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CHAPTER

Khun Orapan Chivaranond (front left), from the Department of Bacteriology, joins Khmer staff who run a diarrheal disease laboratory in Site B, a Cambodian refugee camp in Surin Province. (Photograph courtesy of Khun Orapan Chivaranond)





An example of the logistical challenges of getting to field sites. Khun Suriya Teopipithaporn helps lever a vehicle driven by Khun Opas Utama out of mud in Sa Kaeo, near the Kampuchean border in 1983. (Photograph courtesy of Khun Suriya Teopipithaporn)



The 1980s

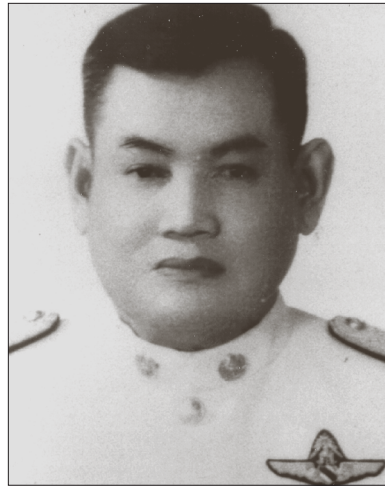
IN THE 1980s, OVERSIGHT OF AFRIMS was shifted from the Royal Thai Supreme Command to the Royal Thai Army Medical Department. This change allowed greater integration into the Phramongkutklao Army Medical Center, where AFRIMS was located, and also brought to an end the era of directors general appointed from any of the three military services. Since 1988, all have been generals from within the Army Medical Department.

The decade began with significant AFRIMS assistance to the Khmer refugees who had flowed into Thailand in late 1979 and settled in camps just inside the Thai border. AFRIMS medical teams mobilized quickly and began providing assistance while the United Nations High Commissioner for Refugees built a medical and logistic support structure. Through subsequent years, AFRIMS clinicians and laboratories continued to provide diagnostic information for disease outbreaks in the camps, including cholera, murine typhus, and enteritis necroticans.

During the decade, AFRIMS laboratories introduced new molecular biology and immunology techniques, applying these methods to tropical diseases. In parallel, extensive field work was conducted in multiple sites in Thailand. The field studies were made possible or enhanced by these diagnostic techniques and immune assessments, as well as new drugs and vaccines.

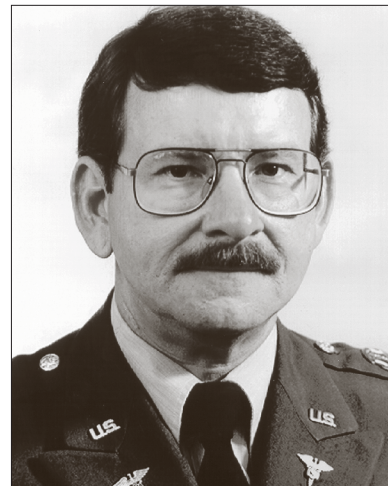
Malaria research teams showed that mefloquine, which had been introduced less than 10 years earlier, was losing efficacy against the falciparum parasites circulating on the Thai-Cambodian border. They also demonstrated that doxycycline, a familiar and approved drug, was effective for prophylaxis (it is still in use today). Major Kyle Webster collaborated with Mahidol University's Professor Yongyuth Yuthavong to study the biochemistry of the falciparum

[Top Left] Air Vice Marshal Sahas Nakasiri, Director General, 1984–1988. (Royal Thai Army official photograph)



[Top Right] Major General Suriya Phalakornkul, Director General, 1988–1990. (Royal Thai Army official photograph)

[Bottom Left] Colonel Michael Benenson, USAMC Director, 1980–1984. (US Army official photograph)



[Bottom Right] Colonel Frank Sodetz, USAMC Director, 1984–1989. (US Army official photograph)

parasite, and worked with immunologists to dissect the immune responses elicited by malaria, as well as the immune suppression caused by the disease. This research laid the groundwork for the first trial of a candidate malaria vaccine in Asia, which was led by Colonel Pricha Singharaj and Major Arthur Brown with volunteers from among Thai Rangers (Tahan Pran). The Rangers were based in a non-malarious area of the northeast but deployed to areas of border fighting where malaria was endemic.



AFRIMS entomologists studied the vector component of malaria. Major Ronald Rosenberg and colleagues developed an enzyme-linked immunosorbent assay (ELISA) to detect vivax sporozoites in mosquitoes. This ELISA, and a similar assay for falciparum sporozoites, enabled easier and more reliable malaria field epidemiology. To increase understanding of individual infections, studies were done on ways to better estimate the number of sporozoites injected by a single mosquito. Five researchers from AFRIMS and Mahidol University's faculty of tropical medicine established and carried out a controlled human challenge model using the bites of *Plasmodium falciparum*-infected mosquitoes. Such models have proven useful in the assessment of malaria candidate drugs and vaccines.

The studies of Japanese encephalitis (JE) begun in the 1970s continued. Assays were developed that allowed diagnosis of acute infections and differentiation of JE from dengue. The diagnostic tools made it possible to formally test the

Main AFRIMS buildings on Ratchawithi Road in 1980s viewed from the southwest. The 8-story building in the center is the main research building. To its left is the 4-story building, still bearing the SEATO crest, that houses the headquarters of both components. Further left is the Royal Thai Army Institute of Pathology. (MFN#003558, AFRIMS photograph archives)



efficacy of a JE vaccine in a setting where most infections are clinically silent. A vaccine trial in 40,000 school children in Kamphaeng Phet, led by Major Charles Hoke and Dr. Ananda Nisalak, proved the vaccine's efficacy and safety, and led to its incorporation into the childhood immunization program of Thailand and to vaccine licensure in the United States.

AFRIMS virologists also studied dengue. Diagnostics were developed that not only distinguished dengue from JE, but also primary from secondary infections. A study of Bangkok children with dengue added to evidence that second cases may be more serious than first cases. Entomologists studied the vector mosquito, *Aedes aegypti*, and found that its efficacy was temperature dependent. This finding helped explain the cyclic patterns of dengue transmission.



[Opposite] Royal Thai Army–AFRIMS joint malaria research center at a Khmer refugee camp in Sa Kaeo, Prachinburi (1981). (MFN#003547, AFRIMS photograph archives)

AFRIMS team and clinic in a Khmer refugee camp near border in Sa Kaeo (1981). Lieutenant Colonel Kenneth Dixon (green shirt), chief of the Department of Medicine, Major Kyle Webster (blue shirt), and AFRIMS staff carrying out a study of falciparum malaria treatment, comparing differing durations of quinine and tetracycline. (MFN#002763, AFRIMS photograph archives)



[Top] Captain Chirapa Eamsila leads a joint team in a study of malaria prophylaxis in soldiers (Sa Kaeo, 1983). (Photograph courtesy of Khun Suriya Teopipithaporn)

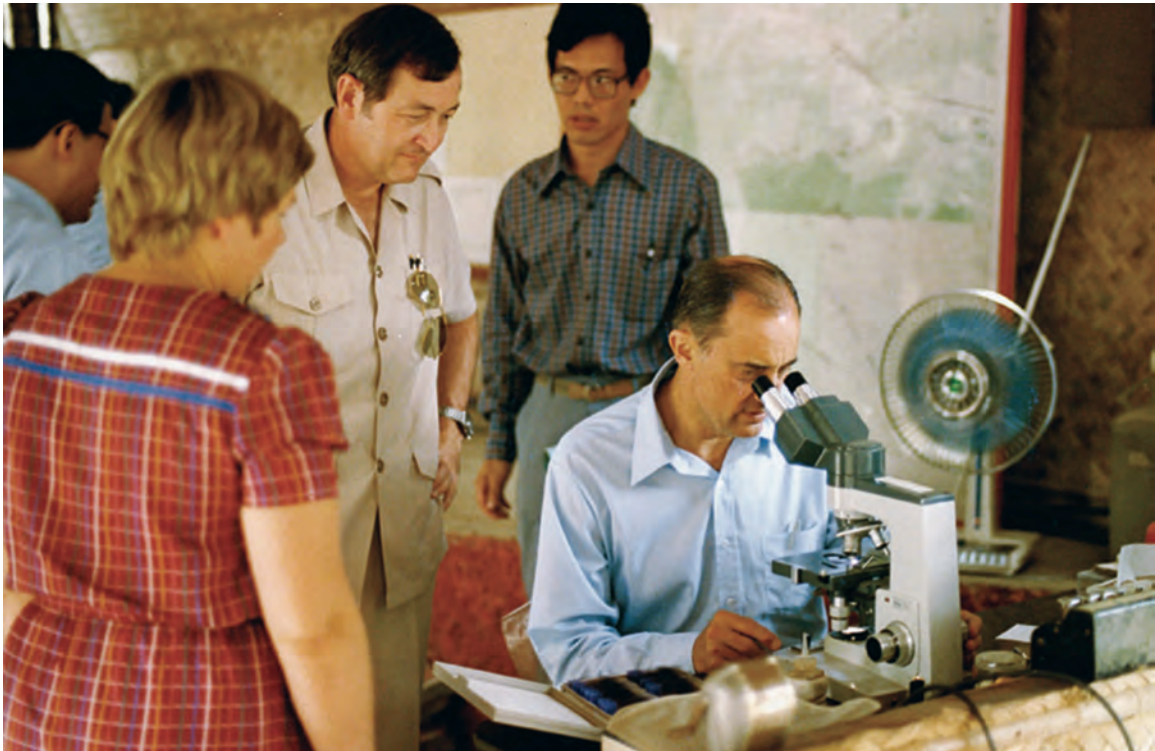
[Bottom] Major Ellen Boudreau examines a Thai soldier hospitalized with malaria in Sa Kaeo (1983) as part of a malaria drug study. (MFN#000949, AFRIMS photograph archives)



Diarrheal diseases were another area in which laboratory advances were matched with extensive field work. Colonel Peter Echeverria led this program. Patterns of diarrhea occurring at high rates (>50%) were described in Peace Corps volunteers newly arrived in Thailand and in travelers in Nepal. DNA probes were developed in the laboratory for numerous pathogens and toxins, increasing both sensitivity and specificity of diagnoses. An example of cross-departmental collaboration was the creation by the diarrheal research team of a DNA probe against falciparum malaria, which was assessed by the malaria field teams. This new type of probe allowed diagnoses of malaria from dried blood spots collected in remote field sites.

The Department of Veterinary Medicine had been testing new malaria drugs in a rhesus monkey model since 1976. The monkeys were initially

Lieutenant General Bernhard Mitemeyer, US Army Surgeon General, examines a malaria blood smear during a 1983 visit at the Royal Thai Army Department of Medicine's malaria field site in Borai, near the border of southeast Thailand and Kampuchea. Standing from left: Major Ellen Boudreau, Major Kyle Webster, and Captain Lorrin Pang. (Photograph courtesy of Dr. Kyle Webster)





Dr. Montip Gettayacamin, center front, from AFRIMS's Department of Veterinary Medicine, inspects Royal Thai Army horses in 1986 to assess a skin problem. (Photograph courtesy of Dr. Montip Gettayacamin)

imported from India, but in the early 1980s AFRIMS acquired new rhesus monkeys from the United States and created a breeding colony that continues 30 years later. Large cages were built within the facility so that monkeys could live as families and groups, with screening that allowed exposure to the ambient temperature and humidity.

The 1980s also brought computers and changing modes of communication to AFRIMS. At the start of the decade, the institute had a single computer, with 8-inch floppy disks, located in the library and rarely used. Over time, Apple computers were acquired for each department and a computer technician joined the staff. The 40,000-subject JE vaccine trial utilized one of the Apple computers as a project management tool. Computers were built into laboratory instruments, and AFRIMS installed the first flow cytometer in Southeast Asia in the late 1980s. Telephone was the main mode of



[Top Left] Khun Somchit Jamjang, a nurse from Kamphaeng Phet Hospital, gives JE vaccine with a foot-powered jet gun to a school child in 1985. The joint AFRIMS–Ministry of Public Health study tested the vaccine in a study with 65,000 children. The positive results led to the vaccine being incorporated into Thailand's childhood immunization program and licensed in the United States. (MFN#003772, AFRIMS photograph archives)



[Top Right] This cynomolgus monkey mother cares for her twin babies. Breeding of monkeys within the Department of Veterinary Medicine's vivarium began in the mid-1980s. (MFN#003581, AFRIMS photograph archives)

connection with WRAIR, with a few telexes sent out from the embassy and a single fax machine installed once an additional phone line was obtained in the late 1980s. An early VAX computer (Digital Equipment Corporation, Maynard, MA) in headquarters provided the platform for the start of email communication. AFRIMS was technologically well prepared to continue advanced research with the necessary means of communications in place as the decade ended.

[Bottom] Anthrax surveillance was carried out in 1987–1988 by the Department of Veterinary Medicine in Mae Hong Son. Dr. Montip Gettayacamin stands in the center of the field team. (Photograph courtesy of Dr. Montip Gettayacamin)

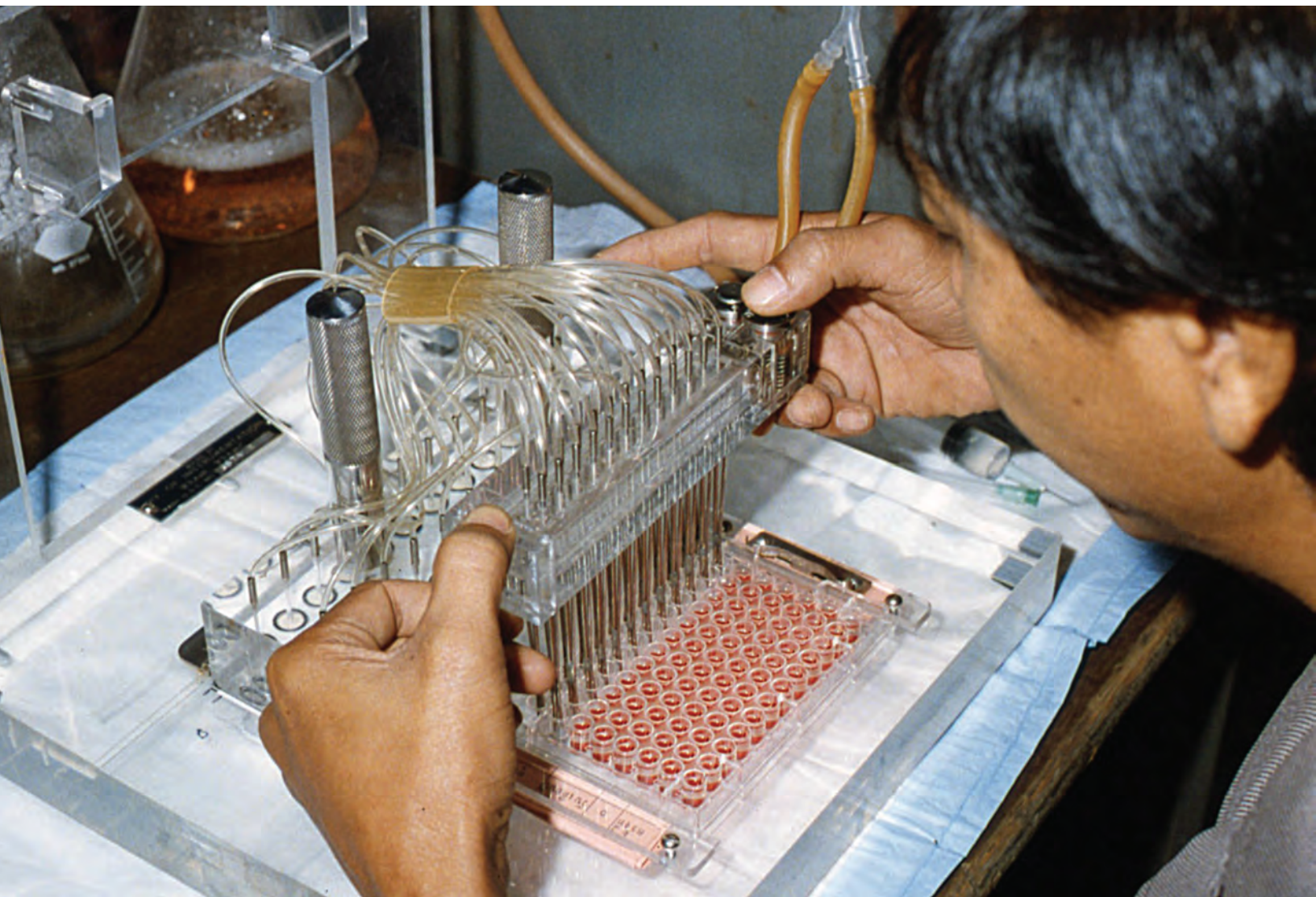
[Top Left] Dr. Ananda Nisalak, from the Department of Virology, leads follow-up of school children who participated in the JE vaccine study (1985). (MFN#002793, AFRIMS photograph archives)

[Bottom Left] The USAMC's 1985 softball team. Memories persist of beating the teams from the other US Embassy agencies, and of sponsors such as "Lucy's Tiger Den." Front row from left: Major David Taylor, Major Lorrin Pang, Major Kyle Webster, Lieutenant Colonel George Ward, and Sergeant First Class Doug Dufault. Second row from left: Sergeant First Class Guy Tyndal, Staff Sergeant Philip Camillocci, Major Jack Gingrich, Colonel Frank Sodetz, Staff Sergeant Carlton Brown, and Sergeant First Class John Marceau. (Photograph courtesy of Dr. Kyle Webster)

[Right] CIWEC Clinic Travel Medicine Center in Kathmandu, where the Department of Bacteriology collaborated to study traveler's diarrhea starting in 1986. Findings included a demonstration that cyclospora caused a significant amount of the diarrhea among travelers to Nepal. (MFN#001818, AFRIMS photograph archives)







Falciparum malaria parasites being harvested from a blood-stage culture, a technique established at AFRIMS. The methodology was used to measure the drug sensitivity of parasites collected from infected subjects. (MFN#002766, AFRIMS photograph archives)



[Top] Khun Phachern Pooyindee collects capillary blood by finger stick from a child in Bonokhlo, a malaria study site on the Burmese border in Tak Province. (Photograph courtesy of Dr. Dennis Shanks)



[Bottom] Major Ronald Rosenberg (second from left) and team from the Department of Entomology. Khun Rampa Rattarithikul (far left), Khun Pradith Mahapibul (second from right) and Khun Chumnong Noigamol (far right) organize the adult and larval mosquitoes they have collected at Phu Kra Dueng National Park in Loei Province. (Photograph courtesy of Dr. Rampa Rattarithikul)





[Top Left] Princess Chulabhorn honored AFRIMS with a visit in 1988. Here she reviews the results of DNA hybridization assays presented by Khun Orntipa Sethabutr in the Department of Bacteriology. Seen over Khun Orntipa's shoulder is US Ambassador to Thailand William Brown. (MFN#3722, AFRIMS photograph archives)

[Bottom Left] Daniel O'Donohue, US ambassador to Thailand, visited AFRIMS in 1989. Here he observes the preparation of mosquitoes for examination with Major Ronald Rosenberg, Colonel Frank Sodetz, and Captain Daniel Strickman. (MFN#001595, AFRIMS photograph archives)

[Right] In the late 1980s, the two components of AFRIMS formed a collaboration with the Thai Rangers (Tahan Pran) of Camp Pakthongchai in Nakhon Ratchasima (Korat). The Rangers had a problem with malaria, which many acquired during deployments to the forested mountains on the border. The researchers monitored Rangers regularly and provided treatment to those with parasites in their blood, often before the start of symptoms. This collaboration was the foundation for a prophylactic vaccine study done several years later. (MFN#000900, AFRIMS photograph archives)