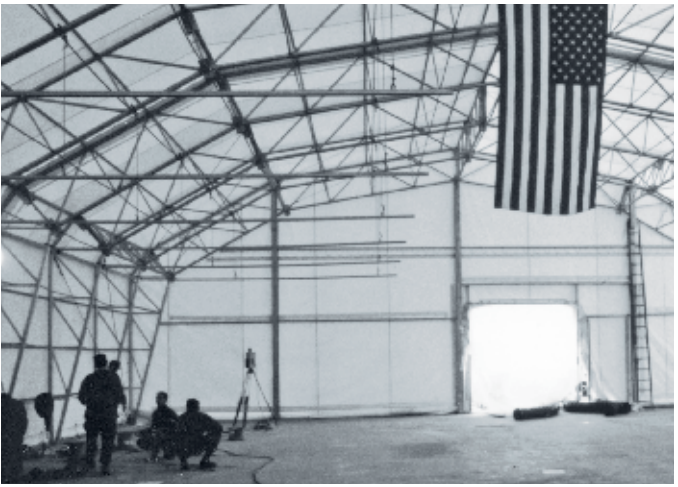
CHAPTER 5



TALENT, TECHNOLOGY, AND TRANSFORMATION, 1976–2000

[Opposite] *Captain Elgin C Cowart, Jr, Medical Corps, US Navy, ninth director of the AFIP, 1976–1980. Cowart sought increased use of the case materials in the AFIP repository during his tenure. "Much of this vast resource lies dormant," he wrote in his first director's message. "Its use must be encouraged, if not by our own staff, then by other authorized professionals."* [1] *In 1980 Cowart became the third director of the American Registry of Pathology serving in that position until 1990. (MIS 09-08344)*

By the mid-1970s, having achieved an enviable level of growth and maturity, the AFIP was poised for the next chapter in its long and distinguished history—a chapter marked by a continued infusion of talent and the incorporation of rapidly evolving technological advances, both of which ultimately transformed the institute's service to the military and the worldwide medical community.

AFIP's reputation as a world leader in pathology consultation, education, and research meant that leading pathologists and scientists, and those who eventually would earn worldwide notoriety in their respective fields, continued to flock to the institute throughout the late 1970s and next two decades. These included pathologists in the fields of soft tissue; gynecology and breast pathology; infectious and tropical diseases; dermatology; orthopaedics; pediatrics; hematopathology; genitourinary pathology; radiology; neuropathology; ophthalmic pathology; cardiovascular pathology; oral and maxillofacial pathology; veterinary pathology; endocrine pathology; acquired immunodeficiency syndrome (AIDS); environmental pathology; pulmonary pathology; hematopathology; forensics; otolaryngic pathology; hepatic pathology; and gastrointestinal pathology.

Additionally, incentive to join the AFIP staff was strengthened in 1976 when Congress chartered the American Registry of Pathology, legislation sponsored by senators Ted Kennedy and Sam Nunn. This legislation gave ARP the ability to expand the scope of AFIP's activities by acting as a principal liaison to the civilian medical community. Included in the charter was a cooperative enterprise

mechanism that allowed ARP to receive fees for education courses and consultations, as well as private grant funding that, in turn, was used to enhance the combined mission of both organizations. Since 1976, this arrangement has allowed continued civilian consultations in the diagnosis of malignant disease; helped fund equipment and technical support in diagnostic laboratories; boosted the continuing medical education program, both within the institute and at national and international sites; helped fund and expand research efforts and staff recruitment, most notably in the areas of DNA and telepathology; and allowed ARP to assume responsibility for printing and marketing publications, which created greater demand for tumor atlases, fascicles, and other publications.

With confidence that this new partnership would ensure recruitment and retention of the best and brightest in pathology, the AFIP turned its attention to identifying and incorporating emerging technologies, and developing techniques to advance pathology and research efforts.

Although the optical microscope continued to be pathology's workhorse instrument, the acquisition of multihead microscopes in the late 1970s allowed several pathologists to view the same cases at the same time, speeding up the diagnostic process. Equally important, these microscopes became instrumental for teaching and staff development. Gas chromatography technology and specialized radioimmunoassay techniques enhanced the Division of Toxicology's ability to support the Department of Defense (DoD) drug detection program. Within the Division of Chemical Pathology, incorporation of scanning electron microscopes in the latter part of the 1970s proved particularly useful in identification of asbestos fibers in lung tissue, as well as other health problems.

The institute built a hypobaric (dive) chamber in the 1970s and a hyperbaric (altitude) chamber in the 1980s, both of which helped advance research on the effects of oxygen on cells at high and low atmospheric pressures, allowing for extensive study on the effectiveness of oxygen on wound healing and tissue repair. More powerful Fourier transform infrared (FT-IR) microscopes introduced in the mid-1980s gave researchers the ability to identify foreign materials and some metabolic materials in tissue and other specimens. This was complemented by Raman microspectroscopy, which also was used to identify materials in tissue, but has the advantage of a laser light that provides superior spatial resolution. The technique also proved valuable in the study of microorganisms related to emerging infections and possible biological weapons. The ability to send the laser beam into sealed glass containers to analyze toxic

[Opposite] *In one of AFIP's more iconic photos, four of the institute's great pathologists discuss cases while gathered around a multihead microscope circa 1988. (Seated from left to right) Dr Nelson Irey, chair, Department of Environmental and Drug Induced Pathology; Dr Frank Johnson, chair, Department of Chemical Pathology; and Dr Elson Helwig, chair, Department of Gastrointestinal Pathology; (standing) Dr Henry Norris, chair, Department of Gynecologic and Breast Pathology. (NCP 17013)*

specimens made this a safe procedure. Confocal laser scanning microscopy (CLSM), introduced in the late 1980s, proved to be especially useful in cardiovascular and ophthalmic pathology. Incorporating a confocal pinhole, CLSM is highly efficient at rejecting out-of-focus fluorescent light, providing the pathologist with a clean, 3-dimensional image of the tissue under analysis.

In 1991 the Department of Environmental and Toxicological Pathology acquired an atomic absorption spectrophotometer—then a state-of-the art instrument—for determining concentrations of metals in tissue samples, such as aluminum, mercury, silver, or arsenic. Also in 1991, AFIP became a leader in digital image processing with the opening of its own facility. Advanced techniques allowed for image processing, quantitative analysis, and computer-assisted image interpretation in anatomic pathology cases. Coupled with microscopy, digital image processing allowed for a 3-dimensional rendering of tissues, resulting in more accurate interpretation of tissue features.

A year later this technology, combined with advanced communications systems, was incorporated into a telepathology pilot study with Malcolm Grow Hospital at Andrews Air Force Base. In the study, the consulting pathologist prepared digitized images from a biopsy and transmitted the images to an AFIP pathologist, who could then resolve questions concerning the biopsy within a matter of hours, rather than days or weeks. Throughout the 1990s this program was expanded to include a network of hospitals in the United States, Europe, and Korea. At the same time, advances were being made in immunohistochemistry, which involves staining minute amounts of specific structures in various cells based on an immune reaction. This made it possible to identify tiny amounts of specific cellular products, making it easier to distinguish one type of tumor from another.

Complementary technologies included a 1977 microfilming project that by year's end resulted in more than 1.3 million case records in the AFIP repository being copied onto microfiche masters, freeing up more than 5,000 square feet while providing easy access

[Bottom] *Donald West King, fourth executive director of the ARP. He served in the position from 1990 to 2002. (NCP 17382)*

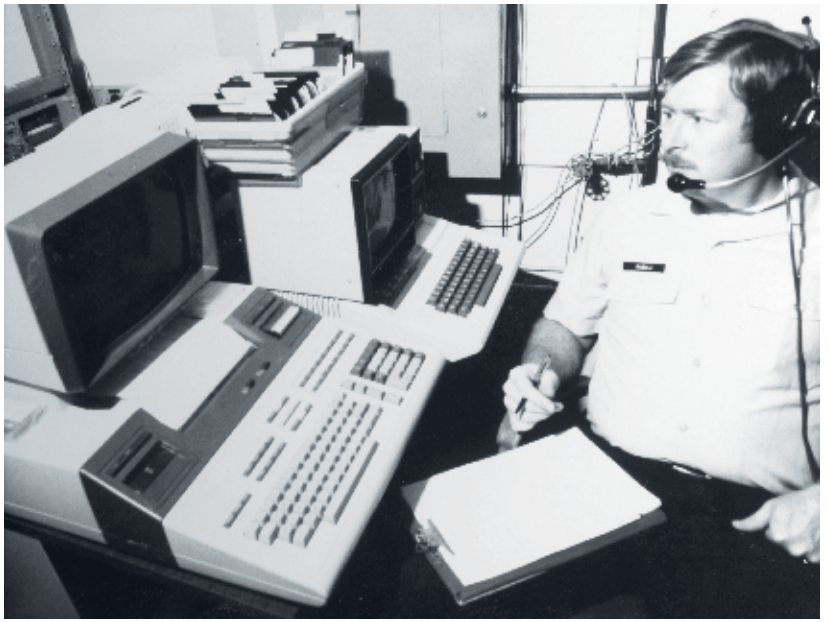
[Opposite | Top] *Dr Chapman H Binford, first executive director of the ARP, 1976–1978. (MIS 08-1087-1)*

[Opposite | Bottom] *Dr Kenneth Earle, second executive director of the ARP, 1978–1980. Dr Earle had also had a distinguished career in neuropathology with the AFIP. (NCP 17347)*

to records. In 1981 a computer-based system called the pathology case management system (PACMS) was put into operation, replacing the old case tracking system consisting of pencil, paper, and keypunch. The changeover allowed for online, real-time accessioning and tracking of cases. PACMS was augmented in 1985 with the acquisition of personal computers as tools to assist researchers with project development, database management, library research, word processing, and telecommunications. Throughout the 1990s the institute made all atlases of tumor pathology available in CD-ROM format, giving the ARP a low-cost way to produce and sell the atlases, expanding their reach in the medical community.

Throughout the 1980s and 1990s forensic pathology and research expanded rapidly. An indoor ballistics testing range built in AFIP's basement in the early 1980s was used to study wound effects with gelatin molds, which mimic human tissue. The gelatin molds allowed researchers to demonstrate specific wound characteristics of various types of weapons, helping them to interpret data and injury patterns at autopsy. The range eventually included a high-speed camera to track the path of a fired round and create a chronograph, which provided an accurate computer readout of the entry, mid-range, and exit speed of all rounds shot. By the mid-1980s, AFIP forensic pathologists were earning a reputation as experts in identifying disassociated remains, having participated in several high-profile investigations.

At the same time, leaders within the DoD had come to recognize the potential of forensic pathology, especially after the 1985 development of the polymerase chain reaction (PCR) process, allowing for the identification of remains using deoxyribonucleic acid (DNA). This powerful tool held the promise of never again leaving a service member unidentified. In 1988, through a DoD directive, AFIP's Department of Forensic Sciences became the Armed Forces Medical Examiner System (AFMES)—a move intended to create a centralized organization for medico-legal death investigations under military jurisdiction and mass casualty events. In 1991 the recently formed Armed Forces DNA Identification Laboratory (AFDIL) became part of the medical examiner system, quickly followed by establishment of the Armed Forces

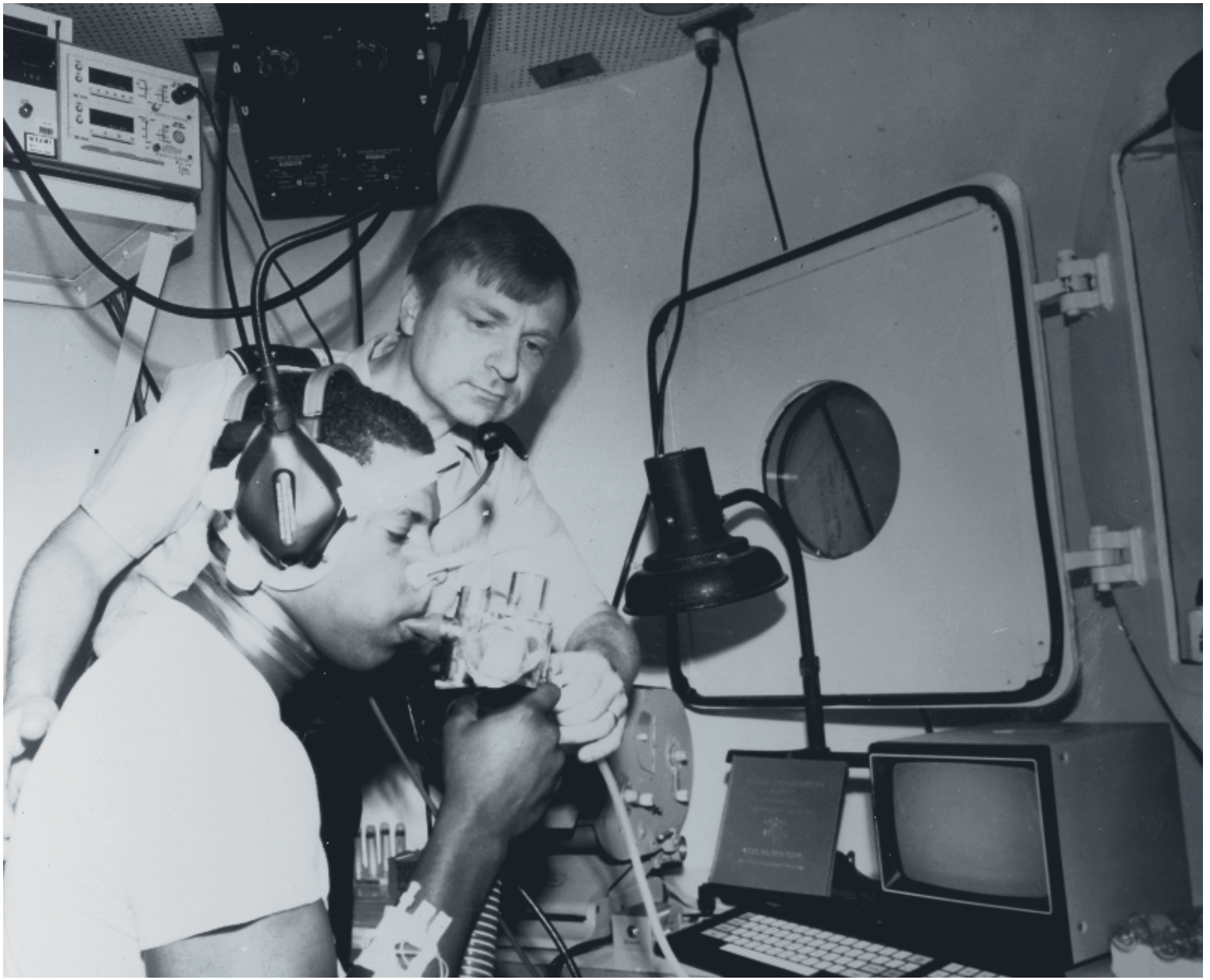


Then Air Force Technical Sergeant Ridgely Rabold uses a newly installed computer system to operate the AFIP's hypobaric chamber in 1980. Rabold was monitoring a human research subject performing a Choice Reaction Time Test at 25,000 feet, which measures the reaction time to a series of blinking lights. Rabold now serves as executive assistant to the director, AFIP. (NCP 17349)

[Opposite] *Air Force Major James Canik conducts a lung capacity test at 10,000 feet inside the hypobaric chamber in 1982. The chamber was also used for studies on wound healing, immune function, oxygen toxicity, altitude hypoxia, and sickle-cell trait at low atmospheric pressures. Canik now serves as the deputy director for administration, support and facilities, AFDIL. (NCP 17350)*

Repository of Specimen Samples for the Identification of Remains (AFRSSIR), which began storing blood-spot cards on all military personnel that could be used to obtain DNA sequencing, if needed, to identify deceased service members. In 1998 a Medical Mortality Surveillance Division was added to the system. The division was tasked to rapidly detect mortality due to unexplained causes or infectious disease, and to analyze all active duty deaths for trends and preventable or modifiable risk factors. DNA technology also paved the way for experimentation with and development of molecular biology and pathology.

During the 1970s, 80s, and 90s, all types of scientific research benefited from the development of new technology. Research achievements during this period included groundbreaking investigations into the identification and eradication of leprosy, both overseas and in the southern United States; the etiology of cat-scratch fever and how to positively identify it compared to illnesses with similar symptoms; AIDS, and specifically attempts to unravel the natural history of this retroviral infection, as well as vaccine development; isolating and identifying rickettsia, especially in Rocky Mountain spotted fever cases; the microbiology of Buruli ulcers; causes, symptoms, and treatment for Legionnaire's disease; the most effective treatments for certain kinds of leukemia; identification of proper and effective treatments for filariasis, a disease caused by parasitic roundworms; the causes and mechanisms of sudden coronary death; pathogenesis of liver diseases; recognition of the various entities that cause leukocoria and the management of ocular melanoma; and accurate testing for early identification of prostate



Air Force Staff Sergeant Dave Nelson prepares an animal isolation box for a simulated hypobaric dive in the early 1990s designed to test the effects of pressure and oxygen on the physiology of tissue repair. The animal isolation boxes, which were specially constructed for use at depth, permitted investigators to accompany animal models inside the chamber during testing without being exposed to the same breathing environment. (NCP 17351)

cancer. These efforts complemented established registries used to track the health of service members, including the Registry for Former Prisoners of War, a database for anatomic pathology material from POWs, predominantly those from World War II, the Korean War, and Vietnam; the Agent Orange Registry, which is being used to track the long-term health effects of exposure to agent orange on Vietnam veterans; and the Persian Gulf/Kuwait Registry, which consists of a repository of anatomic pathology specimens from 1990–1991 Persian Gulf War veterans for research into possible future health issues.

Education too flourished during this period, especially after the institute's continuing medical education program became accredited in the mid-1970s. In 1976 the AFIP offered approximately 20 courses in the major areas of pathology. By 1980 the program had grown to 37 courses and continued expanding steadily throughout the next 20 years. By 2000, the institute had awarded approximately 1 million credit hours to hundreds of thousands of military and civilian medical professionals throughout the world. And this impressive figure does not take into account the less formal education provided through the hundreds of lectures and presentations by AFIP pathologists and researchers at conferences, symposiums, and other such venues throughout the world every year. Nor does it take into account the learning that took place when staff members fanned out around the world during this period, assisting institutions and nations with investigations of viral infections, diseases, and other health challenges.

As the 1990s came to a close and the AFIP entered a new century of service to the nation, the institute had experienced a transformation from a primary focus on Brigadier General Dart's vision of excellence in pathology, into one that also incorporated President Eisenhower's vision of an institute dedicated "to the conquest of disease so that mankind, more safe and secure in body, may more securely advance to the widely shared prosperity and an enduring and just peace."[2]

REFERENCES

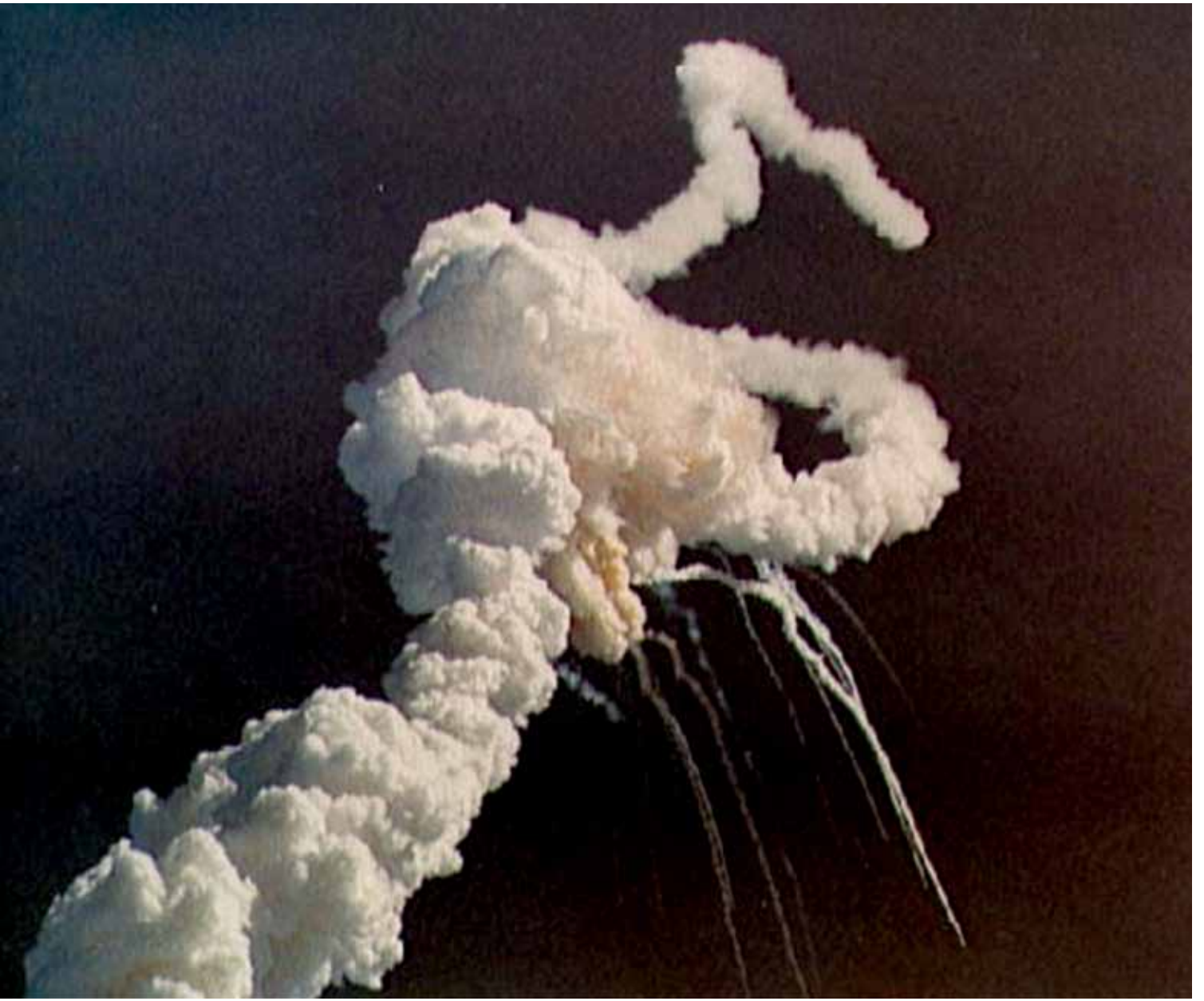
1. *AFIP Annual Report.* Washington, DC: Armed Forces Institute of Pathology; 1976: 1.
2. Henry RS. *The Armed Forces Institute of Pathology; Its First Century, 1862–1962.* Washington, DC: Office of the Surgeon General, Department of the Army; 1964.

[Top] *Members of the 101st Airborne Division honor the remains of fellow soldiers during a December 16, 1985, ceremony at Dover Air Force Base in Delaware. Four days earlier, 248 members of the 101st were killed in a plane crash in Gander, Newfoundland. AFIP forensic pathologists were not expected to be able to identify all victims of the crash, but did so within 10 weeks, solidifying their growing national reputation as experts in identification of disassociated remains, and paving the way for establishment of the Armed Forces Medical Examiner System. (Department of Defense photo; NCP 17352)*

[Bottom Left] *Colonel William R Cowan, Medical Corps, US Air Force, tenth director of the AFIP, 1980–1984. (MIS 05-06195)*

[Bottom Middle] *Colonel Robert R McMeekin, Medical Corps, US Army, eleventh director of the AFIP, 1984–1987. McMeekin was particularly interested in how applications using new technologies could help advance pathology consultation, education, and research. (MIS 05-6669-6)*

[Bottom Right] *Captain Robert F Karnei, Jr, Medical Corps, US Navy, twelfth director of the AFIP, 1987–1991. (MIS 05-06522-1)*



The space shuttle Challenger's smoke plume after it exploded and broke apart 73 seconds into its flight on January 28, 1986, killing all seven crew members. Continuing its history of service to NASA, AFIP forensic pathologists identified all victims. (NASA file photo; NCP 17353)

[Left] *Captain Glenn Wagner, Medical Corps, US Navy, deputy medical examiner, performs an autopsy during an identification mission to Peru in 1989 following an aircraft crash that killed nine people, including an agent of the US Drug Enforcement Agency. By the late 1980s, other governmental agencies were regularly requesting AFIP forensic expertise to assist in death investigations. Wagner would later serve as the fifteenth director of the AFIP, 1999–2003. (NCP 00934)*

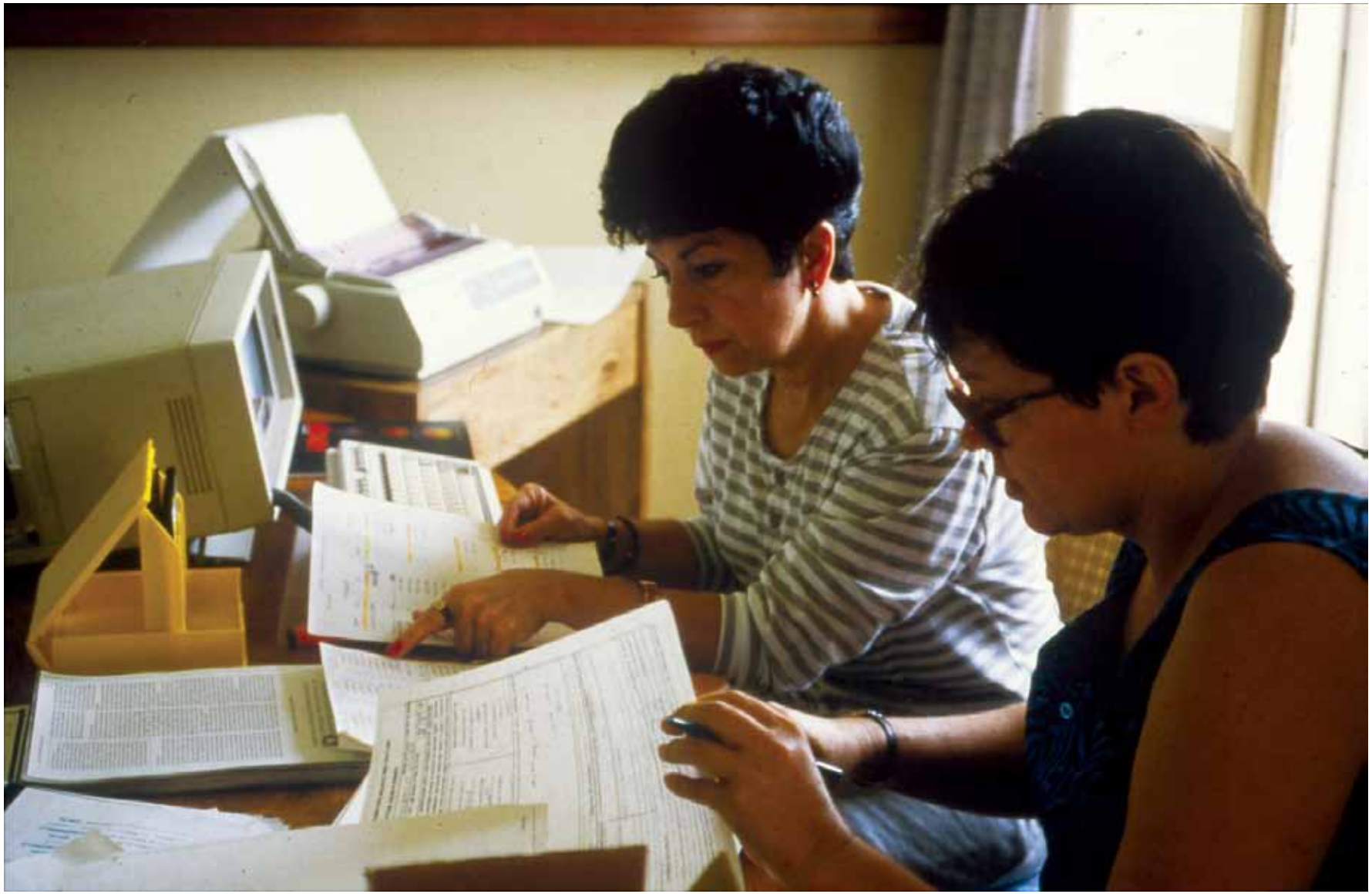
[Right] *Captain Karnei performs an autopsy in AFIP's McNabb Autopsy Suite during the mid-1980s. (NCP 00936)*

[Opposite] *(Left) Dr Daniel Connor, chief, Department of Infectious and Parasitic Disease; (middle) Ron Neafie, Division of Zoonotic Diseases; and (right) Dr Wayne M Meyers, chief, Division of Microbiology, in Zaire (now Democratic Republic of Congo) in 1977. The three, along with other colleagues pictured, were in Zaire studying cases of filarial diseases at Loko Hospital. (NCP 17354)*

[Top] *Dr Ann Nelson (center), chief of AFIP's Special Pathology Unit at the University of Kinshasa (Democratic Republic of Congo; formerly, Zaire) circa 1988. To her left is Professor Raphael Kalengayi, chair of the university's pathology department. Others in the photo are residents and pathology technicians. Dr Nelson was in Kinshasa as part of AFIP's involvement with Project-SIDA, a multinational AIDS project that provided technical expertise and material for studying AIDS in Zaire, especially in the areas of perinatal and heterosexual transmission. The project also included studies on the pathology of HIV infection, as African countries, and others throughout the world, struggled to find answers to what had become a worldwide health crisis by the mid-1980s. Collaborators included the US Centers for Disease Control and Prevention, US National Institutes of Health, and the Institute of Tropical Medicine in Antwerp, Belgium. (NCP 17838)*

[Bottom] *Dr Max Robinowitz, associate chair, Department of Cardiovascular Pathology, examines a heart in the grossing laboratory in the late 1970s. Looking on are Audrey Tinker and Wayne Artis, both of the Materials Repository Division. (NCP 17384)*

[Opposite] *Dr Ann Nelson and Dr Florabel G Mullick examine perinatal HIV transmission cases as part of Project-SIDA at the University of Kinshasa, circa 1988. The cases became part of the AFIP's HIV and AIDS Registry, which quickly grew into one of the largest registries of HIV and AIDS pathology in the world. (NCP 17385)*



[Opposite] *Colonel William Cowan, AFIP director, and Dr Paul Ivan Yakovlev examine brain sections from the Yakovlev Collection in the early 1980s. The Yakovlev Collection, which contains more than 1,500 specimens, consists primarily of whole-brain serial sections mounted on slides; also included are tissue blocks of fetal and neonatal organs. Each specimen has a case record. In addition to normative controls, specimens include examples of cerebrovascular disease, pathomorphic cerebra, neurosurgery for behavioral diseases, miscellaneous neuropathology, and experimental animals. Dr Yakovlev (1894–1983), a neurologist at several hospitals and Harvard Medical School, assembled the collection. In 1974 he transferred the collection from Harvard to the AFIP, where it was managed by curator Mohamad Haleem until its transfer to the National Museum of Health and Medicine, a department of the AFIP. In 1994 it was renamed the Yakovlev-Haleem Collection. (NCP 17016)*

[Top] *In 1988 the institute's Army Medical Museum was renamed the National Museum of Health and Medicine. The name was changed in recognition of the fact that since the Army Medical Museum's founding in 1862, it had been the only federal museum in the country devoted exclusively to medicine. (NCP 3654)*

[Opposite] *Dr Adrienne Noe (right), then deputy director of the National Museum of Health and Medicine, and museum technician Laurie Carroll in 1991 with pieces from the Carnegie Human Embryology Collection. The museum's Human Developmental Anatomy Center maintains and archives the largest collection of human and comparative developmental material in the world, and includes normal human embryos, abnormal specimens commonly used for nondestructive research, photographs, illustrations, and models. The core of the center is the world-renowned Carnegie collection, the most extensive collection of its kind. Dr Noe is currently the museum director. (NCP 01095)*

[Left] *A school group is seen here visiting a museum exhibit in the early 1990s. Docent Amy Simonsen with an audience at the Brain Discovery cart, in the National Museum of Health and Medicine. (NCP 17348)*

[Right] *"Human Body, Human Being," a signature exhibit opened in the mid-1990s, featured preserved specimens from the major body systems and explored how the human body functions in health and in sickness through the presentation of diagrams, medical instruments, and real body parts preserved for scientific study. (NCP 17356)*

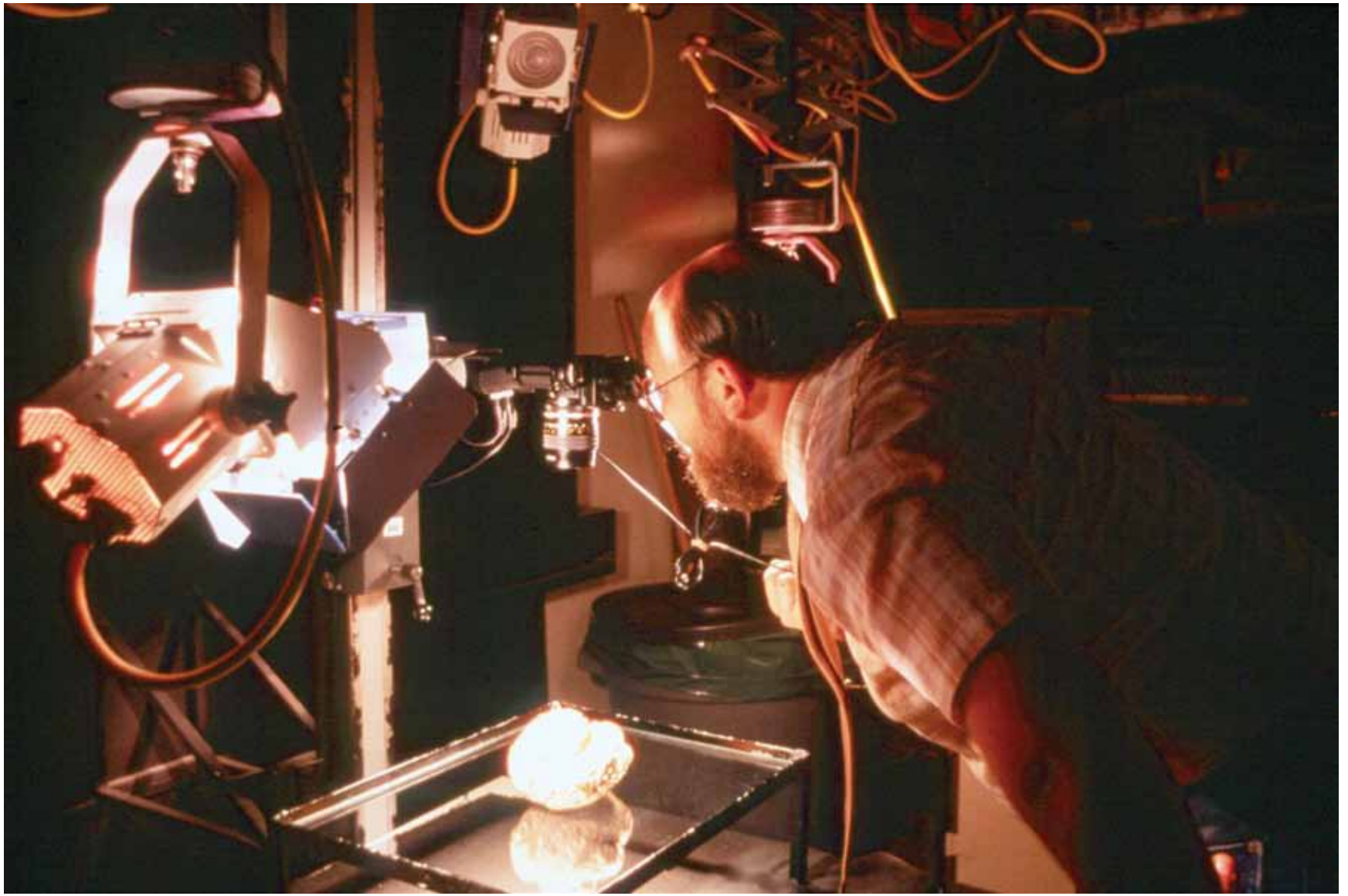
[Top] *The remains of Air Force Lieutenant Michael J Blassie are carried into AFIP headquarters in 1998. In 1984 Blassie's remains, unidentifiable at the time, were added to the Tomb of the Unknowns at Arlington National Cemetery. In 1998, with some evidence indicating the remains could belong to Blassie, they were exhumed and positively identified by AFDIL. (MIS 09-10183-1)*

[Bottom] *In June 1999, the museum unveiled a new exhibit highlighting the DNA research used by AFDIL to identify Blassie. The exhibit, "Naming the Vietnam Unknown: Michael Joseph Blassie Comes Home," explained the science of mitochondrial DNA testing as well as Blassie's story. The exhibit included artifacts that had been entombed with Blassie at Arlington National Cemetery. (NCP 03810)*

[Opposite] *Dr Wayne Meyers, circa 1999, with the shell of one of the hundreds of armadillos he studied at the AFIP throughout the 1970s and 1980s. Dr Meyers played a major role in the development of the concept of leprosy as a zoonosis involving transmission of the disease from direct or indirect exposure to armadillos, monkeys, or chimpanzees. He was also the principal investigator for the supply of leprosy bacillus for researchers around the world who were participating in a World Health Organization program to eliminate leprosy. (NCP 17355)*

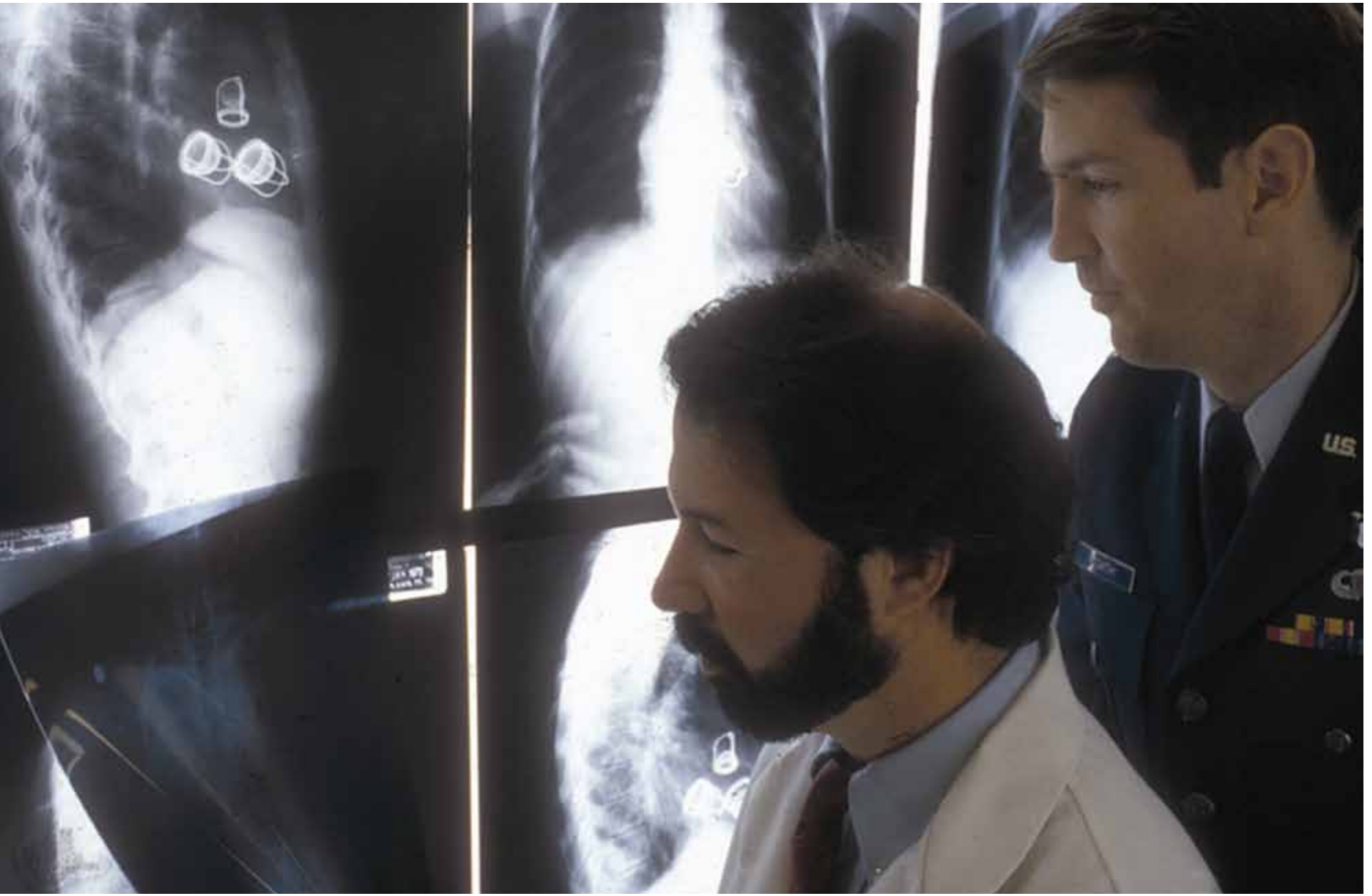
[Top] *Then Army Major Douglas Wear, Medical Corps, at far end of table, leads a slide conference in the Department of Geographic Pathology in 1985. (NCP 17357)*

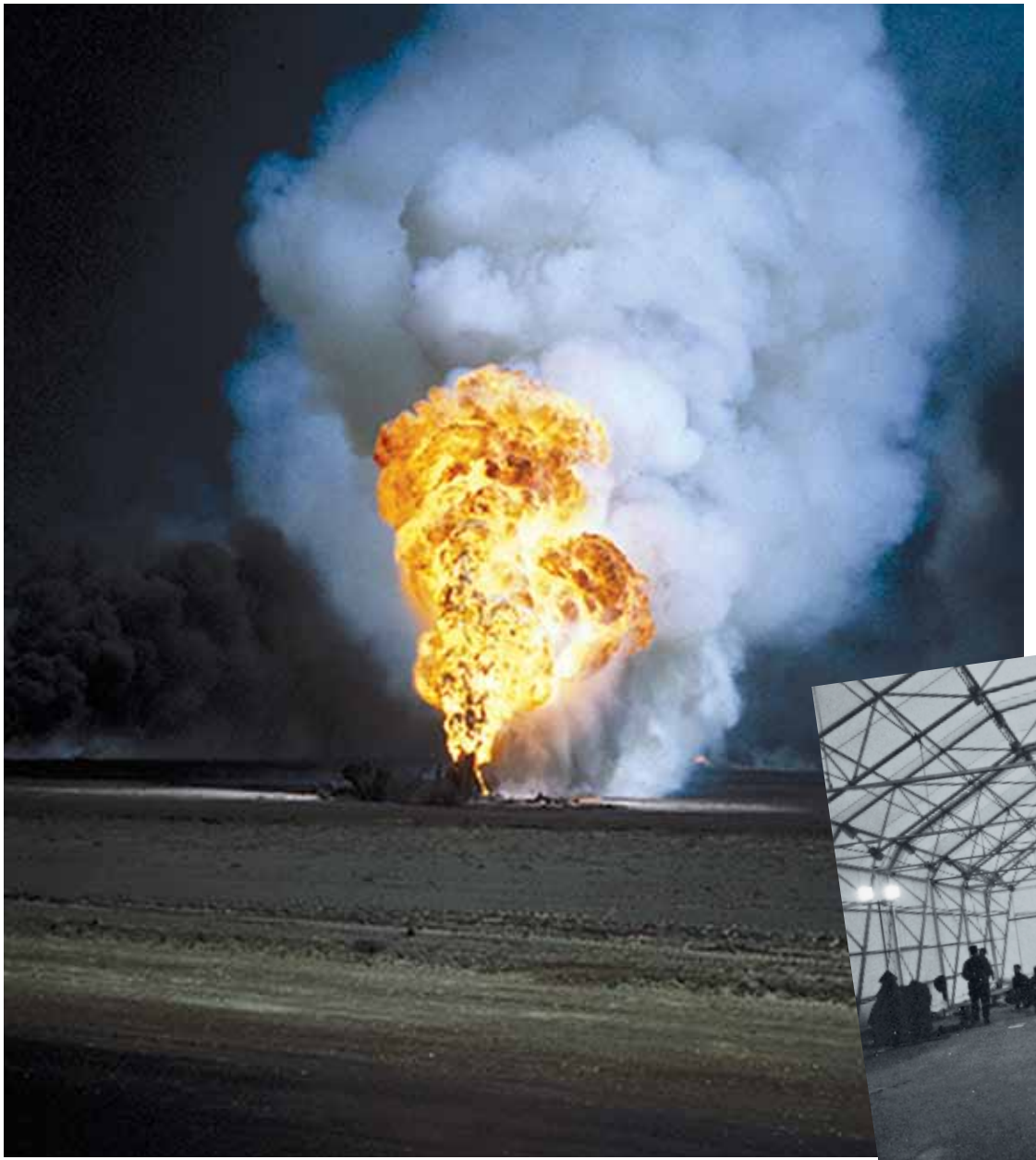
[Opposite] *AFIP photographer Steve Ferendo meticulously photographs a brain in the specimen grossing room in the mid-1980s. (NCP 17358)*



Dr Yvonne Schulman and Captain Edward Dick, Veterinary Corps, US Army, perform a necropsy on a giraffe at the National Zoo in Washington DC in 1992. AFIP's Department of Veterinary Pathology has had a consultative and educational relationship with the National Zoo since the 1950s and regularly assists with necropsies there. (NCP 17359)

[Opposite] *Dr James Smirniotopoulos, chief of the Neuroradiology Department, and Lieutenant Colonel Michael McCarthy, Medical Corps, US Air Force, review radiographs of a chest tumor in the early 1990s. (NCP 17360)*

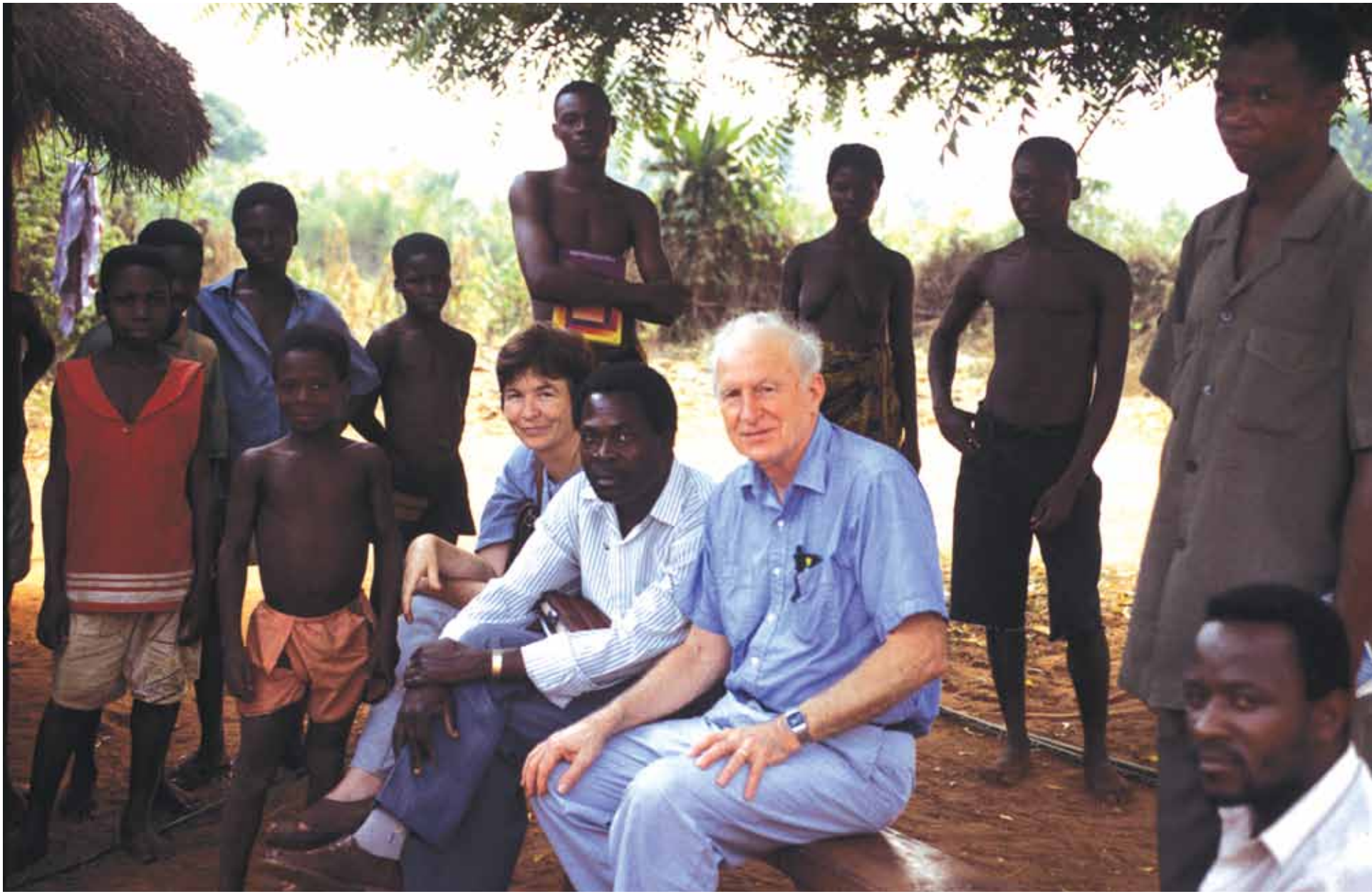


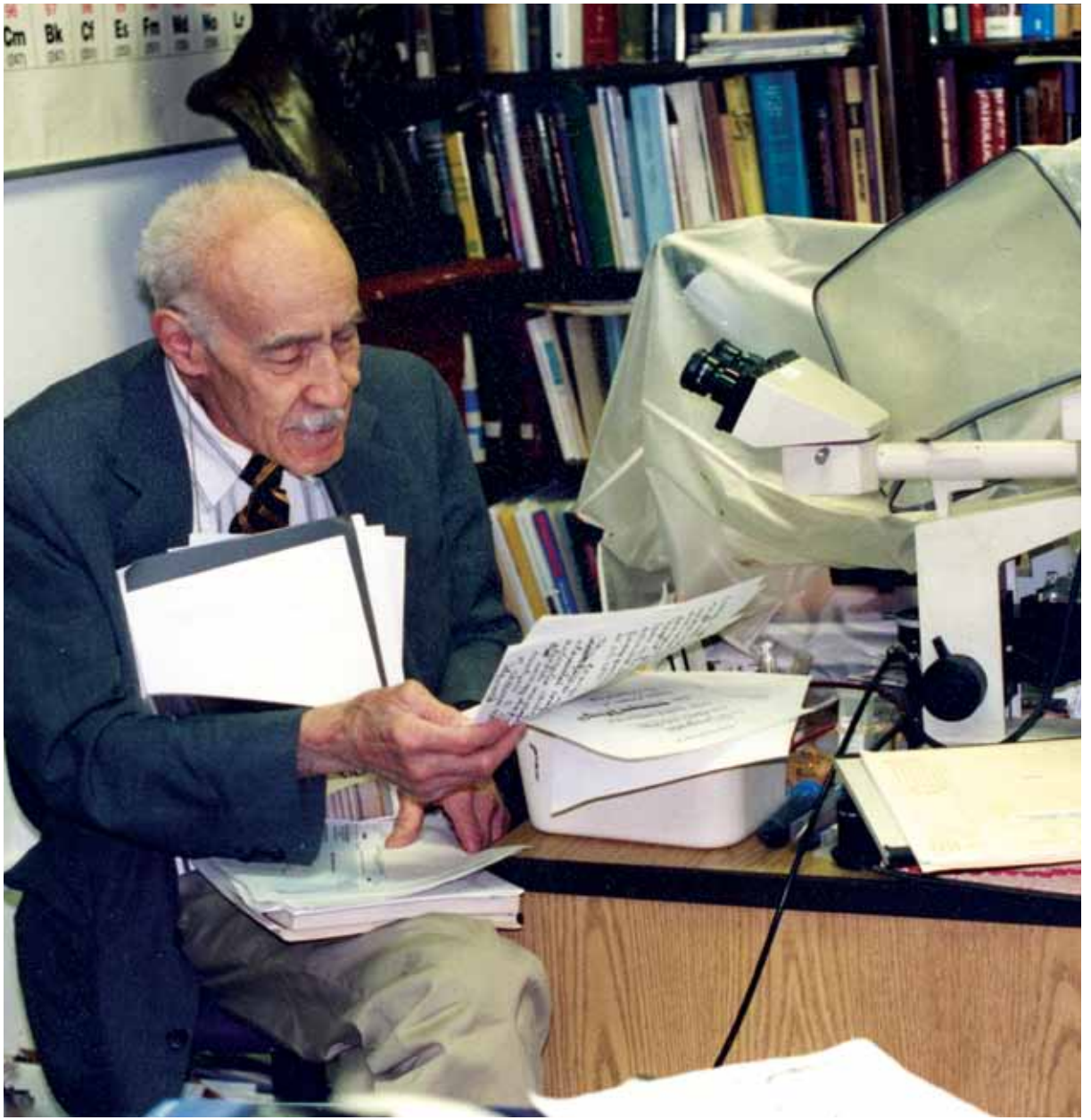


[Left] *An oil fire burns brightly in the Kuwaiti desert in 1991. The invading Iraqi army set numerous oil wells on fire during their retreat, producing a potential health threat for US forces. In 1991, Dr Victor Kalasinsky, chief of AFIP's Division of Environmental Toxicology, deployed to Kuwait to assist the US Army Environmental Hygiene Agency with testing air and soil samples near the oil fires. Those tests were then compared to blood and urine samples from US troops working in the area. (MIS 08-1122-1A)*

[Inset] *A temporary addition to the Dover Port Mortuary stands ready for the arrival of equipment at Dover Air Force Base, Delaware, in 1990. The addition was erected to handle mass casualties from the Persian Gulf War. Desert Storm fatalities reinforced the need for the capability of DNA testing to help reassociate fragmented remains. DNA testing was used to establish identity in two Desert Storm cases. (MIS 08-1098-1)*

The original AFDIL DNA team in 1992. (From left to right) James Canik, program administrator; Demris Lee, chief DNA analyst, Nuclear Section; Deborah Fisher, senior DNA analyst, Nuclear Section; Jill Appleby, research associate; Dr Mitchell Holland, PhD, branch chief; Ann Davis, DNA technician; Dr James Watson, director of the Cold Spring Harbor Laboratory, in Long Island, New York; R James Stavinoha, chief of repository operations; Rhonda Roby, chief DNA analyst, Mitochondrial DNA Section; James P Ross, DNA technician; and Major Victor W Weedn, Medical Corps, US Army, chief deputy medical examiner, DNA Registry. Dr Watson, one of the codiscoverers of the structure of DNA in the 1950s, was visiting the AFIP as a guest speaker for the Ash Lecture Series in 1993. The series, established in 1985, was named in honor of Colonel James Earle Ash, museum curator and first director of the Army Institute of Pathology, and featured lectures by leaders in the fields of medicine and pathology. (NCP 17361)





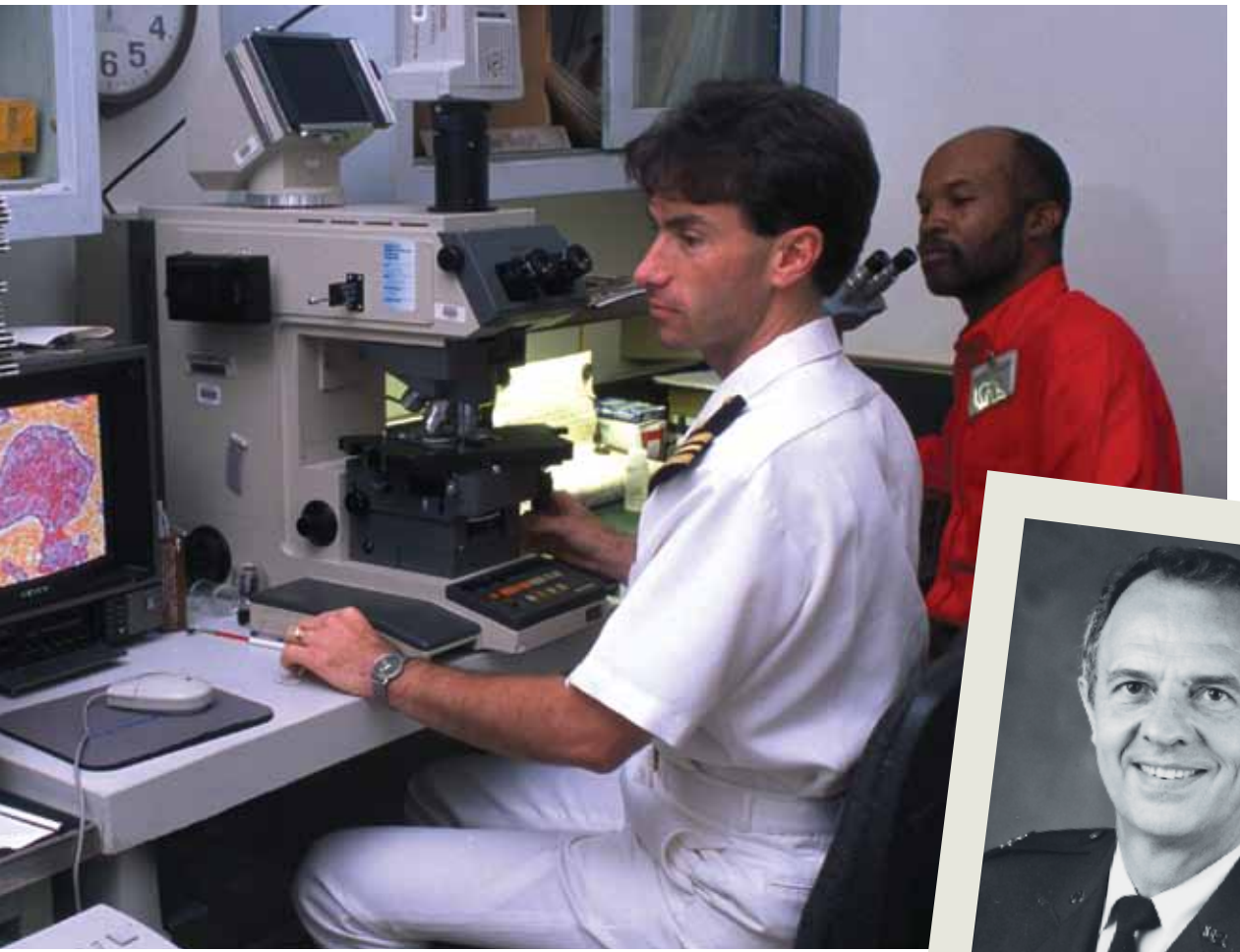
[Opposite] *Dr Wayne Meyers (in blue shirt) and two healthcare researchers meet with villagers in Togo, West Africa, 1995, during one of his many trips to the region to study Buruli ulcers. Dr Meyers, a revered figure in the field of infectious diseases, is considered a world expert on Buruli ulcers. (NCP 17362)*

[Left] *Dr Frank Johnson, chief, Division of Chemical Pathology, reviews case files circa mid-1990s. (NCP 17363)*

Doctors Charles Davis (left) and Isabell Sesterhenn (right), both of the Department of Genitourinary Pathology, review case slides with Dr Fathollah Mostofi circa 1997. Dr Mostofi was the chair of the department at that time. He was succeeded after his death by Dr Sesterhenn in 2004. Dr Sesterhenn became a prominent genitourinary pathologist in her own right and in 2010, she, along with other researchers developed a highly specific assay for the detection of a protein associated with tumor formation that is present in more than half of all prostate cancers. This regeant has an unprecedented specificity (99.9%) for detecting prostate tumor cells in pathologic specimens. (NCP 17364)

[Opposite] *Lieutenant Colonel Ted Hadfield, Medical Corps, US Air Force, chief, Division of Microbiology, and Lieutenant Commander John David, Medical Corps, US Navy, examine a bacterial growth culture as part of biodefense vaccine research in the mid-1990s. Hadfield and David did extensive work to develop a vaccine against the infectious agent* Brucella melitensis. B melitensis *became a research priority during and after the Persian Gulf conflict when the threat of biological weapons increased. (NCP 17365)*

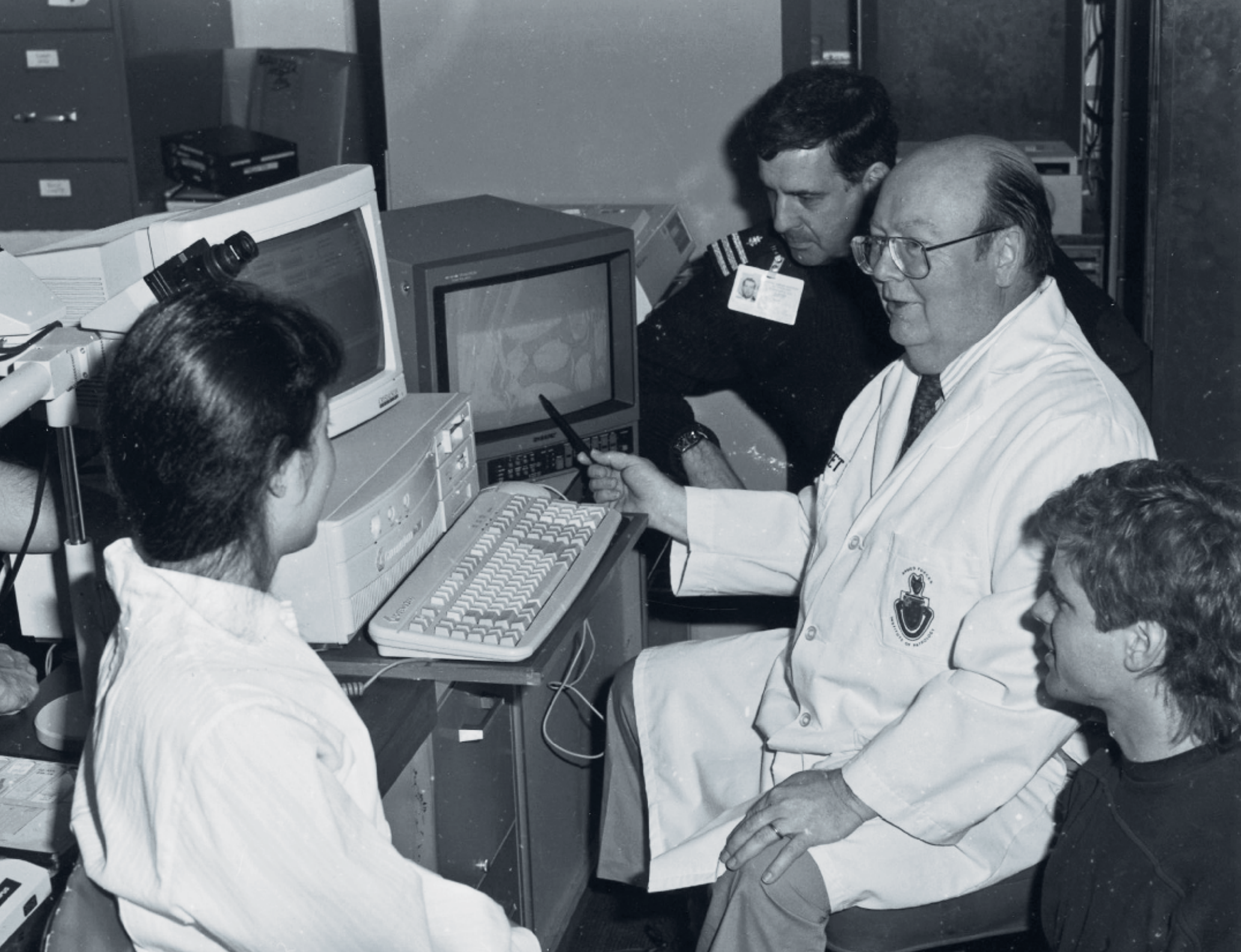
Dr Kamal Ishak, chair of Hepatic and Gastrointestinal Pathology (center), leads a weekly conference of liver cases in the early 1990s. A great believer in staff development and sharing of knowledge, Ishak opened these weekly sessions to all AFIP pathologists who wanted to attend, as well as clinicians from outside the institute. (NCP 17366)



[Left] *Lieutenant Commander Lester Thompson, Medical Corps, US Navy, associate chair, Department of Scientific Laboratories, and Anthony Shirley, photographer, Center for Medical Illustration, examine histopathology slides during a photomicroscopy session in the mid-1990s. (NCP 17367)*

[Inset Bottom Left] *Colonel Vernon W Armbrustmacher, Medical Corps, US Air Force, thirteenth director of the AFIP, 1991–1995. (MIS 08-1865-1)*

[Inset | Bottom Right] *Colonel Michael J Dickerson, Medical Corps, US Air Force, fourteenth director of the AFIP, 1995–1999. (MIS 05-06236-1)*



[Opposite] *Dr Donald Sweet (right, in lab coat), chair, Department of Orthopedic Pathology, provides instruction on features of a bone biopsy. At right is Dr Tuyethoa Vinh, assistant chair of the department. (NCP 16737)*

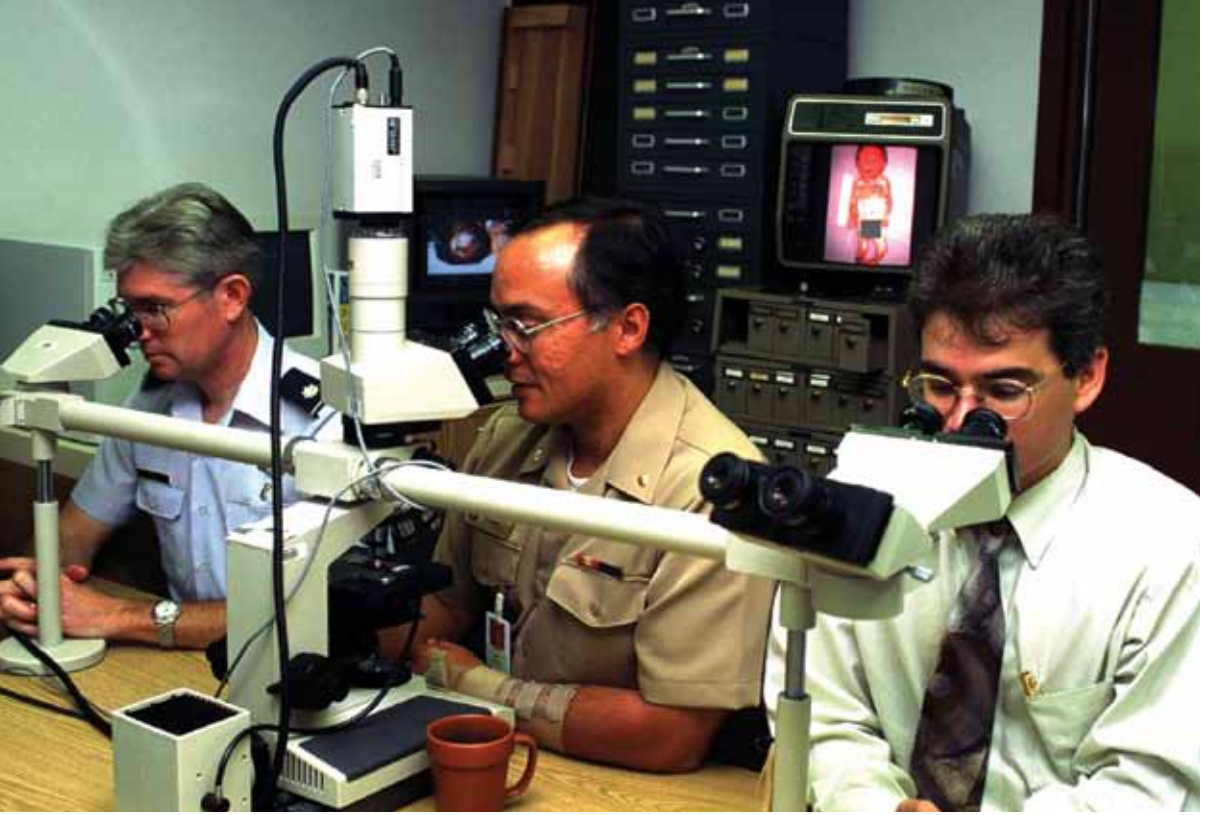
[Top] *Members of the Armed Forces Repository of Specimens Samples for the Identification of Remains enter newly processed blood stain cards into the central database. All service members are required to have a card on file. If necessary for identification purposes, a service member's DNA sequence can be run using a small portion of the blood stain. In mid-2010 the repository accessioned its 6 millionth card. (NCP 17368)*

[Inset] *Dr Kathy Kalasinsky uses Fourier transform infrared (FT-IR) microscopy in 1998 to study drug distribution in a hair from a drug abuser. Dr Kalasinsky's work elucidated some of the mechanisms by which drugs become incorporated into hair, thus aiding the development of hair analysis for drug testing. She received national recognition for this work by winning the Irving Sunshine Award, given for outstanding research in forensic toxicology by the American Academy of Forensic Sciences. (NCP 17371)*

[Right] *Hospital Corpsman Second Class Tyrone Johnson, Division of Forensic Toxicology, performs a toxicology screening analysis on blood and tissue samples using gas chromatography/ mass spectrometry circa 1997. (NCP 17369)*

[Left] *(Back to front) Hospital Corpsman Third Class Robert Zanelli, Private First Class Richard Rosenbaum, and Staff Sergeant Andrea Falcher accession specimens in the Division of Forensic Toxicology in 1998. (NCP 17370)*

In 1995 the AFDIL assisted the Russian government in confirming the identification of Czar Nicholas II, his wife, three of their children, and their servants. Identification of these old, highly degraded remains, as well as the identification of remains of US service members from past conflicts, helped solidify AFDIL's reputation as a world leader in DNA technology and techniques. Pictured here are the czar, his wife Alexandra (wearing crown), and their five children in 1914, four years before they were killed. (NCP 17372)



[Opposite] *DNA analyst Daniel Katz (left) and Demris Lee, technical leader, Nuclear DNA Section, load DNA samples onto an ABI 377 (Applied Biosystems, Life Technologies Corporation, Carslbad, CA) analyzer in 1997. (NCP 17373)*

[Top] *(Left to right) Lieutenant Colonel Glenn Dickey, Medical Corps, US Air Force, chief, Division of Perinatal and Placental Pathology; Commander Eric Suarez, Medical Corps, US Navy; and Dr Shyh-Ching Lo review pediatric cases on a multihead microscope in 1997. (NCP 17374)*

[Bottom] *Commander Kelley Koeller, Medical Corps, US Navy, chief, Neuroradiology, reviews case slides submitted by a radiology student for the Radiological Pathology Course in 1999. (NCP 17375)*

[Inset] *Dr Markku Miettinen, chair, Department of Soft Tissue and Orthopedic Pathology (center), discusses research results with Dr Jersy Lasota, soft tissue pathologist, and Virginia Achstetter, a histotechnologist. (NCP 17376)*

[Top Left] *Captain William Ross, Medical Corps, US Navy, chair, Department of Scientific Laboratories; Lieutenant Commander Lester Thompson, Medical Corps, US Navy Reserve, associate chair; and Gayle Andre, histotechnologist, review laboratory results in 2000. (NCP 17377)*

[Bottom Left] *Captain Ross examines a kidney biopsy using an electron microscope and digital imaging circa 1999. (NCP 17378)*

[Top Right] *Captain Gary Warnock, Dental Corps, US Navy, and Captain Douglas Arendt, Dental Corps, US Navy, both of the Department of Oral and Maxillofacial Pathology, review materials for use in the popular Forensic Dental Identification Course in 1999. (NCP 17379)*

[Opposite] *Petty Officer Second Class Thomas Pierce, course director, monitors work of histology school student in the school's microtomy laboratory during the late 1990s. (NCP 17380)*

[Left] *(Back to front) Dr Bruce Williams, chair, Department of Telemedicine; Dr Mullick, then chair of the Department of Environmental and Infectious Disease Sciences; and Dr Ishak, chair of Hepatic and Gastrointestinal Pathology, analyzing case files in the telemedicine suite in 1997. By then the telemedicine department had installed a BLISS WebSlide (Olympus, Center Valley, PA) workstation and server, giving the staff the ability to read digital slides submitted from contributors using similar systems in the United States and abroad. The system allowed scanning and digitization of entire histologic or cytologic slides—or particular regions of interest chosen by the contributor—for transmission to the AFIP for consultation, which in turn resulted in more definitive diagnoses for electronic consultation. Although the AFIP formally initiated a telepathology program only in 1990, Dr Ishak had envisioned such a capability as early as the 1970s and helped lead the institute's efforts to establish the program. (MIS 09-10620-1)*

[Left] *Dr Jose Centeno, chief, Division of Biophysical Toxicology, use a laser Raman spectroscopy system in the Molecular Microspectroscopy and Chemical Imaging Laboratory to study foreign materials in tissue in 1999. (NCP 17381)*

[Top] *Dr Mullick, Dr Sweet (left), and Dr Wear (right), gathered in the deputy director's conference room in 1999 in preparation for a staff conference. In 1999 Dr Mullick became the AFIP's principal deputy director. (NCP 17266)*

“*Between 2001 and 2011, two dates in particular put into motion a chain of events that tested the strength and character of AFIP staff. The first occurred on September 11, 2001 when 19 Al Qaeda terrorists hijacked four commercial passenger jet airliners. . . . One week after 9/11, these horrific events were followed by anthrax attacks that occurred over the course of several weeks.*”