.

Two years later, upon my return to Cornell, I was looking over these photos and knew it would be of great interest to verify the ground data with the aerial information. Fortunately there was a student who needed her social science credits in order to graduate. Thus a negotiation took place between the professor in anthropology and the student for three credits, for her to do a comparative analysis of the ground survey and the aerial survey.

The result was amazing. First we found that most of the villages were, as suspected, not placed at the proper location. Some were located as far as five kilometers away. Not only did we find two dozen or so villages missed by the ground survey, we also found seventeen villages that did not exist at all. The first was explainable, because the ground survey tracked the villages through a snowball effect. That means after reaching the first village they would inquire as to whether there were any villages higher up and locate these villages. Then they would ask whether there were any more above them and thus they moved higher and higher and fanned out. But inevitably some villages would end up in valleys between two survey areas.

The villages that could not be located were more puzzling. A search pattern was established to examine a radius of five and then

ten kilometers from the missing site. We scanned this area for traces of villages or the scars of abandoned villages. They could not be found. The explanation was simple: In the survey some villages were tracked from one side of the mountain and then approached later from the other side. Thus, some of these ended up being surveyed twice. This was possible because the system of locating the villages was not precise. It would only appear in the data, where two villages appeared to have the same tribal identity and also approximately the same number of households. (Names of tribal villages are usually based on the chieftain's name, and thus very inconsistent. And there was always the possibility of a bit of mischief on the part of our guide. You never know . . .)

It was also possible to count the number of houses and estimate accordingly the number of people. This system was later used for population censuses in Laos with good success.

Basically, the use of aerial photography depends on a lot of common sense. You can almost do anything if it is related to the surface of the Earth. It does not require fancy interpreters, just "pigeons."

Soon, the week was over, and we went back to the civilized world. I did not realize how much this short sojourn with the Hanks would affect my life. Besides the influence of the Hanks, there was Gary, the agriculture expert in Chiangmai, who persuaded me that that the hills had their enchantment. This launched my career of mapping poppy fields in the Golden Triangle.

10 • Poppy Survey in the Making (1971)

The Golden Triangle is a beautiful piece of real estate with rugged mountains clad in a tropical forest, creating checkered patches of green or brown depending on the season. In winter, the flowering white and purple poppy fields carpet the hidden valleys; pretty as a picture and unaware of the anguish it causes in distant lands where it saps the youth of Western civilizations in their attempt to escape from the drudgery of modern living.

In the morning among the flowers in the field, are women who bend over the plants to scratch the poppy pod, from which the white sap oozes to dry in the mountain air, turning it into a brown sticky substance. It is harvested by scraping this brown mess. When smoked, it will bring hope in dreams, but despair on awakening.

America's youth was at stake, and we had to find a way to stop the growing of this poisonous crop. But first we had to find out the location of the fields, their distribution and size.

It all started with an article in the *New York Times* about the plans of the Bureau of Narcotics and Dangerous Drugs (BNDD),

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the predecessor organization of the Drug Enforcement Agency (DEA), to curtail poppy growing in the Golden Triangle. The plan was to conduct a survey of the poppy fields in Thailand using modern technology, namely remote sensing. A horde of the "beltway bandits," consulting firms, were sharpening their pens to bid for such an exciting and profitable undertaking.

Innocently, I thought to provide my little contribution and wrote a letter directly to the head of BNDD, who was interviewed for the article I read. I told him that while finding the fields was easy, it would not solve the problem. I advised him that the solution should include the rest of the land use so that we would know the relationship between poppy growing and the rest of the agricultural activities.

I dropped my letter in the mailbox and forgot all about it until two weeks later, when I received a note from his office that they would like to have a little talk with me in Washington, D.C., to discuss my suggestions.

I had to take the bus to Washington. I was just a graduate student then, and they did not offer to pay my way down, so I stayed with friends. (Probably they would have if I had asked. Still, there are more important things in life than a bus ticket. I was honored enough to be invited by these professionals.)

After the introductions were made, I realized that the little meeting was not so small after all. There were at least two dozen people from all walks of life: government officials, consultants and "observers." I was worried and felt that I had stirred up a hornet's nest. But it was my show, I guessed, and there I was among the VIPs in the field. So, I took the offensive; I was in charge.

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The first question I asked was whether any of them had ever seen a poppy field. Next, I asked whether they knew when the growing season was, and why that was so important. (I realized that representatives of companies that had proposed multi-million dollar projects on how to survey the poppy fields, using sophisticated technology multi-spectral photography were present. These same corporations, ten years later, suckered the United Nations into sponsoring such a project, although simpler, less costly methods had been used earlier. Those fancy four-band cameras took hundreds of photos, but never produced a result. In fact, one of those expensive cameras is now rusting away on a shelf gathering dust in the aerial laboratory of the Royal Thai Air Force.)

The fact is, poppy is not an indigenous plant of the Golden Triangle, and its growing season was not adjusted to the climate of the northern hills. They were well-suited to the region, though, because of the cold weather that was needed for it to grow and grow well.

The poppy thrives when it is cool in the hills, when the cold wind blows from the Himalayas over its foothills southward. The rains will have ceased, and there are no crops growing in the hills at that time of the year. Thus, from November through February, they are just about the only fields with a crop growing. (Unlike in Turkey and Afghanistan, they were not inter-cropped in the Golden Triangle.) The plants stood out light bluish-green against the background of dark green forest, the red fallow soil and abandoned yellow corn and hills of rice fields. Furthermore, they were grown during the dry spell, usually in the concave side of the hills, where some moisture was preserved in the soil. The fields looked like soft, velvet green

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patches within the rough pattern of the other vegetative cover.

There was no need to find the poppy fields using the fancy electronic surveillance methods, because they stood out on the hill slopes almost waving and shouting to us: "Here we are, and aren't we pretty?" When the poppy blooms it is as pretty as the tulip fields in Holland in the spring.

While in Washington I convinced the officials of the simple method to map poppy fields.

One morning at eight o'clock, I was called up and asked whether I was the "witch doctor," who worked in northern Thailand and was an American from Chinese-Indonesian origin. I guess they did not leave anything to chance. I would be suspicious too if I had to call a "witch doctor" at Cornell University in central New York. I guess everything checked out fine, except for the title. I had been called many things before, but never a witch doctor. I am afraid that name stuck with me for years to come.

A few months later I was asked to come to the Pentagon and discuss the availability of a special aircraft to fly over the poppy fields. Well, there are a few problems entering the inner sanctuary of the military complex when you have only a New York driver's license on you. I was escorted by a remote sensing expert who flew in from Thailand, the coordinator for the project. Obviously, I was not allowed into the center of the establishment, the Office of the Chief of Staff. But the expert carried paperwork on me. He whispered to security, and I overheard him telling the guy that I was the "witch doctor," and that they should check my clearance. The guard

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called his superiors and a very interesting telephone conversation ensued about this witch doctor. It worked. I got my badge and entered the inner sanctum. Call yourself a witch doctor and all the doors open for you.

The colonel I had to see did not impress me as being overly bright. He had engineered the attempted rescue of POWs from a camp near Hanoi, which as it turned out did not contain the POWs. It was a well known fact by the rest of the intelligence world; but the army, thinking it would hog the glory, went ahead on its own. Yet the prisoners were long gone, moved to another place.

The colonel was the man I needed to convince that the government needed these special aerial photographs from tens of thousands of feet above the Earth. It was not so difficult to convince him, as he was still glowing about the "successful rescue of the POWs," and seemed to think aerial photography was magic.

I ended up as the special expert for developing an effective anti-narcotics program. That is a fancy objective, but a bit on the dangerous side. Also, they were going to give me facilities. I did not realize what they were giving me, but it turned out later that the photographs were taken by a U-2 wooden reconnaissance crate with the most atrocious system possible, at least for anyone having to interpret the pictures.

A month later I was told that I was being sent to Thailand. I thought that I would just hop on a plane and go to Thailand. Yet it was not so easy to appoint me to my new job; I was to have a relatively high rank in the government and thus needed White House

approval. (I had not voted for anybody and thus I was approved.) It took some time for the approval to come through, but once through things moved fast. The morning of the approval, I was in the garage office of my apartment working on my thesis. I was caught at the tail end of the continuing resolution for the budget of the U.S. government. I had to be in a ticket-issuing transport vehicle before midnight or the project would to be called off!

I packed, quickly, and said goodbye to my wife and kids. I was not sure about the duration of my trip, whether it was for three days, three months or a year. The government was suddenly in a hurry. I had to be sworn in and, after the ceremony, was shoved into a limousine to Dulles Airport non-stop to Bangkok. The one thing I did not like was that the travel orders read "an effective anti-narcotic program." I guessed that I would soon be the target of every jack and . . . So, I asked that my orders be "sanitized." That was the expression in those days for changing the contents from extremely risky to very innocuous, such as "an effective resources mapping program." In essence that *was* the objective of our program: to map all land use.

We developed the project on arrival, but to get the approval from the Thai government was another issue. The Thai army did not really want us to map all the poppy fields as some of them were tied to influential people connected to the fields. Later I was to find out the complexity of the situation, but from the beginning we were allowed to call certain fields "the pineapple plantations of General so and so." It was common knowledge what was really being grown.

11 • Recovery of U-2 Film

(1971)

In the 1970s, the narcotics-based projects were very interesting as there were many things to do. One was the mapping of the opium fields of the Golden Triangle, which consisted of Thailand, Laos and Burma.

We, however, did not quite understand the politics of opium, although we thought we did. Things are seldom simple and easy. Aerial surveillance would be one way of keeping track of the acreage of poppy fields, and with field sampling we could then get some estimate of what the production was. But knowing this and being able to carry out the project were two different things.

Negotiations began with the Thai government, but it was also proposed that a complete land-use study be undertaken so that we could estimate the percentage of opium fields in relationship to other crops, such as rice and corn. It made more sense to look for an alternative livelihood for the people, than attempting to simply eradicate opium production.

At the same time, an effort was made to estimate the distribu-

tion of opium by using sophisticated aerial surveillance capabilities. Accordingly, project "Giant Nail" was established. We were allowed one reconnaissance flight. For this project we solicited the support of the U-2 capability located at the U-Ta-Pao air base, and one sunny day this sleek black spy plane took to the air. We had the plane fly from the northern edge of the Bangkok plain into the northern hills of Thailand. We had a beautiful view of Thailand over to the Burmese border, over Chiang Mai and farther north. The pilot must have had a lot of fun flying that gooney bird at such an altitude (eighty thousand feet).

Hundreds of photos were taken using the panoramic camera, which produced these gigantic six-foot long photos spanning across the horizon.

In a few days we got a call to pick up the photos at the Udorn air force base in Northeast Thailand, where they were developed. My colleague Joe and I went to pick them up. There was no trouble getting to Udorn on the military transport, but we had some difficulty returning to Bangkok, because there were no planes going to Bangkok. All of them went to the United States and the sergeant would not let us hitch a ride to Bangkok. Joe, with a senior GS 15 ranking, got red in the face arguing with the military, but once these guys had made up their mind they wouldn't budge.

So there we were, stranded at the airport at Udorn hundreds of miles from Bangkok. We decided to call the military attaché at the Embassy. Since he was our liaison, we asked him to secure us transport. (Actually not us, but the classified material.) We were sure that this colonel could fix us up, because he was really good in getting

things organized.

Sure enough, after thirty minutes he called us back and told us he got us a U-22 lined up to pick us up. We were told to wait for an hour as they had to find a crew to fly it to Udorn and back. After a wait of an hour or so a fancy small plane landed. It was a military version of a Cessna. The pilots got out looking for their passengers and asked us whether we had seen any VIP wandering around and needing urgent transportation. We told them that we were the VIP, or actually the boxes we had with us. I guess the pilots cursed a bit thinking that they had lost their afternoon off, all for a box of film.

We hopped after the pilots into the plane, and soon we discovered that they were not kidding about it being a VIP plane. It had reclining seats and a nice, fully-stocked bar tacked against the rear wall of the cabin. I guess that was the way these generals moved around. Not bad!

Once we got the film back, it was time for the analysis. We needed to consult an expert from Chiang Mai, where the poppies were growing. So off we went to the northern capital of Thailand. We lodged ourselves at the consulate's office. Then we had a slight problem that the material was classified "NoForn." Since this meant that it could not be viewed by a non-American, we had a problem in that Gary, our expert, hailed from Tasmania.

At the end the consul suggested that Gary was an honorary citizen of the United States, and we proceeded to work on the photographs and decided that there was, indeed, a lot of poppies growing in Thailand. Thus, we started to design the Northern Highland Project to map the land use of the hill and formulate a program to

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substitute opium with other cash crops after we had decided what percentage the opium had in the livelihood of the hill tribes.

This was just the beginning of things as there were many people who would rather not have these fields mapped. Often we called these "pineapple" fields so that it was not too obvious as to what we were doing.

Until recently the poppy fields in Thailand were still not completely mapped. While I worked on a team that completed a similar project in Laos in three months. It was a matter of who wants you to do it and who does not want you to nose around in the "pineapple" fields.

It so happened that the owner of some of these fields ended up rather high in the government and we all thought that it probably was much healthier if we cooled our heels.

12 • Poppy Survey in Laos

(1973-74)

While the survey in Thailand took the slow boat due to political problems, the activities of looking for poppies moved into high gear in Laos. I guess it was not so difficult for the U.S. government to mount a poppy survey. All it needed was some idea of how to do the job.

The word went around that the witch doctor was in the region, namely in Thailand trying to do some work with hill tribe villages in the Golden Triangle. In the meantime, another effort was being made to get the poppy survey restarted in Thailand. It was one of those tedious jobs: making preparations, then trying to get government approval, which was nowhere in sight.

Laos did not have to wait, for they had simple procedures. (The U.S. owned Laos at that time.) One day, one of the high officials of USAID from Laos showed up in my office. He asked causally whether I was interested in doing an opium survey in Laos. I told him that it that it would depend on when, and whether, my boss would approve my visit. The guy simply opened his briefcase and gave me my travel orders, all prepared and signed. It was just a matter of getting me to agree.

There were two small problems. I was now at a teaching job in Thailand and could only go on weekends, and I had a research visa to Thailand at that time and did not really feel like losing my visa by going to Laos for a short visit to assess the situation there.

"No problem."

I was told to take a commercial flight to Udorn and simply go to the Air America desk and tell them my name; the rest would be taken care of — they would know who I was. All went according to plan, and I was told to wait until the plane was ready. Then they escorted me to the commuter flight to Vientiane (also called the Air America shuttle), which was an old C-123. I was given the co-pilot seat, and guess who was flying the plane? Ed, the same Air America pilot who flew our experimental plane in Thailand some seven years back.

Ed was quite surprised to see me in the VIP seat. I did not realize at the time what being in that seat implied. But I guess it was for guys like me who went across the border without the proper papers. Of course I was a little bit nervous. Why wouldn't I be? I was trying to avoid having my visa cancelled.

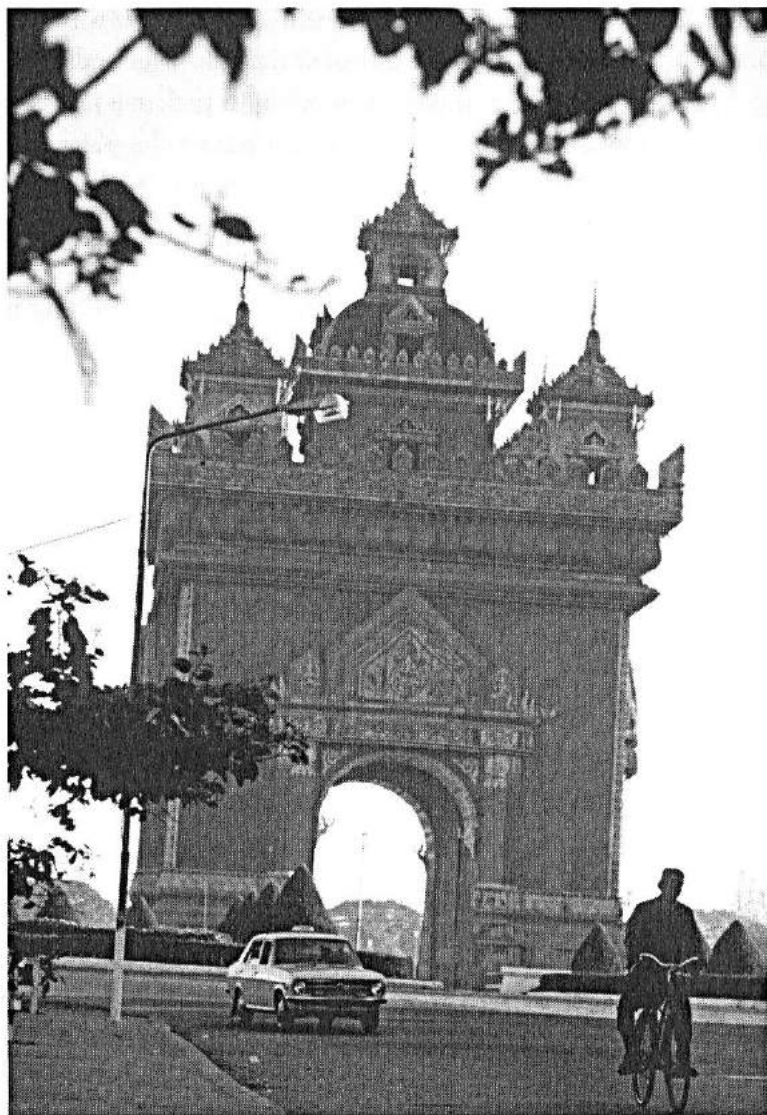
Ed was curious about my trip. He knew me in 1965 as "the kid." I explained to him that I was asked to design an opium survey using aerial photographs somewhat like we did in the old days. He looked at me and then suggested that I note the name of somebody who could help me out, if I needed some help, in getting some aerial photographs. The note said simply, "Pat" and a telephone number. Little did I realize who Pat was.

The flight to Vientiane was uneventful, but the exit was a little bit of a problem. Everybody got out of the plane. I looked around and Ed told me to wait. Someone was going to pick me up, everything was arranged, he said. I followed him out of the plane as we saw someone walking toward the plane. It was my "pick up." He ushered me through a side door of the airport. I was asked about my vaccination record, not my passport, and got a new shot for something on the spot. He then whisked me to a car. I felt a little bit like James Bond.

This was a Saturday. We drove through the little town of Vientiane. (It stayed that same dusty village until the Thai businessman built it up in 1993.) The only significant structure in 1972 was an Arc de Triomphe, Laos-style. The nickname of this mass of concrete was called the "Vertical Runway." The reason for this name was that the cement used for the structure was originally brought in for building the Wattay Airport runway.

We arrived at the USAID compound and went straight to the conference room. Well, this was to be a "little meeting." I am always surprised at how people tend to have different ideas about small. The meeting room was large and there were about two dozen people sitting around the table. There was a little hush as they noticed me. Not that I was impressive, but maybe because I did look like a teenager, and, on top of that, I was not one of those blond-haired, blue-eyed Americans. They were the cream of the "mission," and I guess every Tom, Dick and Harry were there. I rather looked more like one of the natives on the street. Yet, my visit had pulled them away from their weekend hobbies. It put me on a little bit of an ego

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POPPY SURVEY IN LAOS

trip. The small meeting in Washington a year earlier had given me some confidence in handling these “small” crowds, and teaching lively classes in photo interpretation at Cornell University also gave me confidence when facing these important-looking guys.

I was briefed about the vast area where the poppies grew and then asked to design an aerial survey. I had to come up with the costs and the procedures for acquiring these photos and mapping the poppy fields. They suggested that I fly around to see the countryside, and then make my assessment.

So, off I went to the airport again. This time escorted by the Chief of Operation Division and none other than an old friend of mine by the name of Gordon Young, the renowned adventurer of the Golden Triangle. Gordon was the author of a famous hunting book, *In the Tracks of the Silent Intruder*. His father was a well-known missionary, who did his work in the Chinese Yunan Province. My friendship with Gordon went back to the days when I did research chasing guys in black pajamas. This was a reunion of two guys who had fairytales to tell. Now he had been brought down to guide me over the poppy fields of Laos.

Instead of a nice plane, I was hustled into a funny-looking, small aircraft with a long nose. It was one of those STOL (Short Take Off and Landing) planes, a helio porter, which I later came to hate. They were all right if you could avoid sitting in the backseat: the kerosene smell of the engine tended to cause you to have some

The Arc de Triomphe in Vientiane built using diverted cement for construction of the airfield, thus called the “Vertical Runway.”

problem with your breakfast. I did. Also, one should never attempt to turn the plane around on a slick, rained-on landing site, as they tend to take off leaving you behind. (They almost did leave half of me outside the plane one time, and I refused to fly them ever again.)

We first flew northwesterly across the Vang Vien Valley to Saraboury over the hills and the Mekong River. There were poppy fields scattered throughout the hills. It was December and these were mature fields, many in full bloom. We flew along the ridges and across the valleys northeastward straight to the heart of the Golden Triangle; Ban Houy Sai was across from Chaen Khong, in Thailand. We flew northward toward the Chinese-Burmese border. The rice fields were harvested and the stubble was still around, and here and there you found rice drying on racks. The yellow of the stubble was in stark contrast against the emerald green of the poppy fields.

We went back over Luang Prabang, the royal capital, and over the limestone ridges east of the Mekong River, which flowed southward as a shallow muddy stream the beginning of the dry season. The poppy fields were located in sinkholes, where the water was collected in the clay that filled them. These calcareous residual soils were the best for getting a good opium yield, but they were small and less easily cultivated as they were isolated in the bracken fern-covered hills.

It was a long day by the time we finally returned. I had seen a lot of territory. (It was curious that I did not fly over Xieng Kouang Province, but it can be later explained during the second poppy

survey of Laos.) At that time I had very little knowledge on the going-ons and the geography of the country, except that there were good guys and bad guys (who were called "Indians" and where they operated, the region was called "Indian country").

It was a problem getting a plane to fly all that country. To contract such a job could take months, and the growing season would be over by then. I would have to start to write the specifications, which was no problem because we had a whole set from the aborted Thai survey. But a search for a flying company was going to be impossible.

Then, I remembered the little slip of paper the pilot, Ed, had given me. He told me that this guy, Pat, could probably help me get my aerial photos done. So, when the USAID director asked me about this, I suggested he contact a person by the name of "Pat somebody" who could perhaps help us. The name meant nothing to me, but it meant something to the guys in Vientiane, because he called him up immediately and suggested that he meet me the next day. He described me as a Chinese-Indonesian-American fellow from Cornell University.

Well, I went back over the Mekong River, which formed the border between Laos and Thailand, and I ended up in the same place, Udorn, where it was busy as usual with planes landing and taking off to bomb Vietnam.

I had been told some time earlier that a friend of a friend of mine was doing aerial photo interpretation at Udorn. So, I decided to look this guy up. Surprisingly, I managed to find him. After introducing myself, we chatted about my problem. I was really



lucky, because they had for some reason a Wild RC-8 mapping camera that had been left by another team. It was just perfect for my needs. I told him I also had an appointment with Pat — I still didn't have the foggiest idea who Pat was. Looking back, I guess I should have known the connection. I found out that Pat was his big boss. Thus, off we went to see this guy, the station chief of the Agency.

There he was, chewing on his cigar. He grunted a greeting and asked what I needed. I explained the need of an aircraft (with a hole) and an aerial camera. He turned to my escort and asked what assets he had to support me with. Everything was available, and it was confirmed that we could fly immediately if the chief gave the okay. Pat gave the approval as "Priority One," and the whole thing fell into place. They had the airplane, a Twin Otter, which was already fitted with a hole for aerial photography. I was told to simply give them a charge number so they could bill the government for the service. That was that, and they promised to start flying within the week as I had been given high priority by the boss.

Well, when I called Vientiane they were a bit surprised about my success in landing an airplane to do the aerial photography within such a short time. It was probably the fastest arrangement I ever made to get aerial photos taken. This fact would later come to label me as being "an agency man," because nobody could get a Priority One for air support in such a short time, unless he was connected. Thus, it was assumed I was. Yes, I was, but not the way people thought. (It was

Left: Poppy pod, scratched or "bleeding" the sap.

simply the Cornell University connections, because I had taught some of the fellows Aerial Photo Interpretation, Course 2621.)

We got everything done in Laos in less than a week. The photos were not the best, but they were good. The pilots and crew were not specialists in flying aerial photography for photogrammetric purposes, but they were used to doing reconnaissance photography, which means you get the image whatever it costs. They did not fly very straight lines, but there were no gaps. They also forgot to turn off the camera when they went cross-country and continued to take photographs when the oxygen ran low and they started to descend. Thus the scale of the photos increased from one photo to the next. You got photos all right, but it sure was not so good for the eyes as we tried to adjust for the two different sizes of the same objects on the two successive photos. A bottle of aspirin was kept in the office for just the purpose of relieving eyestrain or a bursting headache.

Next came the interpretation and measurements of the areas. The time limit given was three months: there were seven thousand photos covering approximately forty thousand square kilometers. The number of technicians was three. They were field survey assistants, without experience as they previously had held the range poles during the surveys for land allocation plots of refugees. Furthermore, I did not speak Laotian and they did not speak English.

There was no problem teaching them to recognize the poppy fields, because they stood out like a sore thumb against the jungle cover and the harvested rice fields. These young Laotians were my "pigeons" and the procedure of training birds for photo recognition

could be used far more easily to train people. It worked and the photo interpretation training went on smoothly.

There was one large problem, however, with our mission. It was to measure the acreage of all these thousand of fields located along the slopes at altitudes ranging from two thousand feet to four thousand feet and higher at the top of the ridges. The size of the fields in the lower areas appeared smaller than those near the top of the hill as the planes flew at only ten thousand feet, while the mean altitude was at eight thousand feet. It would be a mess to try to transfer each of the fields onto a map in three months with only three people having no experience.

The academician probably would need a stereo plotter or any other fancy machine, which would take months to order and then months more to transfer all these fields onto the maps. The quick and dirty method was simply to locate each of the fields, use a template for the radial distortion, and a chart for the elevation of the fields. Between these two corrections it was possible to get an idea of the average total acreage of poppy fields.

It probably would not be very accurate by photogrammetric standards, but the issue was that the information was needed fast. On top of that, the data on the yield of opium varied from a low of a few kilos to a high of twenty-five kilos per hectare. It was a pretty wide range. The error of the total area of fields was probably less than the lack of good information of the yield of opium. But still it was better information on the total production in Laos than ever before, which to that date had been nothing at all.

A subsequent survey a year later showed there were some

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changes, but also there was certain misinformation about the regional distribution of the poppy fields. This was namely for reasons unknown . . . but we could guess why the area of Xieng Khouang Province was omitted during in the first survey.

The job was finished, some distribution maps were made, and a briefing was held for the ambassador in the "bubble." (That was the secure room, which could not be bugged. The rest I cannot disclose.)

I guess the ambassador was impressed. He asked what the cost was for such an effort, as it must have cost a lot. Actually, it did not, because the flying was done using existing resources and not a commercial aerial survey team. The quality for making accurate topographic maps was probably abused. But for interpretation we could have had worse photos. These were really nice pictures, although perhaps a little bit too dark. I guess he did not believe the cost I quoted for the effort. In the end he suggested that I stay and work in Laos, which I ended doing because the poppy survey of Thailand was still not moving at all.

The fact is that it is not the technicality that makes or breaks a project. It is the human factor that really influence its success. Again, it was those unknown pigeons that saved the day.

13 • Counting People and Other Things, Laos (1974)

Rice grows in the belly of an airplane. In the hills of Xieng Khouang Province, or "Military Region II" as it was called during the U.S. presence in the sixties and seventies, it was a myth that many refugee children believed: rice comes from heaven. The myth was also perpetuated by the old timer, "Pop" Buell.

Pop was a myth himself. He directed the delivery of rice to these "besieged" villages in the hills. Sometimes if the villagers were "naughty" the "rice crop" would be delayed. This area was the great enclave of the warlord General Vang Pao, who led a band of mercenary soldiers under assistance from the CIA. In the center of all these villages lies Long Tieng, the headquarters from where all military activities were directed.

Hundreds of villages clung to the steep slopes of these hills. In the early seventies it was the last area where the Meos, one of the hill tribes later called Hmongs, found a safe haven after having relentlessly been pushed south by the Vietnamese with a sprinkle of Pathet Lao soldiers.

"Did they need all this rice to be dropped from the sky?" This was the question one of my bosses asked me.

The rumor was that the rice, which was dropped near fortified villages on the mountaintops, would find its way back to the valleys and be sold to the lowlanders, the Lao. The rumor even goes so far as to report that some of the rice would be sold back to the rice traders in Thailand, who then sold it back to the USAID rice buyers. One can imagine that some of the rice could have made this round trip many times at the expense of U.S. taxpayers.

There were even rumors that some of these rice bags with the insignia of USAID, the clasped hands, would find their way to the markets in Saigon, traveling along the thousand miles of the Mekong River or the Ho Chi Minh trails.

Because of these rumors, the question was raised at the USAID Refugee Office whether these hills grew enough rice to sustain the hill tribes themselves or at least whether the villagers were able to partially live off the rice they grew. Thus, in the end, the real question was whether we could make an estimate of the rice production in the hills using aerial photographs.

The procedure was very simple, and, like the opium survey, one needed only to measure the area in rice and then take a sample of the yield. The result was a reasonable estimate of what the hills could produce in the form of rice.

There was another factor to take into account, however: the number of people living in these hills. The production of rice was fine to calculate, but an estimate was necessary on how many

mouths it had to feed to see whether there was enough rice. I was told that head counts were conducted every six months to keep the information updated. About 250,000 people were reported living in the mountains, including in Long Tieng and the distant enclave Lima Site (Landing Site) 32, which lies north of the Plain de Jars to harness the flow of goods along the Ho Chi Minh Trail.

There is a difference between a head count and an accurate estimate. The head count was a procedure by which the American officials would fly into a village and announce a week ahead that the village would be subjected to a population count and nobody was allowed that day to work in the fields or be away. This system was to ensure that everybody was present on the census day, but it was misused by the Hmongs to pad the number of people.

Rumor had it that the village chief would send messengers to neighboring settlements as soon as the helicopter had taken off and request reinforcements to augment the village population for that census day. This would increase the benefits later dropped from the air. Apparently this was the way these villages operated. The field officers told me that they had always suspected this pastime of the Meo, but they were never able to prove it. They were very anxious to know the results I would come up with. They said they were sure that often times they saw someone whom they had counted a few days earlier in another village close by, but, when questioned, the villager would adamantly state that his house was the one behind him. The field surveyors told me that appearances should not cloud our judgment, because these people were very smart.

So, without a population count, my measurement of the rice fields would be meaningless, as the shortage or surplus of rice depended on the number of people living in the area.

After some arguments, because I refused to do the job without a proper population count, it was decided that it would be a good idea to use a hut count to replace the standard head count. It was an unbiased method. I was provided again with the good, yet limited, U-2 photos. It was miserable because not only were the photos six-feet long and five-inches wide, you had to drape them across your shoulders to keep them out of your workspace. And, there was so much distortion that the counting team needed aspirin as a standard diet — a large bottle of pills stood in the middle of the table.

On these U-2 photos I could see the dwellings clearly enough to make a hut count. (Some of the staff claimed that they could even see pigs running around in the villages.) But there were a few gaps in the aerial coverage. You could not order the U-2 aircraft around on a whim. You got what you could and were thankful for it. I took them because they were immediately available. The gap was no problem because I sent someone up with a 35-mm handheld camera to take pictures of the missing photo coverage. The field assistant was told to just click the camera straight and perpendicular to the flight path from the right side of the airplane, where the door had been removed. He had to make sure that he took pictures of the hill-sides dotted with clusters of dwellings amidst the great expanse of rice fields and what we later discovered were hundreds of acres of poppy fields.

While we were scanning the photographs, we found that the coverage continued farther north. I was shocked to see the ruins of the provincial capital Xieng Khouang totally obliterated by B-52 bombing. There was nothing left standing. You could see pairs of “fish ponds,” as bomb craters were called, running crisscross through the town. It was pretty impressive, if you considered obliterating a town something to be proud of. I asked a friend of mine who was a bombardier on one of those monsters how he did it. I never got an answer.

There were a few problems correcting the data using these panoramic photos, and the initial estimate caused great alarm. The field team that sampled the household sizes living in each hut came up with a very credible average of 6.87 persons per hut. The real problem was that after having totaled the number of dwellings and multiplied these by the above average we did not come up with a figure of a quarter of a million people, but just 150,000. We did not anticipate that there would be such a discrepancy. Yes, we thought that there would be a difference, but not that big. This difference would total thousands of tons of food and millions of dollars a year. Thus, all hell broke loose, and I was in the eye of the storm.

It became a great issue. I will never forget the day that I was to present my report to the same bunch of executives who attended my first meeting about poppy fields a year earlier. I was sure that my head would roll. In the great USAID conference room I was sitting at one end of the large table with Charley, the USAID director, at the other end. The meeting started with the director shouting at me in his Teutonic-flavored English, he was born in Germany, “What happened to one hundred thousand people in the hills?”

I laconically said that I did not think that there had been that many people in the mountains, or at least they weren't there when the photos were taken a few months back.

The question was whether the aerial photo count was wrong, or the head count was wrong. Nobody in the room would believe that the head count could be that wrong. But nobody in that room of executives had talked to the teams who had many stories to tell about what actually happened in the field. I did! They told me that every safeguard was made to ensure that the people were to stay in the village the day of the head count and that the survey team actually counted the heads. That is why it was called a head count. How could I come up with a better count from eighty thousand feet in the sky? However, the aerial count was unbiased. This was later proven when a tightly-controlled ground survey was undertaken.

I was told that the discrepancy caused a lot of trouble in Washington, and I started to worry about whether I was really right. The figures would have a serious impact on the supplies to the villages, as I had created some mistrust between the USAID on one hand and the thousands of villagers. The USAID director would have trouble explaining the different figure that he had been reporting all along to Washington. He said that it was "a barb in his back," that I had caused serious problems with the data I had presented, and he suggested that I probably had made an error.

An error was possible, but only in the range of five percent to ten percent, not forty percent. He went around the table to ask the group of experts for their opinions. I was sweating, as I was just a little fellow among these big and very important guys. I was amazed that nobody dared to challenge the new figure based on aerial

photography. Aerial reconnaissance was veiled in the myth of secrecy since the U-2 affair and nobody was ready to question it. Many of the field officials questioned during the meeting expressed their doubt of the head counts and felt that perhaps this aerial survey could be more unbiased and therefore accurate than confronting people in the field. The director finally asked for the opinion of old Pop Buell, the guru on refugees in Laos. I looked at Pop and knew that I would sink or swim depending on what "Ole Pop" had to say.

He turned to me and gave me a wink. Then he started rambling about his many years in the hills with the villagers. But Charley was not in a good mood and told Pop to cut it out and get to the point.

Pop then suggested that maybe a lot of people had left the hills since the last head count, and migrated to Vientiane and other places west across the Mekong River without reporting their departure. He thought the hills had been much quieter recently. He thought that the aerial survey could be right and suggested that we try it again with better photos. He sure saved my day.

Pop's suggestion was accepted and a new aerial survey was ordered with new photographs that would have the right resolution and would leave no doubts behind as to the accuracy of the number of dwellings. There would be no holes in the coverage, which I would have to patch up by hanging out of a small plane. Thus my faithful friends from across the Mekong River in the Udorn USAF base in Thailand came forth with their support and launched a reconnaissance aircraft in less than a week. I was always thankful for my Cornell connection.

In the meantime, the Agriculture Department set out to

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measure the yield of the hill rice with dubious results. We then sent a new survey team, obtained better rice production estimates, and we used the information to calculate the potential production of rice in the area.

We went back to square one and started to count the huts again. There were a little fewer than twenty thousand dwellings scattered over a mountainous area of four thousand square kilometers in about one hundred fifty settlements. It was tedious, but it was much easier than the first time when we had those crazy photos to use.

We also had another lucky break. General Vang Pao was thinking of moving his people away from the battle zone and decided to run a survey of his people of MR II. It was to determine where his people would like to move. The person in charge of this survey was Dr. Yangdao, the only Hmong Ph.D. holder in anthropology from the Sorbonne. He was actually the person who started to call the Meo Tribe the Hmong. (In Thailand they are still called "Meos" or "cats." He thought it was a more respectable name, as he told me himself.) A good ground survey to correlate the aerial count would be a "goldmine." We took the project over, as he had no idea of how to run a field survey. We had him borrow eighty non-commissioned officers of General Vang Pao's army.

We knew we had about twenty thousand dwellings and the exact number of dwellings in each settlement from the photos. Thus we divided the teams to cover about three hundred huts each. We allowed them two weeks for the field survey. We dropped them on top of the ridge by helicopter and promised to pick them up down in the valley bottom two weeks later. The most important part of a

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survey, I emphasized, was to be sure that they visited each house and asked all the questions. (I have known survey teams to sit under a tree and fill in the form because the villages were too difficult to reach.) Therefore, we let the teams see a sample of the aerial photos and made sure they knew that we knew how many houses were in the villages and that we could very easily check on them. To be sure that they would do a proper job, we also provided them with colored felt pens with which they had to mark the upper right-hand door jamb of each dwelling with the same number indicated on the questionnaire. This would allow us to double-check their work. (We never intended to check them but counted the number of questionnaires returned against the aerial hut count.) The use of the marking on the door was copied from the Thai Malaria teams, who visited every village in the Kingdom of Thailand, sprayed the houses, and nailed a metal tag with a number on the same place of the doorjamb.

We expanded the questionnaires of Dr. Yangdoa. We did not just ask the number of people living in the house. We also asked a listing of each name, age, gender and family relationship. This I had learned from the Hanks, who had introduced me to the hill tribes. This combination of facts would limit the attempt to give wrong answers and a greater number of people living in the house. Unintentionally, it gave us later some very interesting answers on other things related to the war in Laos, which we did not expect.

The results from the second aerial survey and this ground survey were exciting. The second aerial count confirmed about the same number as before. But surprisingly, the ground survey was

comparable to both aerial hut counts. We gained much respect for the high-altitude photos we had used for the first job.

Dr. Yangdao never came to collect his questionnaires that were stacked up in one of the corners of my special project office. There were twenty thousand completed sets of paper forms, a pickup truckload full, dumped in front of the office door. We called Dr. Yangdao and he arrived. He leafed through a dozen sets, dropped them back on the pile, made a few grunts, smiled, and left the office never to return. I decided to tabulate the population data only to verify our aerial count. First, we checked the number of households in each village and found that the field surveyors did a very good job. Probably it was because they knew that we had an aerial count of the numbers in each village to check against their data. At the same time, we also made a demographic age/gender distribution graph out of curiosity.

There were many surprises. One was that the population data from the aerial count and that of the ground survey deviated less than one percent. It was a shock because we anticipated a difference of five to ten percent.

Either all three surveys were wrong or they all were right. With the tight controls on the ground, it appeared that this may have been one of the field surveys with an almost one hundred percent return on the questionnaires. We had checked the number of households against the number of dwellings. It was an unbiased conclusion as we did not tell the field team the number of houses, but we admonished them with the knowledge that we could check.

The small difference that was found was probably caused by the time lag between the two surveys. Houses could have been demolished or newly built.

Not only did we find that there were 100,000 people less to feed, but there was enough land cultivated to sustain half the real population as we counted. However, environmentally they had devastated the hills. Thus, the refugee office estimated that the people in Military Region II had received supplies enough for the whole population in addition to the rice they grew themselves. Thus they had a nice surplus confirming the rumors.

There was another discovery. The people were also engaged in growing poppies and, in fact, accounted for almost forty percent of the production of all Laos. Until that time we had always been told that the area was opium free. The rumor was that the agency had looked the other way. Perhaps that was why when I made the first reconnaissance flight guided by an old friend of mine who was with the agency, he carefully avoided this whole area of MR II. The result was that I had excluded MR II from the first opium survey. Had it not been for the population and rice survey, we would have never paid attention to the hundreds of acres of poppy fields growing under protection of the "friendly" guns. All the books about the war in Laos always mentioned how clean the Hmong were concerning the growing of poppies. But the aerial photos of the area showed a very different story.

Our survey confirmed the stories of "Ghost Armies" with padded rosters to benefit from U.S. assistance while they were culti-

vating poppies. This hurt those whose taxes were supporting this "army." At the same time, the U.S. government was trying to eradicate the growing of poppies.

The ground survey had some other more interesting stories to tell. Innocently, the name, age, and gender data allowed us to develop an age/gender distribution graph. It was very interesting to find an almost perfect demographic Christmas tree of an almost healthy population. There was no indication of a gap caused by the reported casualties of male population among combat age (between fifteen and fifty years of age). Thus, the settlements were populated solely by refugee families and the combatants were located in Long Tieng and some other fortresses.

I did not realize until recently just how accurate my figures were. While reading a book about the air war in Laos, titled *The Raven*, and written by Robbin Moore, I came upon a footnote that indicated the CIA had inflated the number of Hmong soldiers by a factor of four in a request to Congress for support. Perhaps I had accidentally lifted a corner of the veil of secrecy and deceit concerning the war in Laos. I felt vindicated.

This simple project became a revelation of many other facts. One result was that the supplies were appropriately reduced and saved millions of dollars. Also, this type of survey could be used for many other purposes, especially in the refugee business, which was growing by leaps and bounds. Perhaps, however, there were many people in power who did not really want to know what we could see

from the air, the good and the bad. For instance, while the environment was being destroyed a very easy tool existed to monitor it, especially with the advent of satellites circling the Earth designed for this purpose and flashing daily images to Earth. Still, it seems that even today this tool is rarely employed for public use.

14 • The Dutch Connection and Poppies

(1975)

I was wondering what to do next, when a long, one-page cable arrived inviting me to teach at the most prestigious school in the field of aerial surveys in Holland, the International Training Center (ITC). It came out of the blue from Dr. Vertsappen, whose lecture on coral islands I had attended. This had led me to join the Royal Natural History Society while I was still in high school.

I remember him talking to me, the junior member, at the edge of the Gedeh Volcano about studying geography like he did. I also spent a night with him on a native fishing boat watching the way these fishermen went about catching fish. It was then we realized that most of the fishermen could not swim and kept themselves afloat with bamboo tubes. The last time I had seen him was a decade earlier.

So, off I went with the whole family to the Netherlands. We thought it would be nice to be in Europe for a change, and also we would join my wife's family, who had emigrated from Indonesia to

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Holland. For the first time, my wife's entire family would be together.

We were looking forward to a year in Europe and hoped to do a lot of sightseeing during that time, so we invested in a Volkswagen camper to roam over the roads of Europe. Holland was not a place we would get excited about, because the weather was always gray and raining. A great sunny day would be a gift and they were rare. However, Europe had this great history, and there were many historical places to see.

Settling down to live in another country with a different language was a problem for our children. Settling down in the job was also a bit unnerving for me, as my teaching experience had been ten years earlier. We had to get used to some of the customs, dealing with life in a Dutch city. I thought that it would be nice if I could live in the middle of the old part of the city of Enschede, where the institute was located. A Montessori school was located nearby, and I thought that my daughters would have a better transition. Well, I was called in by the administration and told that it was "very inappropriate" for me, as a senior lecturer, to live in the downtown area. They implied it was like my living in the slums. In those days the charm of living in the downtown of a city was not considered a good choice, while today cost would be prohibitive to find a nice apartment, or flat as they call them, in the center of these towns. So, I ended up in a new neighborhood in suburbia at the edge of town. My kids were automatically put in the neighborhood school. The schools were very accommodating and brought in a special English teacher to help my children with their adjustment. It was not the greatest year for them.

The institute, however, was great, and as it was an International Training Center, we had people from all over the world and the classes were conducted in English.

I was told that I was obligated to teach twenty hours. I assumed that as an associate professor or senior lecturer you would have these twenty hours a week. It took me some time before I realized that they were talking about twenty hours a year. The rest of the time I was to tutor some of the students and assist them in fieldwork in Spain in the spring. This would turn out to be a very nice vacation, and we had some interesting observations and experiences.

My problem was that the system used in aerial surveys at the ITC was a bit alien to what I had been taught and had been using in the field. Therefore, I had some problem adjusting to the curriculum and attempted to change it to make some sense. I was also asked to teach one course in urban geography, about which I did not have the foggiest idea. So, they hired a temporary professor all the way from Germany to assist me. (Today I know much more about urban geography as I have done some work in land use and traffic mapping of Bangkok.)

There were a lot of politics at the institute, like in any other place. In those days it was not easy to become a professor in the Netherlands, because you had to be nominated by twelve of your peers in your field of study to the royal commission. Thus, being a professor had a lot of prestige as it was by royal appointment only. In the entire institute there were just a few professors. The rest were like me, lecturers and senior lecturers. Most of them were Dutch, but there was a sprinkling of foreign lecturers.

The approximately four hundred students were very interesting and came from at least three dozen countries of the world. My course had students from Iran, Korea, Ethiopia, Thailand, South Korea, Tanzania and Kenya and even someone from Mauritius. They were an odd group with all kinds of different backgrounds, such as an urban planner studying agricultural land use planning. I tried to transfer him back to the urban planning group, but to no avail as they were selected per quota. I later found out how this selection took place. Most of the students were selected for the importance of their office for future connections. There was also a very interesting rule for being accepted, and that is that every student should bring with him aerial photos of his country to do some special study. The problem was that they had to hand them over and the institute would make copies of them. A military officer from Iran objected to it, but he was told that he wouldn't graduate if he refused. Well, that is one way to create a huge database of aerial photos of the world. (Cornell University got their collection from all the work Professor Belcher did, including work he did for General MacArthur in the Pacific and Korea. By the time I studied at Cornell he had amassed a quarter of a million photographs from all over the world.)

The best part of being in Europe was seeing the sights. We were tourists and traveled through France frequently. We visited the Pont D'Avignon across the Rhone River, saw the amphitheater in Arles, and visited many historic places of which we had read about, but never seen. Then, the unexpected happened . . .

The immigration officers called me up halfway through the

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term. They opened a black book, read articles of law to me, and told me that I was an illegal resident in the Netherlands because I did not have a work permit. I was told by my predecessor that he had had a similar incident. Therefore I was prepared not to be treated like of the guest workers from Turkey or some other developing country. By that time the weather had taken a toll on my family. We were disappointed in the continuously foul weather and the apparent lack of direction of my work. In short, we were ready to go back home to the States. I told the police that I worked for this famous Dutch institute, and that it was their duty to arrange all these permits. I also told them that I was ready to be deported. (This would be the second time I had been deported out of the Netherlands, plus once out of Thailand, and once threatened by a Voluntary Departure notice from the U.S. Immigration Service.)

"I'm ready to be deported," was not an answer they had expected. Apparently, there were a lot of guest workers from Turkey and Eastern Europe who were often rudely treated. They would cower in fear to be sent home, while I could not have cared less. Plus my English was better than theirs as I refused to speak Dutch.

They closed the book and asked me what they could do. I told them that they should call the office and tell them to get my paperwork straightened out. My predecessor from England informed me that this was an oversight that had also happened to him. So I was rather prepared for it. I also told them that I was fed up with the weather and was ready to leave. It did not work, however, and I remained at the institute.

The best part of working at the institute came when the staff

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escorted the students for their fieldwork. Our group and the soil scientist went to Merida, Spain. Others went to North Africa and France. It was a great vacation for my family. We had been warned about the nasty Guardia Civil and Spanish customs officials. I made sure that I had an American flag stuck above the window of the camper.

We took our time traveling through France, but rushed through Belgium, which was like the Netherlands shrouded in mist. We took the roads through beautiful Dordogne with many castles. Then we went down to Avignon and back up to see the fortified city of Narbonne at the foothills of the Pyrenees Mountains. We crossed the mountain range and visited Andorra, one of those minute countries sitting in a valley of the Pyrenees. We made the mistake of crossing into Andorra when it was a holiday and the roads were jammed full of people from France going shopping at this duty-free port. Everybody was shouting at everybody else, until a sole Andorran policeman with a whistle came by and pushed the cars on the wrong side of the road back to their side and the snake of cars started to move into the valley.

When we got down the mountain, we saw the queue of Dutch and French campers being unloaded by Spanish customs. I was glad for the American flag over my door and our U.S. passports, and we were waved through. My Dutch colleagues had warned me of these customs posts and nasty policemen. However, we were always treated politely. The police saluted us. One day we were lost on a highway between Madrid and Merida and had pulled over to the side of the road. Two highway patrolmen came by on their magnif-

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icent BMW motorcycles, white-helmeted and with white gloves. They stopped in front of our car, saluted us, and asked whether they could be of any help. I showed them our map and the place we were looking for. They told me to go back and turn right. Then one of them walked to the middle of the road, stopped the traffic, and had us make a U-turn as he saluted us. The people of Spain were the friendliest people in Europe. This is true if you stay away from the tourist places, but it is the same all over the world.

We arrived a week later in the city of Merida, which two thousand years ago was the second largest city of the Roman Empire, after Rome itself. The present city by the same name was built on top of the ancient ruins. The law said that when you encountered a ruin you had to stop digging. That was not possible, because there were ruins everywhere. So, I was told that the builders had the cement trucks ready to cover the basement over as soon as they encountered ancient structures. But it had all the monuments of a great Roman city. It had a huge amphitheater, a beautiful aqueduct still being used, and a bridge across the Tagus River, where ten-ton trucks still rumble across today. All over the country remnants of old mansions were strewn across the fields for miles around. Some old cobblestone roads were still used by the farmers.

The city itself was typically Spanish with a plaza in the middle where everybody got together after work. The main hotel was there in the town square, and an old monastery nearby was converted into a Parador National. One of the ancient buildings which were reconstructed and used as the most prestigious lodgings. This system of

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using castles and monasteries created the greatest hotel chain in Spain. The rest of the inner city was a maze of small alleys with ancient-looking houses. It was a quaint place. Tourists had not spoiled it yet.

The team gathered in the plaza, and we were checked into the hotel first and told to gather that evening in a restaurant the teaching staff knew from previous visits to this town. There was a real problem for my kids. In Spain, dinner was not served until nine in the evening. But we managed by feeding them cookies and cakes. Different cultures have different customs, of course, and at times they clashed.

This is what happened one night at dinner in Spain. The dinner went off fairly well although some of the students did not care for what we were served. It was at the end of the meal that we found out what it meant to "go Dutch." I always thought that term a joke, but discovered differently. The most senior lecturer came by and asked if I objected to paying for the drinks. Of course, I had no objections, but I asked about the meals as he had invited all of us to eat there. He said that everybody had his allowance and could pay for their own meal. I was embarrassed by this approach as was my wife. She suggested I talk with the owner and pay for all the meals. This was the custom in the East from where we hailed. So, I went to see the cook and he understood the problem as they had the same custom in Spain: you pay for the meals if you invite people to your table. It was all settled. But No! When the bill never materialized the professor went into the kitchen and argued with the owner, who kept saying that it was all taken care of. Finally he said in exasperation that

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someone else had already paid for it all. So, the next thing I knew, my superior rushed out and started shouting to me that everybody should pay for their own meal. I tried without success to calm him down, and finally I told him that the situation was embarrassing enough, and to please shut up. When the students were invited for a meal the next time, half of them did not show up. Someone went around to collect the money beforehand. It was a real "Dutch Treat."

In the next few weeks the teams fanned out mapping areas north and south of the city. Spring was beautiful in Spain. The red poppy fields were in bloom and covered whole hillsides, and I encountered the first lavender fields. Then there were the olive orchards and the cork oak tree groves, providing the corks for the many wine bottles of the region. The farmers moved out on their mules as they have done so for centuries.

We broke into two teams, one with the senior professor and the other in my camper bus. We would first stop at the baker and pick up a few loaves of fresh bread, and the necessary accompaniments that went with it. As I said earlier, the mapping procedure was much different than that in the States. Here we were using the aerial photos as base maps for the field survey. It was easy using a camper, and we simply put the photos on the table and with the use of binoculars we were able to rattle off the different crops growing in the field. We had predominantly watermelon and what we thought young cabbage plants. There were a few wheat fields and a quite a few fields full of ancient buildings, that was it.

At lunchtime we would park the car on top of a hill and sit in its shadow looking out over the beautiful scenery as we ate our

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lunch. This became our routine. I had done a lot of fieldwork before and took advantage of the terrain and vehicle. We planned the next day's trip every afternoon and selected the roads going over the ridges so that we could coast down the ridge and call out the crops to the person manning the map. The result was that we were always back much earlier than the other teams. We used to see the other teams still slugging it along behind us.

Then we would congregate at the plaza and had our coffee, wine, or beer. In those days things were very cheap in Spain. (Joining the EU just about wiped out the great advantage of living in Spain. Beforehand, wine and beer were less than a U.S. quarter for a liter.)

In the middle of the field survey period the whole group of students visited one of the agricultural experimental stations of the region. We wandered through all the different test plots. I spotted some purple-colored flowers. I looked again and I thought that those were not the common poppy flowers we had seen growing wild in the field, which were bright red and much smaller. So I turned to the agricultural officer and asked him if those plants in the distant were *papaver somniferus* or the opium poppy. He looked at me with surprise and asked how I knew. Well, I told him that I had been mapping poppy fields in Asia and they looked very familiar. He told us that they were, indeed, and were being grown and tested for medicinal purposes. We left it at that.

During one of the holidays we went to visit Seville south of Merida. Two students asked whether they could come along. One

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was a lady from Thailand, and the other a guy from Ethiopia. They and the kids filled the back of the camper and the kids had a great time with Tilimo from Ethiopia. While I mused about this wonderful vacation, I suddenly saw acres of purple tulip fields, but on closer observation found they were not tulips. I stopped the bus rather suddenly and told the students to look outside. The Thai students recognized them as poppy fields in bloom. Just like the small patch at the experimental station. We started to take pictures because we have never heard that Spain was growing opium poppies. These fields were very extensive. I was wondering whether these were also for medicinal purposes.

We enjoyed our visit to the old city of Seville, which had such a history. Much of its richness was due to the bounty from the conquest of Central and South America.

We were back in Merida a few weeks later and enjoying the afternoon at the plaza, when one of the students came rushing up to me and asked me to come along. He wanted to show me the cabbage fields they had been mapping all spring. He was excited, and when we got to those patches the small "cabbage plants" had flowered in the meantime. They were not cabbage plants but hundreds of acres of poppy fields. I shook my head and wondered about it. We actually had them mapped in great detail for the field exercise.

We decided to wind up our visit, and for us it was also the end of our stay with the students as I had accepted a job in Tanzania to survey the land around Lake Victoria. We had our last fling and went out to buy pounds of lamb chops, salad, bread and liters of

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wine and beer. We had discovered a nice pebble beach along the river and spread out on the flood plain that afternoon. Our farewell party was almost spoiled when the Dutch staff asked me whether they could pay for the drinks so that they did not have to pay for the traditional farewell dinner they were supposed to give. My wife was so angry and told them that they could stay away. It was her party, and we would pay for it.

On the way we had an interesting detour. We decided that we were not going over the mountains again, and decided that we should take the tunnel, which would bring us near Lourdes. I was again told not to take it because the toll fees would be prohibitive, as the tunnel was five kilometers long straight through the Pyrenees. We took the turn north, the road became a simple gravel road, and I wondered whether we were on the right track. It was getting a bit late, and we did not meet any cars coming the other way.

Finally there was this hole in the mountainside. A shack stood near the entrance, but there was not a soul to be seen. We stopped and hesitated. There was a big board next to the entrance and it indicated that this tunnel was five thousand meters long. I thought we would find the gate at the other side and pay our fee. We went on through this poorly-surfaced road inside the tube. We were very apprehensive and wondered what would happen to us if we had an accident. We were lucky, however, and fifteen minutes later we emerged at the other side. We stopped again to see where we should pay the toll, but it was exactly the same scene as at the other side: a shack and the same sign.

Well, we had entered a little valley of Spain at the other side of

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the mountain called *Val Verde* or Green Valley. Of course we stopped at Lourdes to receive our blessings.

Back in Holland we visited the U.S. Embassy and reported to the DEA our observation of the poppy fields in Spain. They were very skeptical and told me that there were no reports of poppy fields in Spain. They also challenged my credentials of being able to identify poppy fields. I gave them my name and had them check it against records proving that I had mapped all the poppy fields in Laos and knew what poppy plants looked like.

15 • Invitation to Tanzania

(1976)

I was in Holland and it was cold. I dreamt of warm climates, where the sun shines every day and it does not rain. Where everything is green and lush.

While I meditated on this sad fate of being in a country where the sunshine is limited to the summer, the telephone rang. The voice on the other end introduced himself and in the next sentence I was asked to go to Tanzania.

I have read books about the Boer War, and about the White Nile and the Blue Nile by Alan Morehead. I vaguely realized that I was being asked to go to a country where Spekes died on the shores of Lake Victoria, and I had vision of warriors chasing me through the tall grass. My answer was a definite *NO*.

For a week the telephone rang with the same question. I answered with the same, *no!* I had no intention of going to Africa; I am too much of a coward.

The caller was not imaginative enough to change his approach.

One day, the president of the company called and frantically asked me not to hang up the telephone because he was just relaying a message from a friend of mine, Forrest, who was in Brussels for Christmas and wondered whether I could take a trip to see him.

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I was on my way to the Midi, the South of France, for Christmas and had not seen my friend since we parted two years earlier in Thailand. So why not? It was just a short detour, and I could simply stay there overnight and then move on to the south where it was warmer.

The place at the outskirts of Brussels was sort of complicated to find, but after all I am a mapmaker and after some close scrutiny of the map, we found this small hamlet near Waterloo, of all places. We found a very nice old village, which seemed not to have changed since that famous battle. The weather was, as usual, bad for the area. Drizzling rain and some moisture halfway between rain and mist.

While the women and children went to exchange stories, my friend and I went for a walk through the quaint village. It was a nice place: in the country but still near the capital city.

It turned out that my friend was in charge of the Swedish operation in Africa, and he needed someone to make the land use map of seventy thousand square kilometers of Tanzania. It had to be done in approximately one year. He said that I was the only person he knew who could deliver the goods, and he also complained that I was very difficult to convince. I told him that I really did not feel like going to Africa and confessed to him my fears.

Forrest described the place as paradise and suggested that I visit the region, "God's country." Tanzania was on a plateau some twenty-three hundred feet above sea level and enjoying an eternal spring. It included the Serengeti National Park at one end and the coffee plantations in Bukoba in the western border area(which now has been renamed the Kagera Region).

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While we looked over the old church, he pulled a round-trip ticket out of his pocket and offered an all-expense-paid vacation and a very nice fee to spend a week in the heart of Africa on the shores of Lake Victoria. I was to assess the area and then decide whether I was still firm about not coming to Africa. I was convinced there was a catch, but Holland was so miserable that Yvonne and I had already decided to leave the Netherlands and go back home to America. Africa was not in our program at all, but on the other hand there was nothing to lose and thus I agreed. Forrest is such a great guy and I could hardly resist his request.

That was the beginning of my love affair with Africa.

The flight to Nairobi was fine, except there was some misinformation about my transfer to Mwanza, the town called the emerald of East Africa, on Lake Victoria. Somehow I ended up in Dar Es Salaam instead of flying the charter to Mwanza directly from Nairobi, which would have saved me one and a half day of travel and the agony of not knowing where I was supposed to be. By the time I arrived in Mwanza, I was tired of being shuttled around. There was a plane waiting for me to survey the area. I was really not ready to get back into another plane after so much flying and the small size of it was not very encouraging, but it had been waiting and so I hopped in. That was a mistake, because after an hour of flying in a single-engine plane, bumping and sliding in the air, my stomach just could not hold it any longer, and I got airsick. I managed to get a few hundred photos from the air, but the rest of the time I was staring into the bottom of a plastic bag.

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The baobab, a truly African tree that appears to stand upside down, with the roots full of leaves.

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Once on the ground, we traveled in a Land Rover for miles through the savannah, and the scenery was definitely breathtaking. The air was fresh like springtime. Soon I forgot the miserable day in the air. I was, what they called "bitten by the African Fly." That is, I fell in love with it like so many people before me.

I accepted the job and went back to the ITC in Holland where I was teaching rural surveys. My spirits buoyed with a new adventure ahead. I was not completely sure how the family would react to the move, but they were ready to live in a warm country and anxious to see the new land.

Africa here we come!!

Africa turned out to be a wonderful experience, but was not so pleasant as far as living conditions. It was a hair-raising experience for my wife, who had to cope with shortages. The shops in Mwanza were usually empty. Even the basic commodities were often not available for weeks or months. Bill, the old agricultural colonial officer working for us, was a great source of information. He told us to buy anything we saw available in the store immediately and stock up. He said, "Today you see it and tomorrow you don't. Today you see mountains of potatoes, but next week you find only carrots." So we had to plan our meals by the months. It was feast or famine, though, for many of the local people around us. While in the rest of the world it seems that people live to eat, in Africa one eats to live.

For our children, Africa remains the greatest time in their

lives. When other kids saw the wild places on Earth only on TV, my children were living it. Their first encounter with Africa was Nairobi, and a Land Rover was sent for us complements of the aerial survey company. The kids spent a half-day on safari in the Nairobi Game Park; it was great. They saw all the game, the ostriches and the lions, and the thousands of wildebeest. Was all this leading to the mapping project or one big vacation?

Unfortunately, there were challenges with the work. First, I had no staff. Second, the photos were not ready yet. I did get my equipment, however, and for a month I kept looking for the technicians promised to me by the Ministry of Water.

I haunted the ministry for months to get my technical staff. Finally, the great day came when my technicians arrived. John Mkopi, the administrative assistant, appeared with eight boys and girls. They lined up in front of me, and looked rather young. They were form-four leavers from the Musoma Mission School. Their credit was that they did not pass their exams to move to form five. They flunked out of school and here they were, six boys and two girls. These were going to be my interpreters, my pigeons.

I said, "John, these are the technicians?"

"Yes, sir," he said with a large grin on his face.

I asked them where they came from.

"Musoma Mission School, sir!" they said.

I held up a map and asked them whether they knew maps.

"Yes, sir!" It is true, the English do teach pretty good geography, but when it came to the aerial photos they did not know. I held a photo up and told them that this was an aerial photograph.

There was Nicholas, who ended up being one of the smartest, but not too reliable at times; then Warioba, who was very smart and really could be a great leader. There was Luhende who obtained a scholarship in veterinary science and finished his training, but ended up as a land surveyor.

We also were assigned a Dutch assistant, who was a wild character. His best habits were that he did not take baths very regularly and often drank too much. Also, he tried to avoid paying for his drinks. His Dutch colleagues finally told him to pay for his drinks when his turn came or stay away. His greatest faux pas was relieving himself in front of the whole yacht club. He also rented a camper in Nairobi and ended up with it in Mwanza after the border was closed. What a mess. I have since heard that he is still somewhere in Mozambique doing mapping.

Then there was Ms. Petersen, the geologist who was helping us. She was a hefty girl. She could lift weights twice the weight my Tanzanian staff could lift. They were not small people either. One of her pastimes was to lie in the sun in her underwear. It did not matter in Africa except her skin was a bit too light. On the other hand, we were told that as a bride she would be worth two hundred cows, which was ten times the going rate of a local girl in the Mara region.

How do you map the land use of seventy thousand square kilometers with untrained staff? I figured others could train pigeons to interpret photographs, then we could train people. Thus, there was great hope. One added advantage to working in Tanzania was that all the staff could speak English.

We broke up the team into different groups. Two people would

be mapping just the grassland, two others just the woodlands and another two the villages with the *shambas*, gardens. At the end they would have recognized each of their classes and *voilà*, we got the photo interpreted. Like pigeons they would be doing the same thing over and again.

After six months we had the seventy thousand square kilometers mapped. The small-scale photos of 1:80,000 did help as we had only twelve hundred photographs covering the whole territory. Why this odd scale? It was because the airplane could not fly higher than forty-three thousand feet and the land was three thousand feet above sea level. It was simple mathematics. The camera lens was six inches, or half a foot. So, the altitude of forty thousand feet over the land would generate the scale above.

In addition, there were no new topographic maps available of the area. The field teams got lost because of all the changes caused by the *ujaama*, villagization process. A Japanese company was preparing these maps, and later I ended working for the same Japanese team in Cambodia. The field teams were using an old road map, more of a sketch than anything, and many times these team disappeared into nowhere. (However, I suspected at times that this was just an excuse for doing nothing for a week.)

In Tanzania it was dangerous work to count cows. Cows were equal to money in the bank, so when members of one of the field teams were counting cows, they ended up being beaten by the villagers. As you would not go to your neighbor's house and ask them how much money they have in the bank, so you do not count people's cows in Africa.

We thought about getting this count from a safe distance, from the air. We knew that the cattle would be in the *boma* or enclosure, until about nine in the morning. If we flew over the villages and took pictures of the cattle in the bomas, we could get an estimate of the number of cows in the villages. On the one day we tried this, however, it almost turned into a disaster when the airplane's rudder got stuck, and we almost plowed into the ground at the end of the runway.

16 • Flying over Far Away Places

(1974–1978)

Flying schedules in Tanzania in the seventies were irregular at best. Sometimes planes showed up, other times they flew over without stopping or, typically, the plane was too full and you needed to have some leverage to get onto the aircraft.

While standing outside the terminal — if we may call this simple structure of Mwanza Airport by its fancy name — we could hear the plane overhead. The radio tower would crackled and the radio operator was heard shouting into the microphone, “We can hear you man . . . We can see you man . . . Come down and land.”

The pilot answered, “We are not there yet.”

Half an hour later we heard the purring of the engine coming toward us from the other direction. *It may be our plane coming back.* It was, indeed, the same plane. We found out that it had a new pilot that day, and he had gotten a bit lost.

This same thing happened on the way from Bangkok to Vientiane flying Royal Air Lao. One of the old-time residents of Vientiane was looking out of the window and recognized the

Mekong River below. (Vientiane was located on the riverbank.) The plane continued on, and after ten minutes the passenger tapped the stewardess on the shoulder and said, “Madame, we passed Vientiane ten minutes ago. Can you check with the pilot whether he is supposed to land at Vientiane or Luang Prabang?” The last city was several hundred miles to the north, also on the Mekong River. The stewardess returned after a few minutes and told the gentleman that the pilot thanked him, as he was lost and the radio did not work. The plane proceeded to turn around, and I guess everybody sighed with some relief.

Leaving Tabora by plane was another story. The passengers and the station chief of Tanzania Airways would all wait at the edge of the airfield of red laterite. The suitcases, properly labeled, would also stand on the cart next to all of us. The station chief would open the little shack and crank up the radio. Half of the passengers would crowd into the hut to listen in on the conversation. We would hear the crackle of the radio, and then the pilot’s voice would come in. His first question was invariably, “Did it rain yesterday?”

The station chief would answer, “Yes.”

The next question: “Did someone walk on the runway, and how deep did he sink?”

If the answer was three inches, the pilot would send us his final greetings: “It is too soft, I will see you tomorrow, and we will drop the mail in Kigali. Bye, bye.”

We would all pick up our respective suitcases and boxes and the convoy of cars returned to the town, to attempt the trip tomorrow. This was such agony that when we closed down our

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The team planning the over-flight.

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project we sent a convoy of Land Rovers to make the two-day trip to Dar es Salaam on the coast.

One day a young pilot flew us back from Nairobi, and below us were the migrating wildebeest like strings of ants. He looked at me and asked whether I would like to see the animals a little bit close up. I agreed and off he went in a steep dive. Within seconds we were seeing the eyeballs of the wildebeest as he flew level with them just barely a few feet above the ground. I guess the animals had a scare, as we saw them running alongside the plane trying to get away from the noisy bird.

This same pilot flew my boss and me to Nairobi on a cloudy day. We were a bit ambivalent about the trip, yet off we went toward the mass of water vapor looking ominously and dark gray. It was simply a solid bank of clouds. The pilot took the plane higher and higher; it shook and rattled. We passengers were feeling a bit green. Then the young pilot turned around and dove below the clouds, but there was no opening between the gray mass and the dark green ridges of the Rift Valley. He turned around and asked my boss whether we should go straight through the clouds. I guess that was just too much, and we went back to Mwanza on Lake Victoria for a peaceful but rainy evening. The next morning the weather cleared and we had an uneventful trip.

Then there was this great pilot. He always zipped through the pre-take-off procedures. We were sure that one day he would not make it. On the way to Bukoba we encountered problems with the engine. It was getting a bit hotter than it was good for the engine.

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He circled upward with the excuse that we could glide back to our destination. We were not to worry. We made it, and we did the same going back. The pilot told us that he was trying to get better gliding height in the event the engine decided to quit on us.

He had some trouble the day he dropped the geological team at Sengita. With an empty plane, our hero decided that he did not need the whole runway and took off from the middle of it. Obviously he did not quite make it, and he ran into the bushes at the end of the runway, turned upside down. We were minus one charter plane.

More serious were two accidents, which made me enroll in the IAPA insurance program, which included charter flights. The regular passenger charter from Nairobi via Mwanza to Bukoba had some problems. It was a scheduled flight twice a week. The next day the wife of the pilot called the Safari Air office inquiring where her husband was as he did not come home as usual. Nobody had missed him and nobody knew anything about the missing plane nor pilot. The last sighting was the tower of Mwanza where a controller cleared the flight and saw the plane take off westward over Lake Victoria. Apparently, the plane did not complete the flight and dove into the lake. The next day a fisherman acknowledged seeing the plane dive into the lake. Days of search followed, but only one seat was found floating on the surface and eighteen people were never heard from again.

Later that week, the geophysical plane of Geosurvey took off after it had both engines replaced and inspected. Geophysical flights were flying at a one hundred meters, or 330 feet above the land. They just lined up for their survey pass when, according to the pilot,

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the starboard engine, right side, started spewing oil. He tried to gain some altitude, as three hundred thirty feet did not give him much room to maneuver. He did not get much altitude, since the back-board engine froze. He had absolutely no power and made a classic Hollywood crash-landing. He managed to aim the plane into the clearest path of a rock-strewn valley. This was better than the granite ridges on the side. He dropped the tail and dragged it into the ground to slow down the aircraft, then dropped it on top of a thorn bush, opened the door and three crew members dove out of the plane into a ditch just seconds before the whole machine blew up. Only the tail of the plane remained standing, while the rest was just twisted and molten metal.

One day one of the BOAC pilots was moonlighting and flying one of these small planes. I was happy to have such an experienced pilot. I reclined the seat and went to take a nap. Some loud sputtering of the engine woke me up. I sat straight up looking out of the window while hearing the pilot swear about the unreliable fuel delivery. He told me to look out for a nice clear spot to land, as he pumped the water out of the fuel system. The plane was losing altitude, and the trees were getting bigger. There was a spot to the left, I told him. Then the engine started to sputter and just when we were about to catch some leaves with the undercarriage, the engine started and we slowly gained some height.

This had happened to me twenty years earlier in Spitzbergen, the Norwegian Arctic islands.

All these "almost crashes" do harden you in reference to air travel. It seems that every time your plane had a rough landing the

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crew had some trouble. A long time ago, I was bivouacked at the KLM guesthouse in Bangkok, where the air crew of the same airline was staying. There were often heated post-landing discussions by the crew. There was the engineer who pulled the brakes too soon or too late, or the co-pilot who retracted the wing flaps too early or too late.

One day we were in a Pan Am flight over the Donmuang Airport in Thailand. The plane circled forever. The stewardesses came around every minute telling us to keep the seat straight and the seatbelts tight. Some of us worked in a hanger next to the airport and were looking out of the window and saw below us the fire trucks lining the runway. We thought there was a plane in trouble ahead of us. We circled around a few more times and then made the descent. It suddenly dawned on us that it was our plane that was in trouble, as the fire trucks flashed by our window.

Africa was very exciting when it came to the flights of these small planes. However, the long distances made them a very important transportation network. A one-hour flight between Mwanza and Nairobi was a two-day trip by Land Rover.

17 • Tabora, the Old Capital of Tanganyika (1978)

Tabora was located approximately at the center of what was then German Tanganyika. It was probably selected because there was a large granite knoll, which sort of overlooked the surrounding peneplain.

After Mwanza on Lake Victoria, the town of Tabora was a pretty dismal place. There was not much to remember of the place except the old German fort, now used as the district office, and the old Tabora Railway Hotel.

The hotel was probably the nicest place in town. I was told that it was built as a hunting lodge for Kaizer Wilhelm, who would bring his imperial entourage to go hunting. I would presume that one of his guests would have been Teddy Roosevelt or maybe even my great-uncle Tan Tjoen Lee, who used to travel around the world bagging wildlife.

It did look very Teutonic and massive, but according the old tradition the place was wonderfully built. Each room had an enclosed balcony where one could have his afternoon tea, which probably became a tradition when the British took over the protectorate.

The meals were excellent in spite of the poor supply of fresh vegetables. Then, once in a while, we would get roasted chicken with drumsticks about ten inches long. (A bit long for even the best fighting cock I have seen in Asia.) It was probably one of those storks, which came feeding in the garbage piles in the back of the hotel, although the waiters steadfastly denied that. I must admit that it tasted great. So, I couldn't complain, I just had bit of curiosity in case I happened to be short of fowl when on safari.

This was also the watering place for the whole town. The train would arrive at five in the afternoon seven days a week. That meant that the shipment of beer would arrive. People would be hanging out on the hotel's veranda waiting for the faithful hand wagon to come up the path to the hotel with volunteers pushing it eagerly forward. The cart would disappear behind the bar and people would line up. Then they would lean over the bar and reappear with a few bottles in hand and proceed to find a chair and place their loot between their legs. Then, the person would grab the bottle and open the cap with their strong, white teeth and just down a whole bottle of beer in one long gulp.

We were busy working on finding water for the poor villages, which were moved ten year earlier. President Malimu Julius Nyerere decided that the Chinese and North Korean model of settlements would allow him to service the rural population better, or perhaps control them better than in the thousand of scattered small settlements surrounding water holes.

It was a crazy idea, looking for water after the villages had been moved. It would have been easier to find the water source before

they moved the people. However, the Socialist government did not realize the natural reason for the scattered settlements around these water sources. Each of the water holes could only supply enough water for a dozen families.

One day I was having dinner at a restaurant in Dar es Salaam with a friend, the security officer I knew from Mwanza on Lake Victoria. He pointed out a bearded, casually dressed man eating across the room from us. "That," he said, "is the man who is responsible for the mess my country's in. He is a fellow American of yours, this Professor Green. I wish he had stayed in America." According to the officer, the guy convinced the president to create the settlements, which became a social and economic disaster for Tanzania.

The geologist roamed around, the drillers punched holes in the ground, and the water engineers were using modern dousing techniques, called resistivity measurements, to look for underground water. My team was interpreting the thousand of aerial photos in search of signs of water.

The aerial photo teams were doing land use mapping and the geomorphology to estimate the depth of the soils to find the possible near-surface water sources. It was some team. The geomorphology team consisted of a young Canadian with little experience, but a lot of energy. He had his team organized in a very effective way. The land use mapping, however, was under the supervision of a young lady who worked as interpreter for, I believe, the NASA crop-forecasting project. I guess she had a vision problem, because apparently she was unable to see in stereovision. I did not give her the standard eye-stereo test when we hired her, as I had assumed that NASA would have done it earlier.

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Her interpretation team soon discovered that she did not know much about photo interpretation; she could not correct the mistakes they had purposely made. So, one of the days that I was back in Tabora the workers complained about her. I had noticed that the morale was not very good and thus had to rearrange the team so that the Tanzanian interpreters were controlling their own operations. It was not a good system, but better than what we had using an "expert" in charge.

The Tabora region was different from the area around Lake Victoria, which was primarily covered by grassland savannah and tilled land. Many of the existing trees had been cut for firewood. An old photograph of the area south of Mwanza showed Miombo Forest, which was not friendly to cattle because the tsetse flies caused the dreaded sleeping sickness to both beast and man. However, modern medicine appeared to have overcome this by injecting antibiotics. It seemed to help, and during my work in Tabora you saw the cattle moving in between the trees, but it was not as numerous as in the open plains in the north.

Tabora was a place with a lot of adventures, from poisonous snakes to thieves in the rooms. The whole place was wild and wonderful. There were wildflowers galore and there was wildlife near our quarters. On one occasion my young assistant told me that he had just killed a brown puff adder. He told me that the Frenchman living near us was scared of the animal and he, as an African, came to the rescue of a *wazungu*, a foreigner. It seems for a change the roles had been switched. In the colonial period, it was always the white guy who was "rescuing" the local people. No more!

TABORA, THE OLD CAPITAL OF TANGANYIKA

Other strange things did happen in Tanzania. We were having a wonderful lunch at Gordon's house. All of a sudden I had that strange feeling that I was being robbed. I told Gordon (our World Bank monitor) and Bill, my partner, that I had a feeling that someone was robbing me. They thought I was a joking, but on my insistence we piled into the car and drove like maniacs to our quarters near the airport. Sure enough, we saw someone coming out of the bathroom window and running away. Bill grabbed a piece of wood and chased him while calling, "*Mwingi, mwingi*," or "Thief, thief." We opened my apartment, and a musky smell hit us, but sure enough we were just in time to prevent the thief from opening my strongbox, where I had my valuables. I did lose my watch and a pair of brand new blue jeans, which I recognized on someone else wandering around town a few weeks later. After that, they always viewed me with a bit of wonder. I told them that it had happened before when someone stole my bicycle when I was in high-school.

At another time, two Land Rovers arrived with the World Bank road project appraisal mission. As it is the most important donor agency, the representatives traveled in style: first-class air, and they also brought their wives along. They were to make a first-hand assessment of the road system in Tanzania to see whether they could allow the country to borrow money (under outrageous conditions, no doubt) for economical restructuring.

It was obvious that the trip had not been pleasant. The road was completely rippled throughout the whole route. (I am a victim of this problem also, as my back was operated on for "Land Rover back," or a slipped disk; some of my colleagues suffered from the same problem.)

The representatives were studying maps the day after they arrived and discussed an alternate route out of Tabora. The maps showed a road along the railway east to Dodoma, the new capital of Tanzania. I heard them complain about the terrible road they came up on and not wanting to go back that same way. I told them there was no alternative. I had followed the trail on the aerial photographs and there was no road visible. Possibly the road they saw was a track originally used to build the railroad in the old days.

They came up with the great idea of sending the Land Rovers back to Dodoma and taking the sleeper train. So, the cars left with only the drivers, while the World Bank experts loaded themselves into their train compartments for a comfortable trip to the capital city, Dodoma.

The only problem was that they were traveling during the rainy season, and they soon experienced the vengeance of the natural elements in Africa. Before the train left for Dodoma, the rain poured all night, the roads became impassable, and in the morning the incoming train failed to appear because long stretches of the embankment had collapsed. The cars made it to Dodoma, but they could not return either because many of the culverts behind them had collapsed. Tabora was an island for another two weeks until the railway was repaired. It was sort of funny to see these high-paid experts shuttling between their sleeper wagon and the dining room of the Tabora Hotel. The positive side of this affair is that they had really first-hand information on the condition of the transportation network of Tanzania.

There were other peculiarities that further characterized

Tabora, the ancient capital of German Tanganyika. There were large enclosures with high walls, with gates that were always closed. Our consultant from the London School of Oriental and African Studies, Dr. Ng of the World Bank now, was taking some innocent pictures of cassava plants in front of one of these gates. The next thing we knew, a frantic driver was reporting that his passenger had been picked up by the army. We were later to find out what these enclosures were. They were not bomas with a lot of cows. On one of the many sunny days in Tabora, in the heart of Tanzania in the center of Africa where Stanley met up with Livingstone, things were not very regular. It seemed that the tranquil heartbeat of the Sunday was disrupted. We could not figure out what was wrong until the following Wednesday, when the BBC announced that Tanzania had declared war on Idi Amin and had invaded Uganda. We realized then that the anomaly was the air traffic, which was usually one flight a day and none at all on the weekend.

That was also when we found out what was behind these walls. It was the Western Army of Tanzania. We watched with awe as tanks and cannons streamed from the gates and rumbled north over the dirt roads. We sent most of our vehicles out into the field with orders to stay off the main roads.

During a time of war, it is never a good idea to advertise your skills of aerial photo interpretation. Some of the Tanzanian staff had mentioned to the army that they had pictures of the border area and that the wazungu advisor was an expert in reading these. The rumor was that the army was looking for this innocent photo interpreter. Thus, off I went into the bush doing "field work" until the excitement subsided.

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This war was very interesting as the officers left for the battle zone every morning exactly at seven and returned at five in the afternoon. It was a long commute by helicopter, but the officers preferred the comforts of home above the less-than-acceptable facilities in the field.

18 • Mapping Tanzania

(1976–1979)

In 1976, the only place to stay in Tabora was the Tabora Railway Hotel. I was told that it was the converted hunting lodge of Kaiser Wilhelm of Germany. That is where you met anybody and everybody who was visiting the region.

So, I was not surprised to meet my big boss, Fred, in the corridor of the hotel. He was the Permanent Secretary of Maji or the Ministry of Water, Energy and Mines of Tanzania. I had never met him before. It was easy for him to recognize me, because I was the only Asian fellow around town except for the Mainland Chinese medical team, who did not venture outside their compound.

He stopped and turned around and said, "You are Hank the photo interpreter, aren't you?"

"Yes, sir," I said. (Hank was my nickname.)

"How come you have not answered my summons?"

"To be honest, I have not received any, so I did not know you wanted to see me."

"I wanted to know what you were going to do with the staff when you leave?"



Public transportation is coming to a halt during the rainy season.

"That is a good question, sir," I said, "because I wanted to know the same from you."

I was sort of taken aback as I had never thought of receiving any messages from such an important person. I was wrong because a month later he sent me on another wild goose chase.

The result of the short conversation was that we made a date to show him what photo interpretation was about, so that he could make a judgment about the disposal of his staff working for me.

We agreed to meet at four o'clock that afternoon. It was fortunate that the emperor was considerate about the rooms he built for his guest. They were nicely designed with a spacious veranda, where one would have his cup of tea in the afternoon in the good old days. That was the place where our meeting would take place.

At four o'clock sharp the retinue of the Permanent Secretary of Maji arrived. Six of them and chairs had to be brought in so that we could sit around the large wooden table.

That afternoon I was thinking about a way to introduce someone without any background to the "art of aerial photo interpretation."

As an example, I took a pair of aerial photos of the landscape around us, which consisted of ridges and valleys. I had selected these because it was of a familiar environment. I had a pair, as one needs two photos to see in stereo. I laid the two photos out and set the stereoscope above them.

Stereograms were sold to many people during the late 1800s and early 1900s. Stereograms were photos looked at through a pair of funny glasses, the stereoscope, and one could see the pictures in three-dimension.

So, I proceeded to teach my boss to see stereo using the instrument. Finally after a lot of fiddling, I heard a big sigh. That was usually the sign that the image popped up in three-dimension, and one started to see the trees poking in one's eyes as it they stood real and tall, and the hills became mountains. Suddenly the world below was not flat anymore, but showed depth.

"Great! What is next?" he said.

Now was the time to convince Fred, and influential and important person, what it was all about.

"Please, look again and see whether you can identify the trail that runs through valley."

"Yes, that is clear," was his answer.

"Now, if you follow my finger, can you see a little elongated blimp on the trail?"

"Yes! Now what?"

"If you interpret it correctly, you will know that it is a hippopotamus."

"Are you kidding me now?" His staff was shaking their heads.

"You can recognize something, like a tree, but sometimes you cannot see it. You can, however, interpret it by trying to deduce what it is. During the war, people did not always see the tanks under the trees, but they could interpret the tank hiding, when there were only tracks leading to the tree and not out."

"I understand the reasoning." Well, our boss was not just somebody. He had engineering and law degrees.

"Well, you know that it is not a rock, because it sits too far from the hills in the middle of a swampy valley. A rock would have sunk into the mud. The other reason is that if it were a rock, the

animals would have gone around it. Right? In this case the blimp, or my hippopotamus, sits right in the middle of the trail. So, it is walking on the track."

"It could be an elephant?"

"Well if we measure it," I took a millimeter scale, "you will find it about three meters long. An elephant would be taller and a good size bigger. That is why we need the stereoscope to get the dimensions."

"It could be a rhinoceros, that is about the same size."

"True, but I think it is too muddy for a rhino. So, that is interpretation. We are sure, yet not sure — but given the arguments we can be fairly sure that it must be the animal that fits the description and environment. So, it is a hippo."

The permanent secretary shook his head and said, "Amazing."

"You see," I said, "in this way you can sit in your chair and scan hundreds of square miles in a day and see many things and map many things. In the old days, mapping on the ground would take days if not weeks to cover the area scanned in one day."

"Geologists missed large escarpments in the old days. They would sit in a chair under a large umbrella and scan the horizon with binoculars, and when they found something they would have some guy run over to the outcrop and chip a piece from it and then bring it back. Yes, the geologists in the old days were spoiled. From the air I spotted outcrops which were missed, because the escarpment was hidden behind a small hill if viewed from the trail."

I reported my unsuccessful search for diamonds to the Permanent Secretary of Maji. He was disappointed and asked, "What do we do now?"

Tanzania and its people enchanted me and I wanted to stay. So,

I said we should make a plan to map the whole country this way, because only a few sections have been mapped in the past. These were only those areas where some valuable minerals were found.

"I could teach photogeology at the Maji Institute in Dar es Salaam," I said. I would select promising students to map the geology of an area (a quadrangle). Then, I would arrange for graduate students from a university in the developed world to supervise the field work and have them teach the students field methods and complete the quadrangle. It would be a good deal. One could not lose and everyone would gain. The Tanzanian students would get the experience, the foreign graduate students would get their Ph.D. theses, and Tanzania would get the maps.

The boss looked up, contemplated the idea, and said, "I've got a very nice office next to mine. I expect you to sit there and work this all out for me, and then you can go home and come back to teach."

I did and left him my proposal. I visited Cornell and several other schools to find interested professors and students. There were many interested students because many Cornell graduate students were getting tired of mapping pieces of Vermont.

Shortly afterward, I was told that the permanent secretary, Fred, had passed away. Apparently, some stupid doctors in Germany had left their tools inside him after an operation. With his passing so went my dreams of mapping Tanzania. I ended up in Kenya, but it was not the same. What was different? The people.

19 • In Search of Diamonds

(1979)

It was my last week in Tabora, the old capital of German East Africa, or Tanganyika, now called Tanzania. I was ready to go home when a yellow message-slip fluttered onto my desk attached to a big brown envelope. These types of things have a bad foreboding because they look important and a yellow-slip always means an impossible request.

Yes, indeed. It was no exception. The message came from the big boss, the Permanent Secretary of Maji (the Ministry of Water, Energy and Mineral Resources), who described the contents of this small package as the data on a potential site for a diamond pipe. Tanzania was desperate to find some shortcut to funding their development program, besides the millions of dollars in foreign aid. There were some who hoped to find gold, oil or diamonds.

Inside the package were aerial photographs and a gravity map of a hill northwest of the Serengeti National Park in Tanzania. There was another yellow slip with the note: "There are indications that this hill is a volcanic pipe consisting of potential diamond-bearing

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rocks. Please, investigate this hill and see whether we could have a new source of diamonds." The note was signed by the permanent secretary himself. It was not a request but an order...I was not going home yet.

I asked my supervisor, the project manager, whether this was a joke. He told me that the big boss never made jokes. And, if there were diamonds, we would all be rich. So off we went. The driver, my assistant, Warioba, and I climbed into the white Range Rover. It was a serious mission and we rated the best equipment, plus we accepted the generous offer of the most comfortable car available. What usually took me three hours over a corduroy-rutted road required only half the time and offered great comfort, as the superior suspension absorbed all the bumps. We had air-conditioning, too, not for the weather, because the highlands were cool and comfortable, but to keep out the terrible red-colored dust. Usually a day in an open Land Rover would cover us completely in the red dust, which prevailed in the dry season. (In the rainy season we did not have the dust, but we often got stuck in the mud.)

We studied the aerial photographs first and, indeed, there was a very significant hill, but it did not have the right tone. This hill was light in color, instead of the dark indicative of the kimberlite rock of the diamond pipes, which weathers into a dark, almost bluish clay. Also, this hill did not have the radiating fractures, which are typical with diamond pipes. (At least that was one of the characteristics of the diamond pipes in South Africa, which I had studied for my professor at Cornell, earning a master's degree, and he a reputation.)

IN SEARCH OF DIAMONDS

Before disappointing the permanent secretary, we needed to field-check this hill. It is always unpleasant to report something negative and to disappoint the person who had sent you on a wild goose chase.

Looking for diamonds, however, can be very exciting, and there was always some hope that the scientific theories the geophysicist had come up with might be better than the two eyeballs of a photo interpreter. After all, photo interpretation is at best an art.

We loaded up the car and tied up a fifty-five gallon drum of petrol on the roof rack. (Gasoline is called petrol in Tanzania and ex-British colonies.) Range Rovers were very thirsty vehicles, and gasoline stations were few and far between. Only the larger towns would have petrol and there was usually some in the Serengeti Park to supply the tourist minibuses. (Tourism was one of the most important foreign exchange earners and therefore well treated.)

We took the rough roads north from Tabora. The greater part of the area was covered by the Miombo Forest. But once we were near Lake Victoria, the forest had been cleared, and only the few baobab trees stood, like upturned trees with roots sticking toward the sky. We went through Shinyanga, through the town of Mwanza on the south shore of Lake Victoria, then skirted the great lake to the Serengeti corridor. In Shinyanga we found a reasonable guest-house. There was not much in town besides the dust and the honky-tonk radio blaring into the night. It was an early rise the next day and we filled the tanks and the water jugs.

Water is Africa's great mystery. During the dry season there is not enough liquid around and during the wet season there is simply

too much. There was no middle road. Perhaps the reason for this extreme of climate was that the vegetation must have been denuded over the millennium of human occupation. The forest was replaced by grassland, and so when the rain fell it did not soak into the hard dry soil, but ran between the sparse grass blades.

It seems that nature in Africa has such an unpredictable temper. But, actually, this problem has been there for ages. It was not a problem, however, in the old days when there were more trees around and when there were less people to share the few water holes. You can still see the settlement patterns from the air in Tanzania before the *ujamaa* or villagization. In the old days, the wandering tribes would find a water hole, settle around it and then start to cultivate the land around the water source. That was a very practical idea. But one day the fearless leader of Tanzania visited China and North Korea.

It was the transformation of the African settlement patterns from scattered clusters to villages like those in China and Korea that had such an impact on the land. The only problem was that in those two Communist countries the people had lived for ages in villages. This was usually for security, because raiding hordes required the people to live together and water was more available, except in the desert west and northwest of China. In the semi-arid lands of Africa it was water that determined the settlement pattern and its size. A kinship group would migrate to better land to find a nice spring, and then build a homestead. The family would grow and this homestead expanded into a small settlement, its size determined by the ability of the spring to provide water for man and beast alike.

At any rate, driving down the bad roads in a Range Rover was nothing. In a few hours we covered the distance, which had taken Livingstone months to traverse under the blistering sun. The fastest route was through the east-west Serengeti corridor to Seronera Lodge and then north to Lobo Lodge, and cross-country to this wonderful "diamond" hill in the middle of nowhere.

A corridor lay between the main body of Serengeti Park and Lake Victoria. It gave the migrating animals access to the lake during the dry season. Wildebeest, or properly named gnu, and zebra would make a large circle in search of good grass and water. During the rainy season they grazed at the high plateau where the grass was fresh and green. The animals would be scattered throughout the fields. Often you see a tokapi male standing on top of a termite hill watching for predators, while the rest of the herd is grazing half hidden in the tall grass. A lonely giraffe would wobble on its long legs across the plain. To me, a giraffe is the true Africa beast.

It amazed me that six months later, during the dry season, the grass was grazed down to just stubble and water was only available in isolated water holes, or along the drying rivers. That was when the main herd of gnus started migrating in the thousands to the low valley of the corridor, where the streams still flowed. From the air, they looked like ants moving in long lines. Usually followed by predators, and they were just following their mobile food supply. Often vultures would circle high above, a good indication of a kill.

Tourists were not very common in those days, after Tanzania decided to unilaterally close the borders. However, after the first

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traumatic months, the tourist started to trickle back through the international airport in Arusha. It was not the standard rushing around from Nairobi, when tourists were packed into Volkswagen minibuses and rushed over the dirt roads. These were called the great circle tours. One set of tours would go east and south from Nairobi, and the other would go west and south. Somehow these two tours would meet halfway down the circles in Tanania. Poor souls, they hardly had time to see anything because these buses did not stop, but were trying to make the next lodge, where they unloaded the tourists and told them that game sighting would be two hours, just before sunset. There is nothing that can come close to these sunsets in the African plains. It is even better when you have a thorn tree silhouetted against the blood-red sky with streaks of gold.

With the closing of the borders the tourists had more time. The environment was more primitive because there were fewer tourists and those who showed up were getting royal treatment at the lodges. (You did need to bring your own toilet paper and light bulbs, however.)

Of course, the first sign of the tourists is a cluster of zebra-striped Volkswagen minibuses packed with people sticking out of the sunroofs with cameras bristling in all directions. The best seats are those looking forward, but you cannot expect to have all eight passengers share the two-by-three-foot hole without some shuffling. When you see the vehicles in a circle around "something," it must be a kill. Some predator killed some poor herbivore. For the tourists this was the scene they had traveled thousands of miles to the Serengeti to witness. We were not immune to this type of scenery,

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either. It was not often that one could see a pride of lions tear down a poor wildebeest, and this is just what happened during our search for diamonds. We pulled the white Range Rover into an empty spot among the dirty Volkswagen and excited tourists. Of course, we became the targets of their curiosity, a brown sunburned fellow with a beaten-down hat and field vest bulging with things, two Tanzanian assistants all packed into a luxury field car. The tourists wished to be riding in the comfort of the Range Rover after bouncing for hundreds of miles on the dusty dirt tracks. (The red dust covered everything and everybody, requiring the travelers to wash their hair at each stop.) They wondered who we were, because we did not look like the average tourists, but more like characters out of a movie scene.

After we exchanged greetings, we learned that the tourists were from New York City, from one of the nature clubs. As usual, they were mostly older, wealthy, retired people, although there was a sprinkle of young faces, even two beautiful blond girls in the group. My two Tanzanian assistants could not take their eyes off them. Warioba whispered in my ear that they could fetch at least two hundred cows.

"Why so much?" I said.

"Nice, white skin and blond hair," said Warioba, as he flashed them one of his famous African smiles, a row of brilliant white teeth.

"What are you doing here in that fancy car you have?" said an elderly tourist.

"Looking for diamonds," Warioba said innocently.

I guess they thought we were pulling their legs. So, off we went to find rooms at the Seronera Lodge where these tourists were also staying. Sure, there was enough space. They had plenty of rooms in those days, but they did not have supplies. You had to bring your own. We took our spare light bulbs and screwed them into the fittings, and also brought toilet paper. (At the end of the stay we removed the light bulbs and took the remaining toilet paper for the next stop.)

The driver and Warioba disappeared into the special lodging for them. They refused to stay at the lodge because they felt awkward sharing rooms with the *wazingus*. I had managed to convince them to eat with me. At first they refused, but their curiosity to meet the tourists got the best of them. It was probably the beautiful blondes that attracted them. These girls turned out to be professional photographers. We were the only people who were not visitors.

We tried to evade the questions about diamond hunting. But, finally, the discussion centered on the diamond search. Who would believe such a story? The next day we said our good-byes, and off we went to the northern corridor in the direction of Kenya. We turned onto a track westward toward the hill, which we could see from the road. We chased a herd of elephants from their peaceful munching, and a few bunches of wildebeest and zebras from their snooze in the shadow of a thorn tree. We had a good driver and weaved between the boulders and the thorn trees.

At last, there was the hill. It was not the highest hill I had ever climbed, but I was concerned about the bushes at the top because

we could have a very unpleasant surprise if it happened to contain the den of a lion or leopard. We drove the Range Rover as high up the slope we could and threw stones into the bushes, while keeping the door open for a fast escape in case a nasty animal came charging down on us. After a few minutes, we thought the bush (not the coast) was clear and started to look around for anything which looked like kimberlite or blue clay and perhaps the diamonds themselves.

Well, the intrusion (of rocks) was not the kind that promised the diamonds because it was more light in color, or acidic as the geologist called them. We poked and dug around to see if we could find some dark minerals, but they were all light-colored granite-type rocks and not a sign of diamonds. That was just too bad. I guess we were going to disappoint the permanent secretary of the ministry. Tanzania needed some miracles to help their dwindling income, and minerals would be the best source of sudden wealth.

There were diamonds found farther south of where we looked. An explorer by the name of Williams found a kimberlite pipe by dragging a plow behind his Land Rover. He saw the soil change color from the reds and yellows to a dark blue clay. It was the surest giveaway of the source of diamonds and is now called the Williams' Mine. I would like to come back to Tanzania to look for diamonds, because the Williams' Mine was topped by erosion. On the aerial photos you could trace the direction of the streams, and I would not be surprised that somewhere in the bush there are many diamonds to be reaped in the gravel.

It would have been nice if we had found the diamonds. We could have made a few people happy and put a few in our pockets.

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It was easier said than done, however. Diamonds in the field do not look like those you see in the windows of the jewelry stores. I could have kicked a few diamonds around while shuffling in the African veldt and never have known it.

Subsequently, I interviewed a geologist by telephone in London. He had just returned from six months in Tanzania looking for diamonds. I found out he had been searching the same hill and did not find any diamonds either.

On the way back, we ran into a few pairs of mating lions. We had heard that the lion would copulate several hundred times in the course of a few days. The reason is that the lion, in spite of being the king of beasts, had just about the smallest delivery organ, and needed all this exercise to ensure that the lioness was going to be impregnated. So we drove the car closely to the first pair and waited patiently. Naughtily, we found out that the roar of the Range Rover's engine would arouse the lion to action. So we made the rounds from one pair to the other, until we got bored with the game.

The next day we turned south from an unsuccessful diamond hunting expedition. The dust trail behind us was the ending of our adventure. The call of the birds in the trees and the snorting of the wildebeest in the veldt with the setting sun are a story by themselves.

IN SEARCH OF DIAMONDS



The many "inselbergs" studding the Serengeti landscape.

20 • The Mountains of Kitui

(1982)

An isolated granite hill stands like a lonely sentinel in the middle of an endless alluvial plain stretching eastward from the Kenya highlands until it reaches the coast, where the Indian Ocean glimmers in the sun.

It was a dull, but bumpy ride over the dirt tracks, which sometimes seemed to disappear into thin air.

The stream from this hill is the only source of permanent water for hundreds of miles around. Villages have sprung up along its foothill, as the precious water is important for the people who raise great herds of cattle. From the air the few additional springs are visible as dark spots in the middle of light barren soils, edged by the vegetation trampled by the thousand cattle hoofs in the midst of scattered woodland.

We traveled from Kitui, the district capital, almost straight east, as a bird would fly. The last villages around some water holes were only reachable by car from the west, but the Gala raiders had managed to come up from the coast through the woodlands to steal

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cattle. These cattle thieves were the reason that the famous camel brigade was re-established so that they could trail the robbers through the trackless woodland and savannah.

Our team did not bring any provisions because the Kenyan told me that we would get our supplies en route. However, I insisted on buying a bunch of bananas, which I have always done in Tanzania. It turned out to be a good supply of emergency food. Bananas in Kenya were not such an easy commodity to find as in the neighboring country. I guess they are less inclined to grow bananas. So I started to wonder about our lunch stop.

We found a little village about mid-day and stopped at the market. The boys went and found a butcher who took a good chunk of meat, about a pound and a half. It did not matter to us whether these were steaks or whether they were parts of the rear end of the cow, as long as it was a nice piece of solid meat without tendons and fat. This was wrapped in an old newspaper, and my counterpart proceeded to find a guy with a charcoal burner. He plunked the piece of beef on the table next to the fire, said a few things in Swahili, and we all sat at the long table constructed from a few planks watching the cook cut the meat into nice slabs.

Salt was the only ingredient and all these slices ended up on a square piece of fencing wire, which functioned as a grill. In the meantime, big mountains of *ugali* (cooked maize flour) were put in front of us. (In the Kagera region of Tanzania, I was served the same *ugali* made of mashed plantain bananas, real heaping plates of the African equivalent of mashed potatoes.) Then a soup was served with a few floating vegetables. The meal was a real carnivorous

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lunch of a lot of meat, a lot of *ugali* and a bit of green.

At the end of the dusty trail was a little sleepy town resting in the heat of the afternoon sun. It was an interesting town built around a square with some scattered rain trees, around which the village was strewn in an irregular row of shacks. A few donkeys were grazing and appeared undeterred by the heat. The rest of the town just sat there waiting for the cool of the night to come.

I was told in Kitui that there was a hotel in town. Yes, indeed, there was one. Its location being rather obscured; the owner of the local *duka* (shop), which sold everything from Coca Cola to salt, was also the owner of the "hotel." Through a back door we ended up in the inner court of the compound. The chickens were running around and dropping their little pile of waste indiscriminately around the cement courtyard. It made traversing the grounds a bit of an unhygienic hazard.

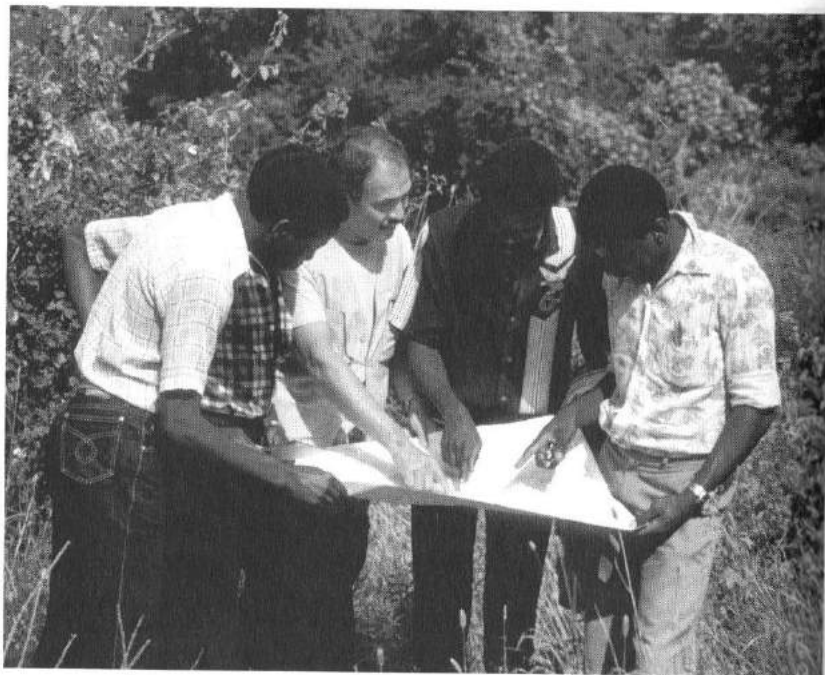
The rooms were nothing to rave about, but for two dollars a night you cannot expect too much. The iron bed was sturdy enough. The mattress was a bit on the worn side, while the bed sheets were a bit the color of the dust we had traveled through all day. A piece of wire, from which you could hang your mosquito net, hung from the ceiling above the bed. Those without netting would suffer from the bites of these nasty creatures. I had a good teacher, Bill Gibbons, an old Irishman who had served the British colonial service in the fifties and sixties. He told me that the minimum supplies you should bring besides your field clothes and equipment were a mosquito net, a can of bug spray and a five-gallon jerry can of drinking water plus a blanket to keep out the chill at night.

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"Kitui Hilton," including the chicken for dinner walking in the "living room."

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The field observation team discussing the landscape with the author.

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As a good student, I viewed my room through his eyes and found it acceptable. I took the net out and hung it from the wire hook; took my spray can and lifted the mattress and sprayed underneath it; then took the sheets and sprayed between the sheets and the mattress; then sprayed the whole room, retreated through the door, closed it behind me and wandered around for an hour or so for the vermin to die. These were not only mosquitoes, but also cockroaches, the most-feared bedbugs, and anything else that crawled and flew. One other thing you should not forget to carry with you toilet tissue, unless one would be happy using some of the leaves in the bush, some of which were poisonous.

Then there was the issue of the "bath." The shopkeeper pointed his finger in the direction of the mountain up the road and told us that there was a nice spot in the stream where we could bathe. He told us not to worry about the *Bilharzia*, liver fluke, as the fast running stream would not let the small amoebae survive; their membranes were too fragile. I guess one has to believe that . . .

It was interesting to find in the middle of the savannah an oasis, which was supplied by a single granite mountain. It collects the moisture as the few clouds rise and condense and fall as rain on the rocky slopes. We climbed the hill to see the condition of the soil layer. The water seeped into the soil and the cracks of the granite and from the many springs a wonderful clear stream flowed down the hill. Unfortunately, slash-and-burn agriculture started on the slopes and soil was eroding and in many places rocks in sizes tens of feet across were exposed, with soil removed from above and around

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them. The rain would rush down the hill over the bare rocks; the water would flood the land below and seep into the desert sand. Very little would be stored in the ever-dwindling soil on the single rock outcrop. There would be no more water, and then the dry season would arrive. The river itself, once flowing clear and fast down the slope and still clear along its foothills, would disappear into the sands of the riverbed. The only water in the dry season was in the holes dug into the sand. Settlements located away from the foothills needed to find water elsewhere.

After we climbed the hill to view the source of water, it was time to bathe. We took our towels and soap and walked down the dusty road in our rubber-thong sandals. It seemed the whole village was there. It was not exclusive to the hotel, but the common watering hole of the settlement. There were babies, giggling girls, and shy-smiling ladies. The men actually had their own corner. We tried to find a more secluded place, but to no avail. I guess the villagers knew where the best spots were and where the bottom was nice and sandy instead muddy and dirty. Two dollars was a fair price for the room plus wonderful bathing facilities in a natural setting.

Dinner was another issue. It appeared that we had to order our meal ahead of time. We tried to order some goat or mutton, but we would have to buy the whole animal, (although the whole village would have been grateful for the feast that would follow). Thus, we settled for roasted chicken, which was pretty good. In this meal, the *ugali* was substituted with rice and was not bad, and the soup tasted like all the soups I found in East Africa (except for the gumbo soup, a delicious concoction made out of boiled goat intestines).

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We walked around the village square after our meal and then settled back into our courtyard, which in the twilight did not seem to be as dirty. The moon rose over the wall and some beer appeared from nowhere. Everybody sat and told stories. The sound of the night took over, a concert of cicadas and crickets, interspersed with the howl of jackals scrounging in the garbage dump. It was a nice ending to a long day on the road, a climb up the mountain, and a refreshing bath in the clear stream.

How long the water will continue to trickle through the rocks down the slope of this lonely rocky sentinel is another question.



Erosion of Mount Kitui destroying the water supply of the area

21 • Joshua, the Mapmaker (1982)

Joshua was the manager of the guesthouse in Kitui, a very busy young man with a rather prominent face that reminded me of a horse. He had bright eyes that sparkled. Joshua was a very friendly fellow, who wanted to know everything about our work.

One day, late in the afternoon, he knocked on the door of my room, invited himself in, and wanted to continue his conversation on the mapping project of Kitui. As usual he expressed his interest in working with us. (Of course, it is good to work for a project that will take you to the big city and maybe earn a better pay. Indeed, his salary of ten dollars a month was enough to keep him in this little village at the edge of the savanna.)

Typically, most projects suffered from a lack of technicians, a most frustrating issue, as was the availability of facilities. Thus, here was a young man who was interested in working for us. Why not? But what background did he have, being a kid from a remote village in Kenya? He claimed to know all about maps, and indeed knew

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about scales and topography. In the course of conversation, we decided to give him a test and see whether he had the aptitude to be trained as an aerial photo interpreter.

There is a simple test to find out how much someone knows about maps, not theory, but practical application. We asked Joshua to draw a topographical profile along a line I drew across the map. It was one of the most difficult cartographic concepts to conceive. It was an effective way to test one's aptitude and knowledge of maps. He proceeded without hesitation. Indeed, to our surprise he completed an excellent cross section along our pencil line and — *voilà* — we had our first interpreter, our pigeon.

He anxiously waited my comments. He asked if he did well. Yes, he did! So, the next question was whether he could work for us. Well, we needed a bit of thinking. At the guesthouse, he was the manager, servant, and everything else. We could not quite take him away without much of a warning to the owner. We told Joshua that we had to think about it and would let him know the next morning. We discussed the issue and decided to tell him that we would take him.

“Joshua, you want to work for us, right?”

There was no question about it. So we suggested that he report for work in Nairobi in one week. We left him with money for the bus, food for on the road, and some more for miscellaneous things. We were careful in explaining to him how to find us, as he had never been to the big city.

A week later, Joshua showed up in Nairobi as agreed. It was just like in the movies. He stood there with a stick over his shoulder and a

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bundle attached at the end of it with all his belongings.

We found him a room, bought a steel folding bed, and settled him in. And then proceeded to train him in the art of photo interpretation.

That was the beginning of Joshua as a mapmaker. Although later we found out that he had some difficulty seeing things in stereo, it did not matter because he could draft, operate the Xerox machine, and run errands properly. Joshua was more than just a pigeon, he managed to become the jack-of-all-trades of the project. We could not, however, get him enrolled as a government official.

It would have been great if we could have trained him further, so that he could find another job if and when we left. We sent him to school for a driver's license, but he was too honest and refused to bribe the official, so he ended up without a driver's license, although he could drive very well.

When the project ended we transferred him to another project, but he refused the slightly lower pay and opted to quit and go back to his village. The last we heard, he had opened a bar on one of the crossroads on the main truck line between Nairobi and Mombasa. Sadly, he returned to where he came from and did not manage to take advantage of being lifted out of his environment. Maybe it is for the better, but it was such a misfortune that this pigeon learned to fly, but could not find a nest to roost. I wish in the end we could have found a niche for him, and for many others like him. Progress for these people remained an illusive goal.

We are never long enough in these countries to build a future for those we train. We are never given the opportunity to build

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institutions to continue the work we started. So in the end there was no place for him in this modern world. I wonder how many other Joshuas are in the social wilderness, able to do a job, but not able to find continuing employment to carry him and others into the future.

22 • At the United Nations

(1983–88)

It was very opportune when I was offered a senior position at the United Nations in Bangkok to head a project on remote sensing. It was timely, too, as the situation in Nairobi was deteriorating after the 1983 coup. The dream of a development expert is always the hope that at one point in time he or she will be allowed to secure a position to contribute to the welfare of the world.

For many people, a UN position ensures a career of financial security. Therefore, having a permanent UN job becomes one's ultimate goal. One has to either fit the mold or be an outcast forever though, and many avoid rocking the boat in order to prevent dismissal and thereby the loss of their wonderful pension. (For many staff recruited from developing countries, this represented a fortune that would allow a very high standard of living upon retirement.)

From the beginning, the recruitment process was less than transparent. Many times positions were already filled with candi-

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dates from preferred countries, perhaps even family of senior staff. For instance, when the Indonesians headed the United Nations in Bangkok, the roster was flooded by compatriots of the executive secretary; and when it was the turn of the Bangladeshis, experts from Bangladesh were taking up senior positions . . . and so on . . . It was a privilege. Often the background of the member would have very little to do with the job or, as they call it, the post.

This became a problem when one's goals and vision clashed with that of one's superior or the man at the top of the bureaucracy. The most important aspect of working for the United Nations is to follow the rules, with the result being that all too often delays in delivering aid would be the outcome. It was not the fault of those in the field dispensing aid. By and large, it was the bureaucracy at the top who were more concerned that all the paperwork was in place before actions could be taken, even though it meant instant failure because of the delays.

I had a great job, however. I was in charge of setting up a network of remote sensing centers in the Asian and Pacific regions. This involved traveling to many countries, and I was treated like royalty, a bit embarrassing, but calmed any concerns I had about not being wanted. It was a great honor for many of these countries to host an event sponsored by the UN, and it would have been disappointing for them not to have the chance to organize a meeting. Sometimes, though, it meant they needed to find the funds to finance the event and to bring the UN together with other participants from surrounding countries of the region.

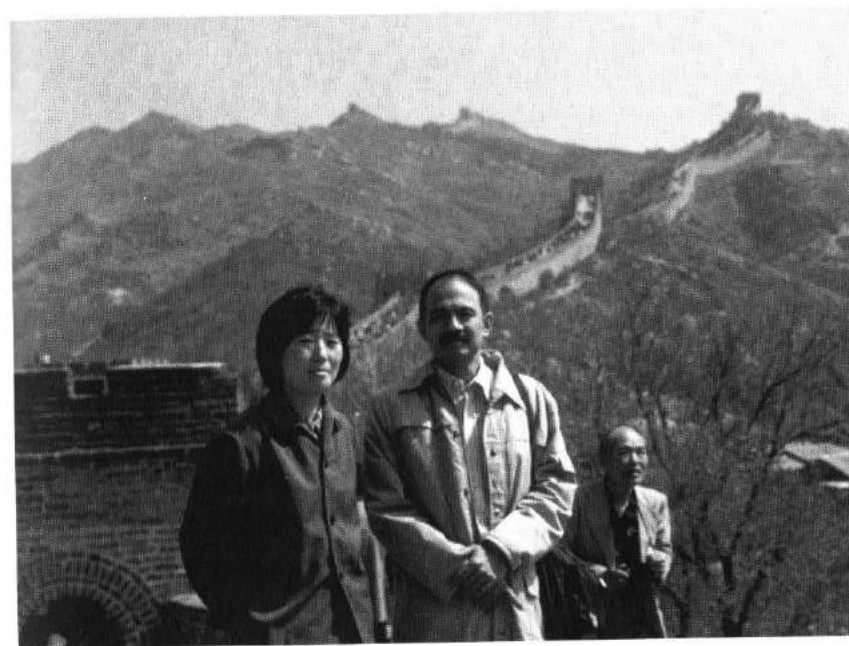
In the five years that I was working as project manager and

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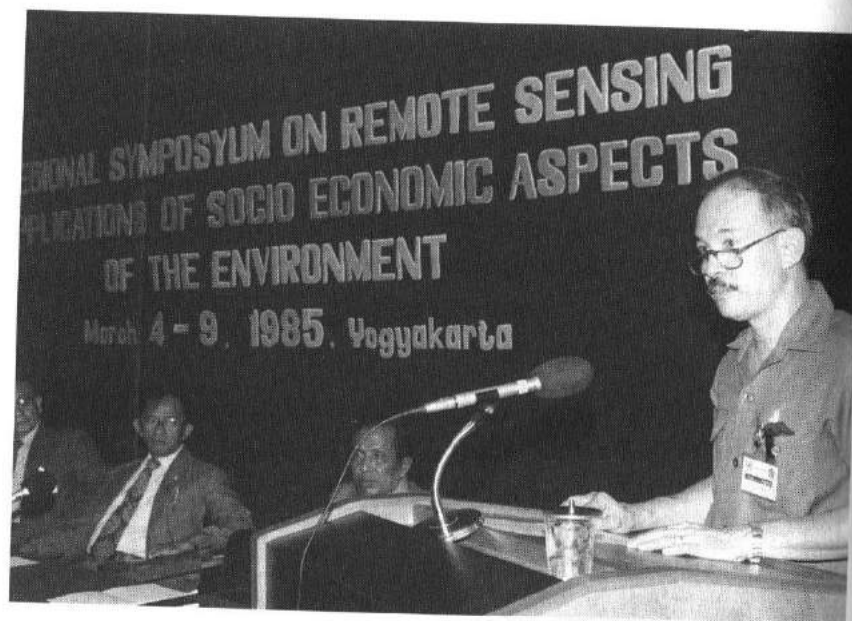
coordinator, I visited almost all the countries of Asia to arrange future meetings and query about their need of support. Most interesting were my visits to China as it was still a novel place to go in the early eighties. My first time out I was escorted by some more experienced staff to make sure that I was not going to make a fool of myself and, of course, not the UN agency I represented. It could not be helped that I made a faux pas, albeit an excusable one. It was all very innocent. During the formal dinner I found myself sitting on the right-hand side of the deputy minister in charge of the event. My first embarrassment was that I got morsels of great-tasting food put on my plate by the minister. As I was rather hungry and he was rather slow, I reached out into the plate to help myself. I noticed a sudden silence at the table and realized I had done something wrong. Sitting next to the host, I was also the guest of honor, so when speeches concluded, the UN representative whispered in my ear that I was to respond. That was a bit awkward, and so I slapped a few jokes and some complements together and sat down wiping the sweat off my brow.

Some of my visits were also interesting as I was offered a teaching job at several of the universities in China. Sometimes it was through my wife, who had occasion to accompany me. Yvonne was also offered a job as English teacher, at Wuhan University, probably the world's second largest university for surveying. She told the professor that she would have to decline as she wanted to stay with me. So they prepared a teaching job for me also. A year later, I was offered an adjunct teaching job at the University of Shanghai. I declined and did not realize that I should have accepted it, for show, as they went through great effort to secure permission from the council minister.

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The author and a guide at the Chinese Wall.



The author giving a speech during a UN-sponsored conference on the economic aspects of the environment.

Another time I was guided through a university and shown an attic laboratory where the Chinese were conducting advanced research in the new field of Geographic Information Systems (GIS). They were improving on the American technology. At the same time, they were given a grant by the Dutch government to set up a training center for aerial surveys like the one I had taught in the Netherlands. I was rather surprised about this as the Chinese were very advanced in technology. Why, then, would they accept such basic support from the Netherlands? They had a very simple answer: The foreign experts could teach the basic course, and leave their instructors with more time to conduct research in advance studies. But, at the same time, they could request from the central government funds to build the building, which was one of the more important aspects of the grant.

One of the difficulties of setting up an event in China at that time was the poverty of the budgets. For instance, foreign participants were getting fantastic food and lodging, while the Chinese participants would eat simple food in a separate dining room. During the first visit we had very little social contact and were, as usual, entertained with a show of acrobats. They had even managed to gather together a chamber music orchestra. I remember very well the shoes of the violinist, which needed patching, as his socks showed throw the bottom when he tapped the floor. During the first visit I was met with a delegation of officials in their stiff Mao suits, but the following years I saw the thaw and they even arranged a huge ball for us with female students of the university as dance partners.

But the most difficult problems were the diplomatic arrangements. In the middle sixties the relationship between China and the Republic of South Korea was non-existent. We had a Korean official nominated to attend a meeting in China. That was a problem, as the United Nations had a rule that I had to cancel the meeting if one member of a country was not allowed to attend. An incident had taken place earlier and nobody wanted to go through the embarrassment of another. So, I negotiated the permission of South Korea to attend the meeting in China. It was ruled that I had to provide his passport personally at the embassy, while hiding the guy. Then they would attach a visa on a loose piece of paper. It all went very nicely, but when I went to fetch the passport, it had disappeared. I feared I really would have an incident of great proportions on my hands, but fortunately the document was found. A very efficient clerk of the UN had picked it up and kept it in his drawer.

At one point I was asked by my sister, the wife of a high-ranking Indonesian official, whether I could arrange for her to visit China. (At that time Indonesia and China did not have diplomatic relationships.) The Chinese were anxious to reopen relations with Indonesia and went out of their way to assist her secretly. This was also during the period when foreign tourists discovered China, and there were not enough facilities. While the Indonesian visitors managed to secure a room in one of the grand hotels, they were warned that they would have to vacate the room at a certain day. They did not pay attention to this requirement and soon discovered just how strict the Chinese were when they found themselves locked out of their room, their suitcases packed and a letter presented to

them referring them to a guesthouse. The ladies were frantic, imagining the flea-infested beds at the guesthouse. I was called to mediate. I phoned the Chinese representative, and he told me not to worry. When I escorted the ladies to the "guesthouse," I was surprised to be stopped at a gate guarded by soldiers. The Indonesian ladies were lamenting their fate as now they really would end up in the newspapers — "Captured in China." As it turned out, the guesthouse was the official government state guesthouse too (Nixon used to stay during his visit to China) and their rooms were huge by any standard, and they had their own servants. Dinner was served in a dining room big enough to hold five hundred people.

It is hard to keep secrets, though, and upon my sister's return her husband was reprimanded, and it did get into the newspapers . . .

I visited many other countries, but none were more exciting than being in a place that was not quite peaceful. You could feel the tension, but at the same time they made every effort to make you welcome. The hosts in these countries were always courteous and went out of their way to help you.

In the end, after arranging many of these meetings, one starts to feel like a travel agent. A colleague from Sri Lanka once thanked me for providing all these opportunities for his staff to travel abroad. He told me honestly that he did not think these meetings were worth attending, but the travel grants were used by him to reward some of his staff with a trip abroad and make a bit of money on the side with their per diems. I knew that. Often the participants would stay two in a room and save their per diem. Often they would come

with huge empty bags. I would never forget the huge empty leather bag one of the Nepalese participants brought with him to China. At the end of the visit to the Friendship Store, where you could buy things tax free, they went home like camels full of presents for the people back home.

The most worrisome aspect of these travels was not being met on arrival, because often we would not be advised of the place where we were going to stay. Once, we arrived in Kathmandu, Nepal, with half a dozen senior officials of the Asian countries. We had faxed the host all our arrival details. But when we emerged from the plane, we did not see the director of the Remote Sensing Center of Nepal. Usually someone would be awaiting us at the airport to help us through formalities. I assured the delegates that the director was probably arranging our visas. But he was not there. I said that he was probably at the customs area clearing our luggage. He was not there either. So, we stood outside the airport with nobody welcoming us. Fortunately, I knew the name of the hotel, and we got into three taxis and off we went. I was a bit upset. I called the director at the office and he was not there. I left a message. It was not until after dinner that he showed up very agitated. He had never received the message from the UN about our arrival. I told him that I could not believe that. Well, rest assured that the UN had fouled things up, as two days later the director came up to me waving the telex message. To economize, the UN in Bangkok had sent all the telexes by night economy rate to New York and then UN New York would send them on by regular telex because it was cheaper that way. Great!

Arriving in a foreign country, I could have done as most of my

colleagues did: wave my blue UN passport or *Laissez Passer*, and make a lot of noise and look important. It was always rather embarrassing to demand privileges, and to compensate I would make an effort to hide my blue document. In Australia, I got into a bit of a problem as they did not really recognize the blue UN *Laissez Passer* and asked me whether I had my regular national passport, which they duly stamped. They advised me not to use my UN credentials in Australia, as they really did not recognize them.

These events left some nice memories. I made friends throughout Asia and kept in touch with them through the years. A network existed throughout the region, actually, and exchanges took place. However, success was usually a dangerous thing in the UN. In my case, it would work against me because I wanted the system to become meaningful and provide an information service so that the region could be informed of new technologies. The center that would be involved in this service required staff to manage it. We tried to advertise for workers and had forty applicants, but, in the end, we had to accept someone who was a countryman of the executive secretary, someone who did not have the qualifications. The center never materialized, and I left the UN a bit wiser.

Of course, jobs at the UN are very scarce. I did not know that I was set up for the fall and another country already had their candidate lined up to take over. I sought help with the U.S. representative, but without result. I resigned after being brought before a kangaroo court for having told outsiders the nasty methods used by the UN, like sending incriminating documents to the U.S. Embassy. Thus, it seemed that my position was already advertised

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and all these formalities were to make sure I left. When the U.S. woke up and saw me being replaced by someone from another country, they scrambled to find an American candidate. They offered the guy such a low salary, however, that he turned it down. And within twenty-four hours they accepted a Chinese candidate out of the clear blue sky. China wanted me to promote China and I refused, because as a UN official you must be neutral. China worked on it to replace me by their own man, and he went around promoting the Chinese capability in space technology. At one point they had a Chinese in charge of natural resources in New York, and Bangkok, and now they had also taken over the central position for space technology at the FAO in Rome. I left and looked back at a job well done as I forged the network of remote sensing in Asia and the Pacific. I was glad that I could go back to my old job as a consultant and not have to go through all those dance steps to stay in a job. I was not a career guy at the UN and five years was sufficient to say, enough is enough.

23 • Remote Sensing for the Pacific Islands

To introduce remote sensing to the Asia and Pacific countries gives one a huge territory. The Asian part consisted of a lot of land, while the Pacific island countries cover a lot of water. Remote sensing makes sense when we want to map land masses, but when we consider water, the situation is quite different. To look beyond the surface of the ocean is a different art from trying to monitor the already difficult land masses.

I was obligated to bring together the people from the Pacific countries. It was a rather difficult case, however, because of the low technological level of their participants and the fact that these countries are islands. Also, the use of space applications for such a marine environment was much different. With co-sponsorship of countries like Australia, it was possible to introduce this technology to the people. It was less applicable to do land surveys, as the land surface was very small. During one of my meetings with the representative of the island of Tuvalu, he asked me why he was asked to this

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meeting, because he could stand on an oil drum and see the other side of his island. Some of the islands are so small that you could walk from the airport to town, because the first houses were at the end of the airstrip, and the landing strips were not very long as they could barely accommodate a small aircraft.

The Tuvalu representative had a very good question.

I proposed that land surveys in these Pacific countries be conducted using small-frame cameras attached to an ultra-light airplane, which could be transported by boat from island to island. I remember a friend of mine who was contracted to take aerial photographs of the U.S. Pacific islands. He mentioned how he would fly for hours to take a few photographs covering these islands. Often the image of the island would be visible as a small speck on the film, as the specification demanded a specific scale. Because he had flown such a long distance for the job, he would come down to more reasonable altitude so that he could get the photo of the island a bit larger in the frame. This was just for his own satisfaction.

I arranged a large meeting in Suva, Fiji, where all the people of the Pacific interested or involved in aerial photography or mapping via remote sensing could gather to exchange ideas. This involved a dozen or more people gathering instead of my going from island to island for two months. (It took that long, as the transportation system was not the best, and often one had to wait to connect with a once-a-week flight to some isolated corner of the Pacific and wait another week to return.)

I decided that it made more sense to call one of the famous

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workshops. It was a popular event for the Island of Fiji, which hosted the seminars at the University of the South Pacific, a wonderful campus with nice buildings. The Australians were going to give a demonstration on mapping under water. They had the best experience; after all they had managed to map the Great Barrier Reef of the eastern coast of their continent. Their presence really made the meeting much better than just having a workshop about the few odds and ends of aerial photo interpretation. The computers gave it more color and excitement.

Because they were close by and had more experience in shallow water mapping, my hope was for Australia to take over the program. This was an important aspect of surveying in the South Pacific, since there was significant boat traffic. Many people did not realize how many small boats, either sail or motor powered, crisscrossed these seas. It was almost like going shopping to the nearest shopping mall. Indeed, some of the large sailboats travel all the way to Hawaii or the mainland of Australia to buy their major grocery supplies.

It took almost a week to assemble the participants — they had to come over some strange routes. For instance, the people from the Samoa Islands had to go back to Hawaii first and then swing south to Fiji. I had to go to New Zealand first, when there was a strike of the airport ground personnel in Australia. I thought that it was a great idea of having a dozen plus people taking these circuitous routes to come to the meeting rather than one person, me, taking these entire different routes over many weeks. I guess if you have nothing to do it could be fun. My colleague from Indonesia, who was in charge of the Energy Section of UNESCAP (the Economic

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An example of an ultra-light aircraft, for making surveys in the Pacific.

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and Social Committee for Asia and the Pacific) did take this round-the-islands trip twice in his two-year tour. It is one way of collecting a lot of per diem, which is the major side income of UN experts. The only problem for organizing this meeting was that the administration at the headquarters in Bangkok could not understand that it took participants weeks to get to the meetingplace. An argument arose about the islanders making too much per diem. I guess it was all right for an official, but not for a little islander, to make such money.

The meeting was great because it was also a way of getting people together to see for themselves what the options were to introduce this technology to their individual islands. Of course, for many islands, the sophisticated satellite imagery was not appropriate for mapping the small landmasses, but they were very suitable to map the shallow waters, and for many of these islands this was the major source of income, namely fishing rights. Often these economic zones were subject to poaching by many other countries, such as Japan and Taiwan. Thus, for many of the islanders the interest was centered toward monitoring the fishing fleets of the foreign countries. This was, however, another use of sophisticated remote sensing. The new fishing boats were equipped with sophisticated satellite remote sensing systems to facilitate their operation. They were able to detect the different temperature of the water surface and search for the contact zones between the warm and cold stream, which because of the good plankton, were the major feeding grounds of pelagic fish, and thus also the collection point of the carnivorous tuna packs, which were hunted by the fishing boat.

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These meetings were very informal — everybody wore shorts and colorful shirts. The cafeteria of the university had very decent food, but the best was the watermelon drink, which was served as a national drink in large buckets.

Maybe one day an adventurous gnome will fly on the back of a gooney bird with a camera and take pictures of the changing landscape of these little idyllic islands.

24 • Leningrad (1990)

Over a cup of coffee, I was asked whether I would know a way to access the infrastructure of Cambodia after years in the hand of the Khmer Rouge and a decade of fighting for control of this sad country. As it was an official of the U.S. government who raised the question: "Sure. All you have to do is take aerial photographs and study them. . . . Yes, you could see the damaged roads, bridges and abandoned villages and much more."

The problem of *getting* the photographs, however, was like a plot from *Mission Impossible*.

"What about the commercial satellite data?" the U.S. official asked. The best data available was from the French, but somehow it was not good enough. We also had a secret system with great pictures, but that was also a no, as well. "How about the famous Russian satellites, which can see a needle in a haystack?"

We knew the Russians had started selling their images on the commercial market. So, I pondered this idea and thought that

maybe a visit to Russia was called for. I had had such an invitation when I was at the United Nations. So, I sent off a letter and asked whether their invitation was still current. The answer was to come along to Leningrad. I was to find out more about this group when I decided to take them up on the invitation.

As I was paying it out of my own pocket, I got a cheap ticket on Aeroflot. The trip from Bangkok to Leningrad was painless. The Illushin aircraft was roomy with surprisingly a lot of kneeroom. Perhaps the Russians were big people and the seats were measured according to their sizes. (It was not cramped as in the Korea Airline where they fit four hundred plus passengers in a Boeing 747.)

This giant Illushin plane was not the most modern, but it was quiet and functional. The meals were also rather good, as they were probably prepared in Bangkok. I guess when people tell you to expect the worst, you tend to anticipate the worst and when it was acceptable, you are pleasantly surprised. Perhaps, it was also the excitement of going to a rather ominous place about which you have read only the negative things. But I was sure that what we read about Russia must contained a bit of prejudice.

The passengers on the flight were definitely a cheap crowd. I was told that Aeroflot had the cheapest flight to anywhere. The crowd consisted of young backpackers, many from Australia who walked around in bare feet. Most of these people connected in Moscow to other destinations some even as far as New York, until that cheap flight was discontinued because of complaints by other airlines. There were other professional people on the flight trying to save a buck as I was. Next to me was a Mercedes salesman from

London. He told me he sold many cars and gave me his card. He was actually pointing out that he was not quite one of the crowd. But I was wondering what he was doing in this cheap plane if he was selling that many expensive cars.

It was unfortunate that this travel over Russia was at night. I would have loved to have seen the landscape below. The refueling stop in Tasken, a city at the southeastern border of Russia at that time, just across from Afghanistan, was also uneventful because nothing was open at the airport during the night.

It did not look like the same airport I had visited back in 1965. Then, the airport was an old palace of one or another prince, and the runway was next to the building; it appeared to be the old racetrack. The palace had fancy parquet floors; chandeliers were still hanging from the ornate ceilings. There were a lot of French doors and the reception area may have been the main hall, where in the olden days the rich and the powerful would swirl to polka music. Every Christmas when we unpack ornaments, an earthenware, reindeer-shaped flute reminds me of that unauthorized trip through Russia on Scandinavian Airlines, in 1965. But it was the shortest way to Europe.

Traveling the area in the early eighties, I was told that a strong earthquake had leveled eighty percent of the city, and obviously the old palace did not survive it either and now an ugly monster had replaced it.

We arrived at Moscow Airport in the middle of the night. There were some anxious moments when my suitcase did not appear immediately, but after retrieving my baggage I went smoothly through immigration and customs. Customs was only



Dr. Shcherbakov and the author exchanging a contract to cooperate in the sales of Russian space photos and consultancy services.

interested in my foreign currency because of the great disparity between the official rate of one ruble for about two dollars, and the unofficial or black-market rate of fifteen rubles for one dollar. There was also a tourist rate, which I could not figure out. I saved a few dollars for emergencies.

I was wondering how I would get to Leningrad, but there was someone with a piece of cardboard with my name on it. His name was Sergei, and he was the marketing manager of an ecological company, which was really advanced as Russia was barely coming out of the Dark Ages. He did not speak much English, but enough for our purposes. I found out later that he was one of the better English speakers. After Sergei explained that the domestic airport was at the other side of town, we hopped into a Lada car, which was the Russian equivalent of an Italian Fiat. At two in the morning, in October, it was dark, cold and miserable, and there was no traffic at all.

It was amazing that the domestic airport was extremely crowded so early in the morning. Every seat in the departure lounge was occupied by either sleeping persons or those just sitting and waiting. There were even people sleeping on the floor, especially over the heating registers because those were the warmest spots. Sergei told me that crowded airports were common in Russia.

There wasn't any place to sit, and Sergei and the driver went outside every so often to smoke a cigarette. (Smoking was not allowed in public places in Russia as early as 1990.) I gave each a pack of Marlboros, which I had read in the *Herald Tribune* was worth a fortune. In return, Sergei gave me a wallet with ten rubles in it. It was a lot of money, half a month's salary for him, but it

seemed that a pack of Marlboro cigarettes was worth a lot more.

We waited a long time before there was an announcement for the flight to Leningrad. We proceeded toward the counter, but the rest of the people did not stir much. So my guide went and asked the official about the departure, and he was told that we were in the wrong waiting room. There was another waiting room for foreigners. It turned out that all the airports in those days had a special place for foreigners. It was like in China where the train station had a "soft seat" waiting room where you had cushions, and it was the same as in the train itself. The regular seats in the Chinese trains were just wooden benches. The foreigners were better treated and loaded ahead of the milling crowd. Contrary to what you might have read, the Russians made special accommodations for foreigners to prevent them from being trampled by an unruly bunch of local travelers, who would rush the plane with little regard for other passengers. They carried all kinds of baggage, and I would swear that if they were allowed they would be carrying chickens and goats onto the plane, just like on the busses in Asia.

On arrival, there was again a group of people waiting for me, including Dr. Vladimir and the translator, Michael. He did not speak much English although he could make himself understood with some effort.

They took me to a huge hotel where we hit the local custom of standing in line. It took us more than an hour just to get checked in. I finally managed to get to my room. I was told later that it was a Finnish-built and -run hotel, and while the rooms were very nice and clean, the water was not potable at all; perhaps it was even

outright poisonous. It was not even good for brushing your teeth as I later discovered.

First things first, and I was given the grand tour. Very quickly we saw the harbor, the various churches. It seemed that the Orthodox Church was returning after years of absence. Then we went to visit the cemetery where famous people were buried, such as Tsaikosvky and I think Mendeljeff, the famous chemist. There were a lot of invalids begging. People seem to share things with each other. Total strangers would stop you if you were smoking and ask for a cigarette and people would simply give it to you and even light it for you.

This first day was for just being a tourist. Then, at three, it was dinnertime, and we looked for a place to eat. Not so easy. Most restaurants had their doors closed, and you had to stand in a queue outside the door. The owners only let people in only after they had properly cleared and reset the tables. It was an excellent meal starting with smoke salmon, fish soup and then trout as the main course. I thought that there was very little food available. It was true that it was hard to find a place to eat. It remained a daily effort to find a place for lunch throughout my visit to Leningrad. As a matter of fact, my hosts would somehow find a place for lunch, which was an adventure by itself, but I was left to my own resources to find something for dinner.

Back at the hotel I had trouble getting water, because whenever I asked for water I got a bottle of vodka. I guess the way I pronounced water must have sounded like vodka in Russian. (My daughter Tina had the same problem when she visited Russia.)

Vladimir showed up, and then we went to the university and had coffee again. The group I was dealing with was AKAO, a conglomerate of about twenty scientists belonging to different agencies working on remote sensing projects. I understood that they moonlighted as AKAO, of which Vladimir was the vice president and had his office in the small space below the staircase, which was about ten square feet with four different telephones. Later, we went to visit the main office of this company, which was called RADAR. Vladimir, who used to be a jet pilot, really zoomed through the city.

We ended up in a dilapidated warehouse district, parked the car and walked through a weathered door. As everywhere else, there was a window next to the door and a fat lady, a babushka, was sitting there. Vladimir just grunted and she grunted back. Then we all trooped up the stairs. When we opened the door, I was thunderstruck; you would have to have been there to believe it. It was a completely different world. The walls had mahogany paneling and the floors had wall-to-wall rugs. Secretaries were sitting behind computers, nice light fixtures. There were several offices, just like at any U.S. company. I was to meet the people who manufacture radar equipment in Russia, equipment which at that time was very advanced.

We met in a very nicely decorated meeting hall. It was a contrast to the outside camouflage of the office, which was just a row of old warehouses. When the engineer from Moscow arrived, I was introduced to the material they had for sale. I was looking for good satellite imagery over Cambodia. They could not give me the exact coverage until a month later when I got home. Unfortunately,

they only had photos over the northwest part of Cambodia, where heavy fighting took place between the government troops and the U.S.-supported rebels and the Khmer Rouge. It was apparent that Russia had some interest in that conflict. But they did not have many photos covering the rest of the country.

I was really amazed at the quality of the satellite photos they showed me. I could see small foot trails and small huts on the one-meter by one-meter enlargement of a sample image shot over central Russia. They came up with an interesting proposal and asked me whether I could possibly sell their photographs and technical skills overseas. We agreed that I would try, but unfortunately at that time they had limited coverage of the world. The second problem was that they were all moonlighting and had no official access to the data. When I tried to get information on what areas they had material on, it was always unclear whether they had it or not. It seems that these cooperatives had contacts in many agencies with access to the materials, but the files were apparently mixed up, perhaps because the people working there had some personal interests and hid or misfiled the photos they thought worthwhile. In the end, I was not able to get anything going, a disappointment because there was great potential for mineral resources in Africa, where the Russians excelled.

Of course, the real problem for me was to leave with a sample of these great satellite photos to show potential clients. They did not think that I could walk out of Russia with one of their secret space photos under the arm, so they finally decided to cut a section of an enlargement the size of an A4 sheet of paper and put it inside a

report on geology of the same size. When I left Leningrad we were all worried about whether I would get searched. It turned out that I had taken one of the first Russian high-resolution satellite photos out of Russia.

The visit to Leningrad in 1990 involved other surprises. The effort to get food in those days was never to be forgotten. Everywhere people stood in line for food. Early in the morning, the women stood in queues ready to snap up the meats and produce. We sort of jokingly discussed the need of a Russian to have three wives. One to stand in line for the bread and milk, one to stand in line for buying meat, and one for getting the vegetables. But, if you were alone, you had to stand in line to select the stuff and then stand in line to pay and get a slip, and then again stand in line to exchange the slip and pick up whatever you bought. You also must have a good shopping bag, because I was caught with four bottles of soda and a loaf of bread. I had to jiggle the stuff all the way to the hotel. I forgot my friend Bill's advice to always carry an empty plastic bag in your back pocket for such emergencies.

Lunch breaks were special events. Vladimir would race through town in the Lada car. I would sit between two huge Russians in the back seat with another big one next to the driver, the boss. As soon as the car stopped, these three Russian scientists in their heavy coats would jump out. They would all rush out and leave me at the river in the car. One would walk farther up the street, another would cross the street, and the other would walk back. While Americans might think spy movies involve a bunch of Russians dressed in heavy coats rushing out of a car, disappearing in

all directions, it was actually a routine procedure used to find a place, to eat. The three would return to the car, and if they did not find a place everybody would hop back in the car and off we went to the next stop. Eventually, we would find a place and have a very good meal. Although we did back out of one restaurant because Vladimir said that there were Russian Mafia around.

The Russian people were very friendly people and share even with total strangers. Yeltsin seemed to be an example of this amiability. One day we were looking over the menu and Vladimir asked me through the interpreter whether I would like to have crab. I was barely able to utter the fact that they were messy to eat, when the lady from the next table came over and leaned over our table and started jabbering. I was told that she told us that the crab was not worth ordering in this restaurant. I found this interaction very common in Russia. Michael, the interpreter, told me that if he was riding a bicycle outside of town around lunchtime, he just waved a car down and asked if they had lunch to share. If they did, the people got out, spread a tablecloth and everybody had lunch. So, in another restaurant he and I had to share a large table with two other couples. The guy next to me started a conversation with Michael asking him who I was. So, the next thing I know this stranger shook my hand, then shouted to the bartender and soon I was tossing away good cognac. He asked me whether I could send him books of building homes from wood, because he was in the lumber business in Sachalin Island in Eastern Russia.

Of course, when in Leningrad one tries to see the many churches, even though most of them were at that time abandoned.

But my hosts were lucky to find me two tickets to the Gold Room at the famous Hermitage Museum, where we spent a whole morning just looking at all the gold. It was amazing that none had been looted or destroyed during the revolution. I do not think I have ever seen a more spectacular collection of jewelry and gold objects. I was most impressed by the gold of the Scythian civilization along the Black Sea, especially the beautiful reindeer and panther images, which were just fabulous. A few years ago, I went to visit this city again. It is now called St. Petersburg. My wife and I tried to see the entire collection of the Hermitage again, but after one day we were totally exhausted and saw no more than a fraction of the museum. We promised ourselves that we would come back one day and see the rest, and hope that they had a better map of the museum layout so that we could find our way through the collection.

When it was time to leave, the entire group brought me to the plane. They were a bit worried about the contraband photos I had in my suitcase. But I went through okay, and there was a common sigh of relief when my suitcase went through baggage. They waved me goodbye and went away. I would be received in Moscow by their representative there.

I never thought that a simple visit to look for space photography would turn out to be such an adventure. Unfortunately, we were never able to do much business because the system was not commercial enough to make a go of it. However, I was actually amazed that I had one of the earliest business contracts with a company in the Soviet Union and also had exported out of Russia one of the first

very high-resolution photographs from space. I guess I never got my space photos for my work in Cambodia. Eventually, Finland sponsored new aerial photographs to undertake the mapping of Cambodia. The U.S. interest faded away; it was a “mission impossible.”

25 • Land Mines and Refugees

(1993)

Geneva is at the edge of a lake in the midst of beautiful mountains, far away from the hungry hordes in Africa, Asia and other parts of the world where refugees have become a household word. The United Nations High Commission of Refugees is located along Lake Geneva at the edge of a magnificent park facing a row of beautiful houses. Its location is an incongruity to the business they are in: helping displaced and hungry people.

There have always been refugees, but are there more now, or are we more concerned with the refugee problem? It was in Laos where I started working on this subject: looking for an accurate count of the refugee population and finding land for resettlements since the land occupied by the refugees in Xieng Khouang Province, north of Vientiane, was slowly becoming deforested from growing rice and poppies. Refugees seemed to outguess officials, as was discovered when the total registered population of a quarter million refugees turned out to be one hundred thousand fewer.

Resettlement was another topic: It was the resettling of hill tribes into more permanent land, which started in Thailand two decades ago. A never-ending story, it seems.

One late summer day a team of experts converged at the headquarters of the United Nations High Commission of Refugee building to decide on the fate of 350,000 people living in camps along the Thai-Cambodia border. The management of the UNHCR Cambodia operation had decided to use the latest technology, namely satellite remote sensing, to identify potential (i.e., abandoned) land for resettlement of refugees.

The information available could not possibly be used. Also, it was impossible to orient oneself on the ground to field check the data, and we were under strict time constraints. It was a sad example of the use of high technology without understanding the real objectives and the local environment.

While technology failed to provide the field team with the necessary data to make a survey, it was a small team of human interpreters who would save the day — the pigeons. What information the computer did not have, they had between their ears and between their eyes.

The pigeons consisted of a mixture of people assembled at the Mekong Secretariat where I worked. Four came from Cambodia and were familiar with the land. Two were from Thailand and were familiar with the technique. One was a Laotian who had mapped Cambodia on Landsat imagery before. Then there was a Vietnamese forester who had roamed Cambodia when Vietnam was in charge. There also was a Filipino draftsman. It was quite a team, and in four

weeks they produced maps that indicated the potential land for resettlement: abandoned fields, which were now covered by grass, shrubbery or secondary forest.

However, they could not tell whether the land was owned or whether there were landmines. The information they provided, while it was very good, was not as accurate as could be obtained from aerial photographs. Thus, problems resulted in the field, because there was not enough land available for all the people to resettle. Besides the 350,000 at the border camps there were also 200,000 people displaced by the war within Cambodia. Together more than half a million people.

The meeting in Geneva was very interesting, as there were the UNHCR officials wringing their hands in desperation: the de-mining team in charge of removing the landmines, and the experts in remote sensing.

The decision was made that we would produce a new map. The de-mining team demonstrated their procedure. They marked an area on the ground in the office and crawled and showed how they would dig the mines with a knife. They said that they could do sixteen square meters a day. I could not help but suggest that it was a good business, you could be busy finding mines for hundreds of years. (Today it has become a big business because the conflicts in the world seem to use mines as a favorite tool to deny access to the enemy. But, as a result, thousands if not millions of these nasty devices are littered in areas of present and past human conflict.)

In the end, I was invited to visit the minefields in Cambodia by the de-mining team. I was briefed properly that mines are

dangerous, and that I should not wander around without a guide. I should not even get off the edge of the pavement to do what nature may demand of me, and should never select a tree for that purpose because they were a favorite place to plant mines. Well, I thought I might have a problem, but figured that others would have the same need and the de-miners would probably clear an area for us to relieve ourselves. The first day I was a bit afraid to wander away from the vehicle I rode in. The de-miners were rushing in and out, telling us where the mines were and all kind of dangerous stories . . . I had a very uncomfortable day watching where I placed my feet.

My attitude changed the minute the deputy governor of Pursat Province climbed into the vehicle I was traveling in. He directed the driver simply to drive through a hedge and through a field of bushes. I panicked, grasped his hand and asked, "What about the landmine?" He told me not to worry because he knew where they were and it was safe where we were going. I immediately relaxed. And sure enough after half an hour cross-country driving we managed to reach the place where we were going to build some refugee camps. The only problem was, the governor told me, the area was peppered with landmines because they had a big battle there, and thus we needed to get the land cleared first. Poor refugees, I thought.

However, the next day I made a trip with the same guide to the south. He told us then that we would have to be very careful and should step exactly where he put his feet. While walking and talking through the minefield, he would point out to the small

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LAND MINES AND REFUGEES





Page 234: The Governor of Sisophon Province, Cambodia demonstrating that the ammunition was not lethal anymore.

Page 235: A young soldier stands guard over the Angkor Monuments to prevent looting.

This page: The United Nations High Commission for Refugees' representative and the author discussing the available land for refugee resettlements.

sticks protruding out of the soil. "There is one," he would say. Well, I walked like I was stepping on eggs. It was a relief when I finally got on safe ground.

Later that week, I was invited by the team to visit a triple-A-class minefield. It was very dangerous because it was an active battle zone, west of Angkor. I climb into the white UN helicopter and off we went. I was told that it was so dangerous that we had to take evasive action to get to this site. The helicopter flew first high and then zig-zagged toward a dirt road and landed on it near a fortification of dirt. The soldiers were waving at us. What attracted my attention, however, were the hundreds of farmers tending the field on both sides of the road. When they saw the helicopter, not a daily affair, they converged to the road and the helicopter. I looked down the embankment. If anyone had planted mines, it would have been next to the road as indicated on the maps of the de-miners. The people surged toward the aircraft and climbed onto the road. I waited to see whether I would get blown up. Yet, I am still around.

So, I looked at Colonel Mitchel who was in charge of the Halo Trust de-miners, and asked about the mines. He told me gruffly that it was a misunderstanding . . .

I started to think that if I believed the de-miners, I could never walk freely in Cambodia. True, I almost made a fatal mistake when later I tried to look over a field site in Angkor and simply rushed off the vehicle into the bush trying to ignore the soldiers waving their hands and shouting. I told my guide to stop and see what they wanted. In the meantime the soldiers put on their uniforms, lugged a self-propelled grenade and their AK-47, and approached us

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muttering. They asked what we were doing. I said I wanted to see the bend in the river and showed it to them on the aerial photograph. They studied it for a few minutes and then said to follow them. They zig-zagged through the bushland, and suddenly I realized that they had laid mines along the perimeter of the Angkor Wat complex to protect the antiquity from thieves at night. How stupid could I be? I was later told that one should not venture into the area of Angkor Wat too early in the mornings in case the guards had not removed the mines along the road yet.

After ten years, landmines are still maiming people. These mines, in general, do not kill. The designers became sophisticated and decided that one wounded person would cost the troops three combatants (because it required two other persons to take care of a wounded comrade, while a dead soldier is disposed of).

Landmines.

In the last few decades *millions* of these nasty little “toys” have been buried throughout the world, especially the developing world where conflicts continue to flourish and the demand of these silent sentinels remains popular. The business of removing them will be with us for a long time to come.

26 • The Aerial Mapping of Cambodia

(1992–95)

There always is something secretive about maps and aerial photographs. In 1987, when the question was raised whether it was possible to gather information over Cambodia using remote sensing, it was accompanied, with a whisper, that “this conversation never happened.”

When I started looking into the possibility of gathering the data necessary for the reconstruction of Cambodia, I looked into various options. The simplest way would have been to use aerial photographs, but that was not in the realm of possibilities. The only option was satellite imagery. The Russians were known to have the best imagery around; at least their satellite photos shown to me were very good. Yet we couldn’t get what we needed from the Russians.

Things dragged on and the people who first asked for the analysis of satellite images of Cambodia, in the end, did not have the money. In the meantime, things started to move in the peace process. It seemed that the world was getting closer to seeing an end to the war in Cambodia. Soon, the “invasion” of Cambodia by the

United Nations started. Everybody seemed to have ideas about the reconstruction process. Along with the carpetbaggers, who bought up every single piece of unattached real estate, and the United Nations, was the development crowd. Cambodia was overwhelmed by offers for help. Most of these were in the form of paper. Land changed hands so fast that those who hesitated found the offer of yesterday taken up by a competitor for twice the price.

While this significant shift took place in Cambodia, the need for information to rebuild the country became more urgent, and an important source of quick information was the aerial photographs. While originally cloaked in secrecy, it soon became an issue of the greatest need. At the eleventh hour, funds were found to get an aerial survey of Cambodia. The United States, who pioneered the idea, became a spectator.

Against all odds, the secretary of the Mekong secretariat managed to scrounge the money together. Finmap, a small but aggressive aerial photo-flying outfit, got the contract. The survey started with twenty thousand square kilometers before the smoke from the firing of the slash-and-burn fields made the aerial photography useless. Still, people were needed to interpret these photos and transform them to maps, which could then be used by the people involved in the rehabilitation of the country. Thus, we had a reasonable chunk of territory with which to start the interpretation.

We began with fact-finding missions to Cambodia to see what they needed and what resources were already available. We met a small group of people sitting around a large table sipping tea. They told me they were sipping tea all day waiting for someone to give

them work. There were nine of them. They once roamed the country mapping the soils and the land use with the Vietnamese teams. They learned a few things, but mostly they carried the tools while their “saviors” did the work. They knew the land, even though they may not have had the training, and they begged for work. Ironically, it turned out that the Vietnamese I worked with were the same team who used to work in Cambodia during the period of the Vietnamese occupation of Cambodia, when Vietnam invaded Cambodia to destroy the Khmer Rouge.

The deputy minister of agriculture listened with attention to the discourse about remote sensing and what it could accomplish. In the end, I asked him if he thought this was a good idea and had his blessing.

He first tapped the table and then held his hand over his eyes, and said, “I am like a blind man making decision over the resources of my country, and what you promise are a pair of eyes. How can I refuse such an offer?” And off we were to a flying start — with no funds so to speak of, but with hope for the future: Maybe together we could provide information that could guide the course of the country’s development and its reconstruction after decades of war. This would be the nucleus of a team who would have the responsibility of putting Cambodia on the map, literally. Out of these humble beginnings a team was created, a team of people who hoped that somehow they could work and maybe make a living.

Although we had the people, we did not have a room or equipment. But the aerial photographs arrived so we borrowed the equipment and eventually got a room big enough to hold all of us

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The Land Use Mapping Office of the Ministry of Agriculture of Cambodia learning to study aerial photos.

THE AERIAL MAPPING OF CAMBODIA

and the furniture, what little there was. It was not the best building, and we shared it with others. It needed a lot of paint, but it was a place for the team to call their own. The hallway was dark and musty. It could use a light so that one could find the staircase going to the next floor. The cobwebs were all over the place and the people already in the room were determined to stay. Space was a precious commodity and not given up without a fight. But at the end of the day the Land Use Mapping Office moved in. It was their home for a long time to come.

The floors were washed and the walls were painted by the staff themselves. There was no power because electricity in Cambodia was not dependable. The roar of a Chinese generator produced enough power to light the lamps the staff worked by. The lamps themselves were jerry-rigged. Wire was slung from one window bar to the next and the lamps attached hung aslant, but they functioned and the people were happy.

The staff was resourceful when it came to supplementing their income. Once a week they pooled their money and eventually bought a second-hand motorcycle. Then, one of the smartest guys would disappear. I was later told that he took a trip into Vietnam through the maze of little trails, sold this motorcycle and made enough money to divide among the staff. Eventually, we managed to find the funds to supplement their meager salaries. It never occurred to the donor agencies that without such activities the employees would not have been able to survive at all. In fact, many of the people riding motorcycles along the roads looking for a fare are called motto riders, and many of them are government workers

moonlighting to make a living wage.

With all the money being donated to Cambodia, we thought the United Nations would sponsor us. Our resources from the Mekong secretariat were dwindling, and we needed to find another donor. We thought we had found a donor in the United Nations Development Program (UNDP). However, we soon realized that we had garnered not a savior, but a group of people who spent all their time determining whether or not we followed the rules. Also, there was no additional money for the staff, since the standard of United Nations agreements with all governments was that the recipient government had to supply the facilities and staff for free. In a way that is understandable in most developing countries, but a country recently devastated by decades of war did not have those resources. Either I had to find funds to provide a livelihood for my staff, or I would find them absent, moonlighting to earn some money to feed their families.

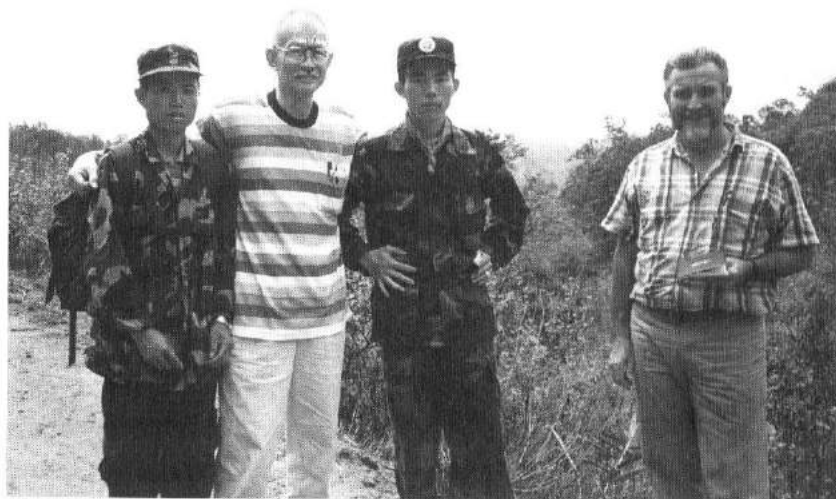
In the end, we had a million dollars worth of aerial photographs, but we did not have the money to support our staff, and slowly our project simply collapsed. We then moved to another agency. We started from scratch and created a new team. We tried to make the office earn some money by subcontracting work out to other agencies. In theory, that was also not allowed. But the whole process was never to be self-sustaining. However, for the United Nations there is a simple solution. They concluded that the project was successful and transferred the group to the government and reported that they had closed a very successful program, which in six months showed the tragic sign of failure with a padlock hanging

on its closed door.

It was not the end of things, however, because another donor appeared on the horizon and decided to take the same project over from scratch. This time we were not short of funds and the new project was a bustling activity.

We mapped the land use, the forest, the waterways, the rocks and the hills and the roads. Six years later, we had all the maps ever needed. So far nobody has used all this valuable data. Perhaps it is too difficult to understand its value and coordinate the use of millions of dollars of priceless information about Cambodia. It may be that in the process of progress we lost the human factor.

The minister understood the real purpose of gathering the data of Cambodia. He had told me: "I am making decisions in the dark like a blind man. You promise me light so that I can see." Now he has passed away and probably took his vision with him. Cambodia is no closer in bringing order than it was a decade ago. I feel guilty that I failed him.



The manager of the Wa project, Dr. Dalton (far right), and the author with two soldiers of the United Wa Army.

27 • The Wa Country

(1999)

Almost three decades later, I am back doing the things I did in Laos in 1973, namely mapping poppy fields. This time it was in the far northern reaches of Myanmar in the Wa country across the border from China's minority province of Sipsongphanna in Yunnan.

This is a land of hills and valleys. A granite mountain rises seven thousand feet into the sky. Villages stud the steep slopes like little brown jewels among the newly harvested rice fields. Among the forests, grassland and the soft sea-green poppy fields are clinging in the narrow valleys, where the soils will remain moist during the dry winter months. It is the only crop that grows during the dry season because it requires cold weather to germinate and grow.

This beautiful country has been contested throughout the ages. It was also the territory through which the allies built the famous Burma Road to supply the war theater in China, where General Stillwell's Merrill Marauders harassed the Japanese troops at the end of the Second World War. Telltale signs of Allied troops are

THE PIGEONS AND THE WITCH DOCTOR

still visible along the roads of Myanmar, as Burma is now called. Snub-nose trucks, built by Ford and Chevrolet in the 1940s and filled with war materials for China, once rumbled over red laterite roads through the jungle and over the mountains. The engines are now probably replaced by the more commonly available ones from Toyota, but they still follow the mountain roads and ply the city streets as busses full of daily commuters.

Just recently, a final battle was won by the Wa nation, who defeated the infamous Kuhn Sa's Shan army for control of the lucrative opium trade and control of the border with Thailand and Laos, through which this illicit drug is funneled throughout the world. The king of the hills, who controlled the opium trade for years, is now "retired" somewhere in the capital Yangon, the renamed old city of Rangoon. It is whispered that this money is now being laundered through legitimate activities of casinos and hotels.

To get to our destination was an effort. One has to take the local flight on Yangon Airways. It flies three times a week as a milk run to Keng Tung, the ancient capital of the Shan nation. Then it travels via Tachilek on the Thai border and then the Heho Airport, which serves Taungni in the land of lakes, where you would find the sources of vegetables for the people of Yanggon. There the tourists watch the "one-legged" fisherman on the lake and then walk on the floating bogs full of flowers and vegetables growing at the edge of the lake. In the town market you would find the hill tribes selling and buying. Many smoke the local cigars and are puffing away.

At Keng Tung we started the eight-hour long trek across the newly rebuilt road to the north. Here we changed our money from

THE WA COUNTRY



The roads in the Wa country of Burma, snaking along the hills.



The Burmese aerial photo team and the author teaching the finer points of the study.

the Burmese kyat to the Chinese yuan. We were told only Chinese was spoken and not Burmese. These new roads would wind along the mountain ridges. The scenery was magnificent. It was a bit like Switzerland without the glaciers. The grass-covered mountains, caused by the over-tilling of the land, stretch for miles, ridge after ridge fading into the blue horizon.

Keng Tung was also an ancient city under Thai control until recently. I was told that the Thai Princess HRH Sirindhon visited this ancient capital. There was a beautiful temple in middle of the city and I was told if you entered it and prayed, your wish to return to Keng Rung would be fulfilled. Perhaps one of these days I will come again to northern Myanmar as it seems to be sort of frozen in time. The market was very interesting and filled with Chinese products, such as blankets and plastic. What interested me were the ancient coins and opium weights in the form of ducks and lions. I have a soft spot for them and decided to buy a few more sets. These are old bronze weights, nicely cast and beautifully crafted.

The first shock I encountered was a boom across the road and a pillbox with a soldier in it. The driver of our official UN car turned around and said, "Can I have your passports, please??"

I said, "What for?" Well, we were entering another state. It was the Shan State. This "border" post dully entered us in the log and then waved us on. So, now we were in the Shan State. I had read about these states within a state, but had never physically crossed such a border.

The land adjacent to China was so different from the rest of Myanmar. It seemed that the Chinese control the economy and the Shan the countryside. The border towns used the Chinese yuan as the currency. Chinese, who did not speak a word of the local language, staffed the hotels and the instructions were all written in Chinese. The stores sold only products from China among a sprinkle of Thai Coca-Cola and other soft drinks. Even Pabst Blue Ribbon water, not beer, filtered in China was widely available. The telephones were all connected via satellite with China. It was very interesting to find little folding tables on the sidewalk in front of the many stores. The people sitting at the tables had mobile telephones and a writing pad where you could write the telephone number and they would connect you to anywhere in the world.

The town of Mong Lay is just a few minutes away from the road crossing to China. A huge parking lot with souvenirs straddles the border. Amazingly, the border stone was facing the wrong direction; in coming from China, it says China as if you were entering China. Perhaps, the Chinese were laying early claim on this territory.

What tourists visited here, you ask? These Chinese tourists came to gamble in the many casinos and other forms of entertainment, which in China were frowned on or outright prohibited. The people visiting the towns were very interesting: from the traditionally dressed hill tribes to the nicely-legged Chinese girls in provocative short skirts or transparent dresses. I am convinced that emancipated Chinese women were exhibitionists. The traditional Burmese sarong, the *lonyin*, was not a common dress.

Mong Lay is a boomtown. The many buildings had nice façades behind the shoddily-built shacks. But brand new Toyota Landcruisers plied the streets and here and there someone would come by with a gilded .45 pistol stuck in his waistband. You had a feeling that you were walking on the movie set of a Chinese western. The banks were amazing in that they were open until nine in the evening. You would not try to rob these either, because the two armed guards at either side of the door would not let a robber pass and would probably shoot them on sight just to have some practice. There must have been a lot of business in this small border town of no more ten to twenty thousand people. But the most amazing thing was the water truck washing the streets. Someone must have visited Stockholm, where this is a common sight once a week. You wouldn't dare park your car on the wrong side of the street on the one day a week they come to clean your particular street in Stockholm. If you did, you would find your car locked up on an island and a hefty bill for you to pay to rescue your vehicle.

In the course of the day we crossed several more borders. First, back from the Shan States to the Myanmar side, which had control of a little sliver of road. And then another gate back into the Shan State and finally we crossed in the Wa State, a country with a reputation for mean people. At least when you read the local Thai newspaper, they were blamed for everything concerning drugs. For me it was interesting, because I went up to the Wa country to help with mapping the poppy fields and to help the crop substitution program. The Wa has promised the UN that they will stop growing poppies by 2005, if the UN helps them with new crops. In the

meantime, they have already replaced a lot of area adjacent to China with sugar cane fields and rubber plantations. Those were already considered opium free. It is amazing that the sugar refinery was in China, and so were the rubber processing plants. These were activities unknown to the outside world.

The trails were being changed into wide roads to allow the large modern trucks to travel from China to farther inland into Myanmar. Hundreds of Chinese workers were setting the stones to form the roadbed, using the well-established system invented by the Scotsman MacAdam, and known as Macadam roads. This type of road is very labor intensive as each of the stones is set by hand. However, it seems that the cheap Chinese labor in this area beats the cost of using modern road-building technology, which does not last as well as the primitively built roads.

People in Thailand thought the Wa country a backward country of headhunters. But the fact is that the Wa have taxed the opium growers directly, and use that money for development. It paid for the road, school and dam construction. The idea of direct taxation of drugs seemed to be a very novel idea and not even considered by the developed countries. Sure, it also paid for the arms of this army.

One day we had a meeting with a delegation of the Wa concerning the program that we were running with them. The paramount chief of the Wa was the guest of honor. The minute he arrived our compound was surrounded by a fully armed detachment of Wa soldiers protecting their important people. It was amazing that the briefing was held in Chinese, which turned out to be the

official language of the Wa tribe, being one of the latest tribes migrating from China into Burma or Myanmar. At the time I met him, the chief looked very grave and serious. I was told that just two days earlier he had executed two senior officers who did not listen to his warning to stop the manufacture of methamphetamines with the Chinese traders. The Chinese escaped across the border, but the Wa officers were given an hour's warning to escape and were hunted down and killed.

I do not think that the Wa made an idle promise to stop opium cultivation by year 2005 if a viable alternative could be found for the economics of the hills. There was a question as to whether a real viable substitute crop could be found. I am sure, however, the growing of poppies was losing against the much simpler production of pills, which seems to flood the markets of the cities.

In the meantime, sophisticated aerial surveys were conducted to map the land use of these hills, rocks and soils to see what other crops could find a way of life for these people.

We were unfortunate to do the field survey in the beginning of the rainy season, and travel on the yet-to-be rehabilitated roads was a liability. Several times we had to climb out of the vehicle because it threatened to slide off the slippery trail into the deep ravines. I was glad when I was finally released to return to Yangon. We cheered too soon as a monsoon storm blanketed the mountains and the roads became treacherous. Trucks and cars were stuck on the roads, which had turn into quagmire. Our four-wheel-drive vehicles just managed to move past these stuck vehicles, and with great relief we arrive back in Ken Tung after spending fifteen hours on the road, as opposed to the regular ten hours.

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Upon arrival we were told that there were not going to be any aircraft flying for the next three or four days. People were looking for alternate routes to get back to civilization, including trying to cross the closed border into Thailand at Tachilek. It was not a good idea, and the Thai authorities may have let us rot at the gate into Thailand.

So, I spent the next few days roaming through the market and looking over the old coins still available. But I had enough souvenirs; and when the storm passed and the plane landed, which it eventually did, it was time to leave.

• About the Author •

Heng Thung was born in the Dutch East Indies, which later became Indonesia. He received a Bachelor of Arts in geology, a Master of Science in aerial photo studies, and a Ph.D. in transportation, regional, and city planning — all from Cornell University.

It was the study of aerial photos, and later satellite imagery, which made a profound impression on him and set the course for his career. Using satellite imagery, one could map more of the world in a shorter period of time while sitting behind a stereoscope than tromping for extended periods through the bush and jungle, though Thung's work took him all around the globe.

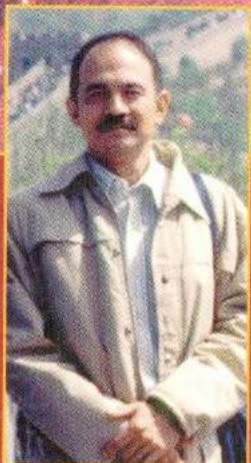
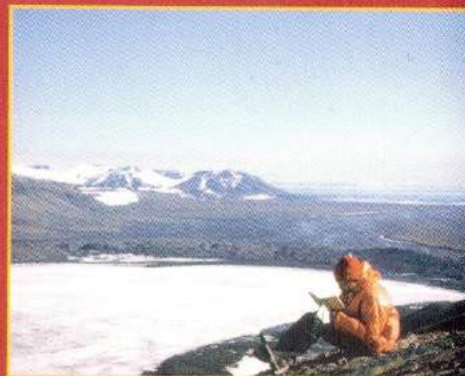
The author mapped dwellings to establish the population of villages and mapped the poppy fields of the Golden Triangle. He made studies for war and the development of countries ... and the rehabilitation of countries destroyed by war, such as Cambodia. Thung mapped the land from Thailand, Laos, Myanmar to Cambodia, from the tropical jungle of Sumatra and the veldt of Africa to the Arctic Islands of Spitzbergen north of Norway.

He has lately found enjoyment in mapping the ruins of the Angkor Empire in Cambodia, making new discoveries behind Angkor's decline and the denudation of the forest of the once mighty empire a thousand years ago.

He and his wife, Yvonne, currently divide their time between their home base in Asheville, North Carolina and their home away from home in Bangkok, Thailand.

"This land, our earth, as we look from higher and higher perches, appears to become more like an atlas with continents and seas, forests and land, mountains, and with rivers snaking over the landscape.

"Looking back over forty-five years as a photo interpreter, it has been a very exciting life . . .



"... a life traveling all over the globe, sometimes seeing things and documenting land I was never to set foot on. There were no limits and no borders to cross. Aerial photographs have no frontiers. Visits to the actual sites to field check the data, however, took me to many continents: from East Africa to Asia and from the Arctic to the Pacific. It was one hell of a great adventure."

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