HUMAN IDENTIFICATION

HUMAN IDENTIFICATION

Case Studies in Forensic Anthropology

Edited by

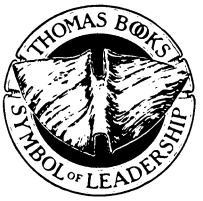
TED A. RATHBUN, Ph.D.

Department of Anthropology
University of South Carolina
Columbia, South Carolina

and

JANE E. BUIKSTRA, Ph.D.

Department of Anthropology
Northwestern University
Evanston, Illinois



CHARLES C THOMAS • PUBLISHER
Springfield • Illinois • U.S.A.

Published and Distributed Throughout the World by

CHARLES C THOMAS • PUBLISHER
2600 South First Street
Springfield, Illinois 62717

ISBN 0-398-04875-4 (cloth)
ISBN 0-398-06337-0 (paper)
Library of Congress Catalog Card Number: 83-24268

With THOMAS BOOKS *careful attention is given to all details of manufacturing and design. It is the Publisher's desire to present books that are satisfactory as to their physical qualities and artistic possibilities and appropriate for their particular use.* THOMAS BOOKS *will be true to those laws of quality that assure a good name and good will.*

Printed in the United States of America
SC-R-3

Library of Congress Cataloging in Publication Data
Main entry under title:

Human identification.

Bibliography: p.
Includes index.
1. Forensic anthropology—Case studies. 2. Criminal investigation—Case studies. I. Rathbun, Ted A.
II. Buikstra, Jane E.
GN69.8.H85 1984 614'.1 83-24268
ISBN 0-398-04875-4 .— ISBN 0-398-06337-0 (pbk.)

ABOUT THE AUTHORS

Editors

Jane E. Buikstra, currently a Professor of Anthropology at Northwestern University, received her graduate degrees from the University of Chicago. Her forensic interests in individuation, burned remains, and forensic archaeology derive from her osteological training in prehistoric human variation and mortuary customs. A Fellow of the American Academy of Forensic Sciences and diplomate of the American Board of Forensic Anthropology, she serves as a consultant to various law enforcement agencies in Illinois and in Indiana. Although her bio-archaeological research has centered in the North American Midwest, her studies have also taken her to South America, the Canadian Arctic, Africa, as well as other regions of the United States.

Ted A. Rathbun received his M.A. degree in 1966 and his Ph.D. in 1971, both from the University of Kansas, and is Associate Professor of Anthropology at the University of South Carolina. His academic work has concentrated on the osteology, paleopathology, and demography of prehistoric populations in Iran, Iraq, and South Carolina. Although he was appointed as consulting physical anthropologist to the Office of the Chief Medical Examiner at the Medical University of South Carolina in 1971, most of Dr. Rathbun's forensic consultations involve human identification for coroners and law enforcement agencies. He lectures on forensic anthropology to various groups and offers a yearly course on human identification in forensic anthropology to undergraduate and graduate students. He is a member of the American Academy of Forensic Sciences and is a Diplomate of the American Board of Forensic Anthropology.

Other Contributors

J. Lawrence Angel is curator of Physical Anthropology at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. He received a Ph.D. at Harvard University in physical anthropology and has done field work in Greece, Turkey, and Cyprus on the social biology of culture growth. In addition to anthropology (at Berkeley, Minnesota, Harvard, and George Washington Universities) he has taught human anatomy (Jefferson

Medical College, Howard, and the U.S. Naval Hospital in Philadelphia). Dr. Angel has analyzed forensic skeletons at the Smithsonian since 1962. He is current president of the American Board of Forensic Anthropology.

William M. Bass received his first training in Forensic Anthropology under Dr. Charles E. Snow while working on his master's degree at the University of Kentucky. A desire for further training in Forensic Anthropology led Dr. Bass to the University of Pennsylvania, where he completed his Ph.D. under Dr. Wilton M. Krogman. He and Dr. Krogman worked jointly on many cases while Bass was a graduate student, and Dr. Bass has continued a tutorship program with his students at the University of Kansas (1960–1971) and the University of Tennessee (1971–present).

Richard H. Brooks received a Ph.D. from the University of Colorado and is affiliated with the University of Nevada, Las Vegas, where he is Research Professor of Anthropology, and Principal Museum Anthropologist.

Sheilagh T. Brooks was born in Tampico, Tamaulipas, Mexico and became a U.S. citizen in 1945. She received a Ph.D. in physical anthropology from the University of California, Berkeley and is Professor of Anthropology at the University of Nevada, Las Vegas, having joined the staff in 1966.

Margaret C. (Peggy) Caldwell, the daughter of a U.S. Foreign Service officer, traveled extensively with her family and as a senior in high school participated as a paleoanthropological assistant on the International Afar Research Expedition at the Hadar in the Rift Valley of Ethiopia. She was awarded a Master of Arts degree in Physical Anthropology from Arizona State University in 1981. During her graduate education she undertook several specialized projects in osteology and received additional training in forensic anthropology at the University of Arizona. Ms. Caldwell is currently a collaborator in the Department of Anthropology, Smithsonian Institution, teaches science at the Brearley School, and acts as a consultant to Dr. Gross, the New York City Medical Examiner. She is a member of the American Association of Physical Anthropologists and a trainee affiliate of the American Academy of Forensic Sciences.

Homer R. Campbell, Jr., received his D.D.S. from Baylor University School of Dentistry in 1956. He has been in private practice in Albuquerque since 1959. He has been associated with the New Mexico Medical Investigator's Office since its beginning in 1973 and is currently the Chief Forensic Odontologist. He is also Clinical Associate Professor in the Department of Pathology at the University of New Mexico School of Medicine. Dr. Campbell is a Diplomate of the American Board of Forensic Odontology, Inc., and conducts a growing practice in forensic odontological consultation. He is recognized as an innovator in the analysis of bite marks.

Michael Charney, Ph.D., was educated in anthropology at the Universities of

Texas and Colorado and at Columbia University. He is presently serving as Emeritus Professor of Anthropology at Colorado State University and is the director of the Center of Human Identification. He is a frequent consultant for law enforcement agencies in the mountain states, but has worked for other agencies from New Jersey through Canada. He has published numerous articles dealing with forensic anthropology and is probably best known for his work in casting materials and facial reconstruction techniques. He was codirector in the identification of multiple deaths in the Big Thompson flood. Dr. Charney is a fellow of the American Academy of Forensic Sciences and a Diplomate of the American Board of Forensic Anthropology.

Della Collins Cook is Associate Professor of Anthropology at Indiana University. Her interests include skeletal biology, paleopathology, and demography in North American Indian populations. She is presently evaluating population differences in dental and postcranial growth arrest indicators in prehistoric midwestern materials. She received her M.A. from the University of Chicago in 1971 and her Ph.D. in 1976.

R. C. Dailey is a consultant to the Florida Department of Law Enforcement. He has been doing forensic physical anthropology for the past 16 years and regularly lectures on methods of estimating age, sex, and racial origin as well as participating in law enforcement sponsored training programs.

Jack Duncan is currently a research and training specialist with the Florida Department of Law Enforcement. He has 17 years' experience in crime processing and was a crime laboratory analyst for 10 years.

Michael Finnegan is a Professor of Anthropology and Director of the Osteology Laboratory at Kansas State University. He is a consultant in forensic osteology and holds a Ph.D. in anthropology from the University of Colorado. He was a postdoctoral fellow at the Smithsonian Institution and is a fellow of the American Academy of Forensic Sciences, a member of the International Association for Identification, and a Diplomate of the American Board of Forensic Anthropology. Dr. Finnegan is a recipient of the Kansas Attorney General Certificate of Merit in recognition of outstanding service rendered to law enforcement in and for the State of Kansas by a private citizen. He has published numerous articles on theory, method, and application of osteological analysis in population studies and forensic application.

George W. Gill is currently an Associate Professor of Anthropology at the University of Wyoming. He received a Ph.D. from the University of Kansas. He has studied burial archaeology and human osteology in populations in western Mexico, the northwestern plains of North America, and on Easter Island. Dr. Gill has provided human skeletal identification service to the Wyoming State Crime Laboratory since 1972. In 1978 he became a Diplomate of the American Board of Forensic Anthropology and is also a member

of the American Academy of Forensic Sciences. He has authored several articles and has contributed to books and special volumes.

Claire C. Gordon received her Ph.D. degree in Biological Anthropology from Northwestern University in 1982, after receiving an M.A. degree in Anthropology from Northwestern in 1977 and a B.S. degree in Biology from the University of Notre Dame in 1976. During eight years of archeological fieldwork, she has done research in Southern Illinois, the American Southwest, and Micronesia. Dr. Gordon currently holds the position of Research Anthropologist at the U.S. Army Natick Research & Development Center, where she conducts research in anthropometry, allometry, and biomechanics for application in the human engineering of personal protective clothing and equipment.

Thomas Grubbs received an M.S. degree in Mechanical Engineering from the University of Houston in 1968 and is a Professional Engineer in the State of Texas. He is currently an Aerospace Technologist with the National Aeronautics and Space Administration (NASA) at the Lyndon B. Johnson Space Center, Houston, Texas. For the past 18 years he has been responsible for mechanical design and analysis related to spacecraft, aircraft, and various specialized mechanical devices, presently working on a manned EVA task simulator for Space Shuttle 5. He has had 8 years of forensic engineering experience, mainly related to mechanical design, stability, and accident reconstruction.

Sathya V. Hanagud is Professor of Aerospace Engineering, Georgia Institute of Technology, Atlanta, Georgia. He received an M.S. Aerospace Engineering degree from the India Institute of Science in Bangalore and a Ph.D. from Stanford University in 1963, with specialization in catylization of structures, metals, and impact loading. He teaches in the field of structural engineering and materials and is a specialist in aircraft crash dynamic reconstruction. For 7 years he conducted research at Stanford Research Institute. He has written over 100 scientific papers.

Rodger Heglar is a Professor of Anthropology at SanFrancisco State University, having joined the faculty in 1967. He received his Ph.D. from the University of Michigan and has taught there (1959–1963) and at Southern Illinois University (1963–1966). He is recognized professionally in both physical anthropology and forensic anthropology. In physical (biological) anthropology his teaching and research interests are the biology of human populations, particularly in the New World, skeletal biology, paleopathology, paleoserology, and medical anthropology. In forensic anthropology (medicolegal investigation) he is Board certified and practices among the northern and Bay Area California counties. He is an Assistant Medical Examiner-Coroner in San Francisco and deputized in several neighboring counties, where his investiga-

tion and opinion in unknown person or homicide cases are desired.

J. Michael Hoffman received an M.D. degree in 1970 from the University of Maryland and M.A. and Ph.D. degrees in 1972 and 1973 from the University of Colorado. He has held teaching appointments at Northern Arizona University, the University of California-Berkeley (where he was also Curator of Human Osteology at the R. H. Lowie Museum of Anthropology), and Colorado College. His research interests include human osteology, skeletal paleopathology, and forensic physical anthropology.

Paul N. Jolly is currently Chief Deputy Coroner for the Hamilton County Coroner's Office, Cincinnati, Ohio, and Assistant Clinical Professor of Pathology at the University of Cincinnati, where he earned an M.D. degree in 1941. He has served as chief of the section of pathology for the Ohio State Medical Association, as president of the Ohio Society of Pathologists, and as counselor for Ohio for the American Society of Clinical Pathologists.

Allen M. Jones has been Forensic Pathologist, Office of the Chief Medical Examiner, Oklahoma City, since 1979. He earned M.S. and M.D. degrees from the University of Louisville and was an American Cancer Society Fellow in Surgical Pathology at Washington University. He served a residency (1975–1976) in forensic pathology, Office of the Medical Investigator, Albuquerque, New Mexico, advancing to Assistant, and Associate, Medical Investigator. He has taught at Washington University School of Medicine and the Department of Pathology at the University of New Mexico and is presently Clinical Assistant Professor of Pathology at the University of Oklahoma Health Sciences Center. Dr. Jones is certified by the National Board of Medical Examiners and the American Board of Pathology in both Anatomic Pathology and Forensic Pathology. He is a Fellow of the American Academy of Forensic Sciences.

Ellis R. Kerley was awarded an M.S. degree from the University of Michigan in 1956 and a Ph.D. degree from the University of Michigan in 1962 and has postgraduate work in Forensic Pathology and Orthopedic Pathology at the Armed Forces Institute of Pathology. His professional experience includes 3 years of research in medical genetics at the Bowman Gray School of Medicine (1950–1953); identification of the Korean War dead at Kokura, Japan (1954–1955); research in skeletal variability and age change at the Orthopedic Pathology Section of the Armed Forces Institute of Pathology (1957–1966); teaching in the Anthropology departments of the University of Kentucky, University of Kansas, and University of Maryland; and teaching in the Anatomy Department of the University of Puerto Rico Medical School. He has served as a forensic consultant for the Armed Forces, FBI, and coroners and medical examiners in various parts of the U.S. as well as the Congressional Subcommittee on the Investigation of the Assassination of President

John F. Kennedy. Dr. Kerley has held numerous professional offices and received many professional honors.

Lowell J. Levine received the D.D.S. degree from New York University in 1963. In private practice in Bayside, New York, Dr. Levine has been both on active duty and in the Naval Reserve for over 10 years. He is frequently consulted by investigative agencies around the country. He is past President and a Fellow of the American Academy of Forensic Sciences and a Diplomate of the American Board of Forensic Odontology, Inc. He is a Clinical Associate Professor in the Department of Forensic Medicine at the New York School of Medicine.

James L. Luke received his M.D. from Western Reserve University. He has served in the offices of the Chief Medical Examiner in New York and Oklahoma and became the Chief Medical Examiner of Washington, D.C. in 1971. His specialties in forensic research concern the pathology of strangulation, problems of forensic pathology and pediatrics, and blunt force injury. He is a fellow of the American Academy of Forensic Science.

William R. Maples received his Ph.D. in Anthropology from the University of Texas (Austin) in 1967. Dr. Maples spent 4 years in Kenya, where he was associated with various biomedical projects. He has taught at Western Michigan University and the University of Florida. He is currently Curator of Physical Anthropology at the Florida State Museum and Professor of Anthropology at the University of Florida. He is Head of the State Medical Museum of Florida. Dr. Maples is a Diplomate of the American Board of Forensic Anthropology and a Fellow in the American Academy of Forensic Sciences.

Patricia McFeeley is Associate Medical Investigator, Office of the Medical Investigator, New Mexico Center for Forensic and Environmental Science, Albuquerque, and Assistant Professor of Pathology, University of New Mexico, School of Medicine. Her M.D. degree was earned at the University of New Mexico in 1972, followed by 4 years of pathology residency training at the University of New Mexico and at Denver Children's Hospital and a fifth year at the University of New Mexico as a Forensic Pathology Fellow. Dr. McFeeley has conducted medical investigations in numerous aircraft accidents during the past 5 years as Assistant Medical Investigator in her present position. She is a member of the American Academy of Forensic Sciences and is certified by the American Board of Pathology in both Anatomic and Forensic Pathology.

Dan Morse is a retired physician and has held the position of Research Associate in the Department of Anthropology, Florida State University, for the past 13 years. He is certified by the American Board of Forensic Anthropology and has been a consultant to the Florida Department of Law Enforcement for the past 8 years.

Thomas T. Noguchi was Chief Medical Examiner-Coroner, Los Angeles. His recognition of the importance of forensic anthropology paved the way for the formulation of the research design for the skeletal aging study by Suchey.

Patricia A. Owings received the M.A. degree in Anthropology at California State University-Fullerton in 1981. Her M.A. thesis was based on epiphyseal union of the anterior iliac crest and medial clavicle, the research being done at the Department of the Chief Medical Examiner-Coroner, Los Angeles.

Anthony J. Perzigian is Associate Professor of Anthropology and Adjunct Associate Professor of Anatomy at the University of Cincinnati. He received a Ph.D. degree from Indiana University in 1971. His research focuses on the skeletal and dental biology of prehistoric populations. Dr. Perzigian is a Fellow of the American Anthropological Association and the Human Biology Council, a member of the American Association of Physical Anthropologists, and an associate commentator for *The Behavioral and Brain Sciences*. His forensic work has been performed for the Hamilton County Coroner's Office, Cincinnati, Ohio.

Theodore A. Reyman, M.D., Director of Laboratories at Mount Carmel Mercy Hospital, Detroit, Michigan, has held an interest in forensic pathology since his training as a resident, which included sessions at the Wayne County (Michigan) Medical Examiner's Office under Dr. Edward Zawadski. He has continued this interest through a close working relationship with Werner Spitz, M.D., the present Chief Medical Examiner. Dr. Reyman was eager to examine the tissues of Elmer McCurdy when the material was made available by Dr. Thomas Noguchi, bridging the gap between forensic pathology and the study of Egyptian and other mummified bodies that Dr. Reyman has examined in the past as part of the multidisciplinary team under the aegis of the Paleopathology Association.

J. Stanley Rhine received his Ph.D. from the University of Colorado in 1969. He taught anthropology at Colorado State University for 4 years and then assumed the post of Associate Professor at the University of New Mexico in Albuquerque. He is also Associate Curator of Physical Anthropology for the Maxwell Museum of Anthropology, and since 1974 he has been a consultant to the State Medical Investigator. He is certified by the American Board of Forensic Anthropology.

Norman J. Sauer received his Ph.D. degree in 1974 from Michigan State University, where he presently teaches. While most of his research and writing have involved Great Lakes area Native American and European skeletal samples, he has been consulting with law enforcement agencies in Michigan and nearby states for 10 years. He lectures regularly to state and

local agencies about the recovery of and the information that can be gained from decomposed remains. He is a member of the American Academy of Forensic Scientists and a Diplomate of the American Board of Forensic Anthropology.

Sir Sydney A. Smith (d. 1969) received his M.D. at Edinburgh University and was Professor of Forensic Medicine there until assuming Emeritus status in 1953. Over his distinguished career he was a consultant to the Egyptian government in forensic medicine and also to the World Health Organization. He is probably best know for his *Text Book in Forensic Medicine*, first published in 1925 and now in its 10th edition, and for his popular work *Mostly Murder*, published in 1960.

Clyde C. Snow, a founding member of the American Board of Forensic Anthropology, received his M.A. in zoology from Texas Tech and his Ph.D. in physical anthropology from the University of Arizona. He served as part of the consultant team in the review of the Warren Commission investigation into the death of President John F. Kennedy. He has recently retired from the Federal Aviation Administration's Civil Aeromedical Institute, where he conducted extensive research related to aviation safety. Dr. Snow is currently a full-time consultant in forensic physical anthropology.

Richard G. Snyder has an educational background in Physical Anthropology with M.A. and Ph.D. degrees from the University of Arizona. He has done postdoctoral work in dental anthropology and in aerospace medicine at Ohio State University and the USAF School of Aerospace Medicine. He is currently Research Scientist and Head, Biomedical Department, Transportation Research Institute, Institute of Science and Technology, and Professor of Anthropology, Department of Anthropology, The University of Michigan and has held academic appointments at Michigan State University and the Universities of Oklahoma, Chicago, and Arizona. His experience also includes Manager of Biomechanics, Ford Motor Company; Chief, Physical Anthropology Laboratory, Civil Aeromedical Research Institute, Federal Aviation Administration; and Research Anthropologist, Applied Research Laboratory, College of Engineering, University of Arizona. Dr Snyder is internationally recognized as an authority on human impact tolerances; he has authored over 390 scientific papers and has received many awards. He is a member of numerous aviation, medical, and scientific biological societies, and is Board Certified in Forensic Anthropology.

T. Dale Stewart is currently Anthropologist Emeritus of the National Museum of Natural History. He identified skeletal remains for the Federal Bureau of Investigation for many years while serving as curator of Physical Anthropology at the Smithsonian Institution and has long been recognized

as a distinguished scholar in forensic topics, especially age changes in young American males. Dr. Stewart received his M.D. from the Johns Hopkins Medical School and has conducted major identification seminars. He is a member of the American Anthropological Association, American Academy of Forensic Sciences, National Academy of Sciences, and is a consultant to the American Board of Forensic Anthropology.

Lucile E. St. Hoyme received her graduate education at George Washington University and Oxford University, where she was awarded the doctoral degree in 1963. Currently an emeritus curator at the Smithsonian Institution, she has been active in various phases of physical anthropological research and education. Included among her research interests are human variability, dental pathology, growth and development, and sexual dimorphism in the skeleton. This background in physical anthropology and ability to communicate clearly about the field have served Dr. St. Hoyme well in forensic anthropological consultant roles as well as in the teaching of forensic applications of physical anthropology.

James Stoutamire was a Research Associate in the Department of Anthropology, Florida State University and conducted the field training program in forensic archaeology. He is a professional archaeologist presently employed by the Florida Office of Coastal Management, Department of Environmental Regulation.

Judy Myers Suchey received an M.A. degree in Anthropology at the University of Kansas (1967) and a Ph.D. at the University of California, Riverside (1975). She is a physical anthropologist specializing in human osteology and forensic anthropology. Her major research specialty is skeletal aging. She has taught at California State University, Fullerton since 1969, currently holding the title of Professor. Dr Suchey has worked on over 200 forensic cases throughout Southern California during the past 12 years while serving on the staff of Coroner's Offices in Los Angeles, Orange, and San Bernardino counties. She is a Fellow of the American Academy of Forensic Sciences, a Diplomate of the American Board of Forensic Anthropology, and an officer of the Board of Forensic Anthropology (Treasurer).

Robert I. Sundick specialized in Physical Anthropology at the University of Toronto, receiving his M.A. degree there in 1967 and his Ph.D. in 1972. His doctoral dissertation was written on human skeletal growth as observed in American Indian populations. Between 1976 and 1978 he lived in Europe, examining Middle Ages European and prehistoric Nubian skeletons for age changes. He is currently investigating the similarities and differences seen in skeletal growth from various population groups. He has been at Western Michigan University since 1969 and is a Professor of Anthropology. He has been a member of the American Academy of Forensic Sciences since 1976

and is now a Fellow of the Academy and a Diplomate of the American Board of Forensic Anthropology.

Douglas H. Ubelaker received his Ph.D. from the University of Kansas in 1973. Since that time he has served as Curator of Physical Anthropology and currently is Chairman of the Department of Anthropology, National Museum of Natural History/Natural Museum of Man, Washington, D.C. Since 1978 he has served as consultant on forensic anthropology for the Federal Bureau of Investigation, Washington, D.C., for which he has prepared over 100 case reports. Dr. Ubelaker's research focuses primarily on problems in New World skeletal biology with special interest in prehistoric demography, bone microscopy, the prehistoric biology of Ecuador, and the excavation and interpretation of prehistoric mortuary sites.

Charles P. Warren holds M.A. degrees in anthropology from both Indiana University (1950) and the University of Chicago (1961). He is currently an Associate Professor of Anthropology in the Department of Anthropology, University of Illinois at Chicago. Professor Warren has done extensive field work in Southeast Asia, both as an ethnographer and as a physical anthropologist employed by the U.S. Department of Defense. He has been awarded a Fulbright Fellowship to the Philippines (1950–1951), a U.S. Public Health Service Grant (1958–1960), a National Science Foundation Science Faculty Fellowship (1963–1964), and the Meritorious Civilian Service Award from the Department of the Army (1975). He is a consultant to the law enforcement agencies in the Chicago Metropolitan region and to the U.S. Army Memorial Affairs Agency, Washington, D.C. He has published a book and a number of articles on the ethnography of Philippine tribal groups and has written extensively in the field of forensic anthropology. His most recent field experiences were in Southeast Asia, where he worked and did field research in Thailand, Viet Nam, and Kampuchea.

Curtis W. Wienker is Associate Professor and Director of the Graduate Program in the Department of Anthropology at the University of South Florida, Tampa. He received an M.A. and Ph.D. from the University of Arizona. He serves as a consultant to medical examiners in the greater Tampa Bay area and maintains a research interest in the population biology of living peoples.

Charles G. Wilber, Ph.D., received his graduate education at the Johns Hopkins University and later at the Air Force School of Aviation Medicine. He is Professor of Zoology and director of the Forensic Science Laboratory at Colorado State University. He has published numerous articles, technical reports, and books dealing with various aspects of forensic biology. He has particulary emphasized traumatic injuries, wound ballistics, and forensic toxicology. Dr. Wilber is qualified as an expert witness in his specialty areas, averaging 12 appearances per year in local, state, and federal courts. He is a

Fellow of the American Academy of Forensic Sciences, the New York Academy of Sciences, and is a member of the American Physiological Society. He is on the editorial board of the *American Journal of Forensic Medicine and Pathology* and edits a series of monographs dealing with environmental studies (Charles C Thomas, Publisher).

Dean V. Wiseley (deceased) was formerly Chief, Forensic Medicine Division, Department of Chief Medical Examiner-Coroner, Los Angeles. He generously gave his time in support of the skeletal age research from 1977 to 1980. In particular, he examined medical records and autopsy reports on all the females in the study.

CONTENTS

HUMAN IDENTIFICATION

Section I
THE ROLE OF THE FORENSIC ANTHROPOLOGIST
The Case for Cooperative Research

Forensic Physical Anthropology? Probably very few people have heard of this scientific specialty. Its major focus is upon the identification of human remains in a legal context. Other specialists in the medical and legal fields are also concerned with identification, but physical anthropologists who specialize in skeletal analysis bring a particular perspective to those instances when identification cannot be made with traditional medical and legal means: fingerprints, dental and medical records, or personal recognition. We have developed special methods, skills, a documented data base, and theoretical orientations for the analysis of human remains.

Once a forensic anthropologist has become involved in the collaborative activities dealing with human remains in a legal setting, our purposes and potential contributions need to be made clear to the cooperating participants. Essentially, the forensic anthropologist provides direct physical or circumstantial information from the human remains to allow the designated authority to determine identity of the deceased and the circumstances of death. Since the anthropologist is a consultant, cooperation with law enforcement personnel—forensic pathologists, coroners or medical examiners, forensic odontologists, attorneys, and judicial officials—is essential. Communication and the establishment of responsibility are important aspects of any given case.

As the case studies in this volume illustrate, forensic physical anthropologists can provide service at the discovery site of human remains, determine if the bones are indeed human or not, provide organizational and analytical expertise at mass disasters involving multiple deaths, help to unravel the intricacies when commingling of multiple remains has occurred, and suggest possible time intervals since death. Burned remains can be especially challenging—even so, the incinerated skeleton may frequently provide clues to identity. Cause of death, although ultimately determined by a physician or the courts, may be suggested by the anthropologist from skeletal analysis. Individual identification of a decedant from the probable match with skeletal attributes such as sex, age at death, ancestry or social attribution of race, probable living height, and unique features of the skeletal structure may be made by the legal authorities. Presentation of findings and opinions as an expert witness in court may also be necessary if litigation is involved.

Anthropology, that branch of science traditionally defined as the study of humans from a holistic perspective, is characterized by the four major subdisciplines that focus on different aspects of the human condition: physical anthropology, archaeology, sociocultural anthropology, and linguistics. Physical anthropologists in general concentrate on the biological aspects of humans that have developed from a long biosocial evolution and the variation seen within our species. Osteologists, specialists in analysis of the skeleton who have further developed their expertise through training, research, and experience to render an expert opinion as to the identifiable characters of human remains, can become qualified by the court as expert witnesses. Although there are no statuatory definitions of forensic physical anthropologists, it should be clear that not all physical anthropologists or even osteologists are qualified to conduct forensic analysis.

Part of the rationale for this volume was to reduce the amount of mutual ignorance among fellow forensic scientists, medicolegal practitioners, law enforcement personnel, academic colleagues, and students concerning forensic anthropology. Although forensic physical anthropology may appear to be a relatively recent academic and forensic field, the application of anthropological data and approaches has deep historical roots as indicated by Stewart (1979). As he and Snow (1982) document, the earlier work often stemmed from forensic medicine, through which we share concerns with medicine, odontology, anatomy, and other biological sciences. Thompson (1982) also documents the role of forensic work within physical anthropology from 1930 to 1980.

The professional recognition of forensic physical anthropology as a specialty in its own right has been enhanced by the organization of those physical anthropologists interested in forensic matters into an established section of the American Academy of Forensic Sciences. Kerley (1978) and Snow (1982) chronicle the development of this group in which almost all of the contributors to this volume are members. Membership criteria incorporate the principles of forensic science and the usual basis for qualification as an "expert" witness in courts: study and practice of the application of science to legal questions through education, training, and experience. The official relations are expanded by the informal personal network and the frequent sharing of unpublished data and ideas, referrals on particular analytical problems, and in many instances cooperative analysis on an individual case. The 1983 membership directory includes 75 individuals ranging from the status of trainee affiliate through fellow. Rhine (this volume) illustrates the geographical distribution of the members in the United States and documents the uneven distribution of forensic anthropologists across the country.

Further credentials as professionals are established through certification by the American Board of Forensic Anthropologists after an arduous written and laboratory examination and review of case reports. The functions of the board include concern with standards of proficiency and training, certification, and circulation of information to potential clients. Approximately 30 individuals in the United States have received board certification.

The concept of a forensic science is also relatively obscure to many people. There are many different definitions and semantic colorings of the term, but the broad and unifying definition proposed by Matte (1970:334), "forensic science is the study and practice of the application of science to the purposes of the law," accommodates the range of activities of most of the forensic sciences. He further argues that as a profession, practitioners of a forensic science should define with scientific and semantic accuracy its data base, its purposes, and its limitations (Matte, 1970:332). These aspects are, of course, interrelated.

The data base for forensic physical anthropology is extremely broad and varied with a range of documented human skeletal collections, the most frequently referenced being the Terry collection originally developed at Washington University and presently housed at the Smithsonian Institution, and the Hamann-Todd collection at the Cleveland Museum. Other museums, medical schools, physical anthropology laboratories, and archaeological facilities have various collections that can be useful for reference in a particular case. Many physical anthropology and anatomy laboratories have as their motto "This is the place where the dead teach the living." The availability of documented skeletal materials is an essential factor in the continued refinement of accuracy in forensic activities as well as academic endeavors. The Physical Anthropology Section of the American Academy of Forensic Sciences is attempting to establish a computerized data base from the documented and positively identified skeletons analyzed by its members. This data base should allow for a continual expansion of information on contemporary populations.

Documentations of the utility and accuracy of various methods of skeletal analysis by osteologists are published regularly in the academic literature through the *American Journal of Physical Anthropology, Human Biology,* the *Journal of Human Evolution, Ossa,* and other professional journals concerned with skeletal biology. Theoretical or methodological approaches developed from analyses of prehistoric populations that may have direct application to a particular forensic case also appear in these sources. Specific references to the systematic compilation of reference data, methods, and results of forensic anthropology have appeared sporadically in the professional anthropological literature. Bass (1969,

1979), Kerley (1978), and Snow (1982) provide excellent surveys of the forensic anthropological literature.

Anthropological findings have been made available to the forensic sciences through articles in the *Journal of Forensic Science*, and more general articles also appear in the *F.B.I. Law Enforcement Bulletin* or other medical and law enforcement publications. Summary chapters of the range of forensic physical anthropological approaches to human identification are also included in some of the standard references in forensic medicine (Stewart, 1976; Kerley, 1973, 1977). Krogman's (1962) well-known text in legal medicine and the human skeleton has been expanded by the publication of works by Stewart (1970, 1979), which focus on American populations, human identification, and forensic physical anthropology.

The general purposes and range of forensic physical anthropology are illustrated by the organization of this volume and the documentation of the particular cases presented. A case study format is something of a novelty. As Stewart notes, individual cases are usually published and available to wider audiences only when they are unusual or involve celebrated characters. The cases presented here, however, were chosen to illustrate a particular aspect within the matrix of the entire identification procedure. The reprint of the early case by Smith is included to illustrate the historical perspective and the range of information to be gained by skeletal analysis.

Since forensic physical anthropology is a relatively newly recognized specialty within the forensic sciences, most of us work as consultants with other agencies in addition to our regular academic duties. Our involvement with a specific case of identification varies with local circumstances, the nature of the case, and as some of the chapters illustrate, the relations of the individual anthropologist with medical examiners, coroners, and law enforcement personnel. Rhine points out that once agencies have seen the results of the work of forensic physical anthropologists and official relationships have been established, the rate of anthropological input may rise dramatically. However, full-time employment as a forensic anthropologist is rare, and most forensic anthropology will probably continue to be conducted on a consultant basis in the near future.

Academic colleagues also are not fully aware of the range of activities in the forensic specialty. Too often they simply assume that a forensic analysis is a methodological matter without academic implications. As almost every case in this collection illustrates, however, a particular analysis is a test of the methods and skills of the analyst, and in many instances the case illustrates the need for additional documentation and

stimulates scientific research with new data, improved techniques, and theoretical implications. The recognition of the forensic specialty within academic physical anthropology perhaps is best illustrated by the recent increase in regularly organized sessions of papers at the national meetings of the American Association of Physical Anthropologists. Stewart and Snow have both been "profiled" in the Newsletter of the American Anthropological Association (Profile of an anthropologist, 1979, 1982). The increasing attendance by forensic colleagues at the scientific sessions of the Physical Anthropology Section at the annual meetings of the American Academy of Forensic Sciences also indicates recognition and interest.

Colleagues in medicine and law enforcement should also realize that although forensic anthropologists deal primarily with bones, the range of knowledge and skills may articulate with many other problems dealing with human biology. Snow (1982) argues convincingly for an expansion of physical anthropology into related topics. We should remember, however, that staying within our areas of expertise is critical to the maintenance of credibility and effectiveness as forensic scientists. In some instances, our scientifically derived opinion may not be at the level of certainty hoped for by investigators. Most of our techniques, however, are accurate and valid within the range of certainty usually accepted in medicolegal matters: within reasonable medical certainty (51% and above), clear and convincing (75%), or to the exclusion of any and all reasonable doubt (95%).

Possible ambiguities of forensic anthropological analysis generally stem from the nature of scientific inquiry in the biological sciences and the nature of the data with which we deal. The human species is highly variable, and descriptive norms must take the degree of variability into account. Skeletal analyses by forensic anthropologists generally progress through a series of successively more specific diagnoses. For example, once the determination has been made that bones or other remains are from a human, then more specific determinations as to sex, age, race, etc., can be made. Population variability is recognized, and our findings are given in a range, e.g. age 17 to 22, height 5'3" to 5'6". The ultimate aim, of course, is to establish enough congruities between recovered remains and a decedant to allow "positive" or circumstantial identification.

Successful analysis may also depend upon the nature of the evidence. The information that may be established is generally proportionate to the amount of material available for analysis. When only partial specimens or skeletons are recovered, the task of identification becomes more difficult. Even when complete remains are recovered, no case of identification is really routine. Each individual is unique and, as such, each case has

unique aspects. The presentations in this volume indicate some remaining areas of doubt and ambiguity in our methods and theoretical approaches.

As in all fields, diagnostic standards may be refined through additional research. Since many of the methods available to forensic anthropologists originally were developed with archaeological collections, the representativeness of the sample as well as the applicability to modern groups may indicate reservations in general applications. There is a continual need to update standards and reference groups and to refine established techniques with additional findings and often technology. Documentation of the temporal changes in populations must remain an ongoing process for both academic and applied sciences. This will enhance the degree of certainty that must be employed in applying findings from population or group studies to a specific individual in a forensic situation. Kerley (1978) indicates limits of particular methods and needs for research in the forensic field.

A current problem in the forensic application of anthropology appears to be a mutual unfamiliarity with the aims and needs of different specialists in the investigative process. Although well-established relations between agencies and particular anthropologists occur, infrequency of interaction can lead to misunderstanding and the loss of effective communication. Legal agencies may not know exactly what anthropologists can offer, and in return the anthropologist may not know the constraints or procedures of a particular investigator or agency. A successful association generally rests on cooperative good will, an explicit statement of expectations with analytical possibilities, and sufficient time for a systematic, comprehensive analysis of the material. Time and money can also be limitations. Since most anthropologists have regular employment with accompanying commitments and responsibilities, time spent on a forensic consultation can complicate regular duties. Some of the analytical methods also require time for preparation. On the other hand, investigative personnel often need and want answers or opinions in a short time, especially when a homicide is indicated.

The decision to consult a forensic physical anthropologist often depends upon the local coroner or medical examiner. Since a physical anthropologist is a professional, consultation merits recompense for time, supplies, and equipment as well as expert opinion. In some jurisdictions, sufficient funds are available for consultations, but in others, limited resources may tempt a local investigator to attempt analysis personally or to refer the material to the local physician or pathologist who may not have had experience or training with skeletal material. Several of the cases presented subsequently illustrate the unfortunate outcome when this is done.

Training specifically in forensic anthropology is rare in most departments of anthropology, and few of the current professionals received a formal training in this specialty. Expertise and forensic application of osteological findings appear to have developed through individual initiative and experiential learning. Currently, the forensic aspects of physical anthropology are emphasized in some academic departments, but formal degrees and specializations are rare. Brooks (1981) documented the range of course offerings by forensic anthropologists and found that a small number of departments offer courses specifically in forensic anthropology. Many of the courses included laboratory work with skeletal remains. The forensic aspects were occasionally included in a number of other courses. Since that survey, however, a number of individuals have instituted courses at both the graduate and undergraduate levels that examine the range of forensic anthropology rather than aiming at producing new professional forensic anthropologists. The interest in teaching forensic anthropology appears to be expanding with more course offerings and specific considerations given to problems of training and teaching at the undergraduate and graduate levels (Rathbun, 1980; Warren, 1983). Enrollments in forensic courses include majors in anthropology, biology, criminal justice, nursing, pre-medicine and dentistry, and a variety of majors who just have an interest in the topic. Graduate students from related fields appear to benefit from the materials. Forensic anthropologists also regularly participate in workshops, short courses, and seminars in the forensic sciences for medicolegal and law enforcement personnel.

The relative paucity of academic forensic offerings is also reflected by the rarity of textbooks. Krogman's (1962) basic text of skeletal material in forensic medicine was the only acceptable available work in book form until recently. Stewart's (1979) text, which emphasizes essential developments in forensics in the United States, although primarily aimed at advanced students with osteological backgrounds, is widely used. With supplemental materials, the text has also proved appropriate for use in more general undergraduate courses. Experience with students as well as nonprofessionals has indicated that text material, no matter how well based, is best illustrated with particular applications. This volume, with the emphasis on specific cases, originated from student interest and the opportunity to illustrate the involvement of forensic anthropology in the human identification process. The thematic organization suggested to each contributor included the background of the case with the individual anthropologist's circumstances of involvement; documentation of the relevant aspects for analysis; focus on a specific case that illustrates the potential problems, theoretical basis, and typical modes of analysis; and the specific considerations for the case in general as illustrated through

the processual analysis. The disposition of the case is another unique feature, since examples in the literature frequently are brief and only part of the process is indicated. The bibliography for each case, in conjunction with reference to Stewart's *Essentials of Forensic Anthropology* (1979), should prove to be a useful guide to those interested in a particular analytical problem, since the typical modes of analysis as well as specialized methods are indicated.

The identification of human remains in a legal context may take many turns. The case studies in this volume document the important role of forensic physical anthropology from the time of discovery through identification and final litigation. In this first section, Stewart reviews the typical reporting of forensic cases, and the historical example by Smith reflects the traditional range of information gleaned from skeletal analysis. Rhine documents the current distribution of forensic physical anthropologists in the United States and the developments when this specialty is systematically included in cooperative forensic analysis.

Section II includes examples of anthropological expertise in determining the circumstances of death. Although individual presentations accentuate particular topics, the various phases of analysis are frequently interrelated. The anthropological perspective and the range of specialized training can be seen in these case studies, which illustrate the exhumation process, distinguishing human remains from other materials, anthropological activities and logistics with multiple individuals from mass disasters, the problems of segregating individuals when body elements from more than one person have been mingled, and estimating time since death. The significance of anthropological analysis in cooperation with other forensic specialists can be seen in the cases dealing with burned remains and establishing cause of death. Cooperative research and analysis is a theme seen in many of the presentations.

The major biological characteristics important in forensic identification are reviewed in Section III. Physical anthropologists have developed a wide range of methods and findings that are applicable to forensic diagnosis of sex, age, stature, and ancestry from human skeletal remains. The individual cases illustrate the application of academic findings to specific forensic situations. The choice of appropriate investigative techniques frequently depends upon the nature, extent, and condition of the skeletal elements. As Buikstra notes in the introduction to the section, case studies are particular examples, and although they include significant coverage of their topics and illustrate professional applications of a range of techniques, supplemental reading and training may be necessary.

In many instances, documentation of the major demographic characteristics of skeletal remains quickly leads to specific identification by the

designated legal authority. Section IV provides examples of anthropological research and analysis that make identification possible from specific skeletal attributes or suggest lines of investigation that may lead to positive identification. When traditional fingerprint comparisons or medical and dental records cannot be matched with the deceased, anthropological analysis of the skeletal details or construction of facial features on the deceased's skull may develop enough circumstantial data to allow identification.

In Section V, many of the aspects of a forensic science come together in the crucible of the legal system: the Court. Through involvement in the identification process, the forensic anthropologist may be called upon as an expert witness. As in most of the other examples in this volume, anthropological activities once again occur in a collaborative context. Thorough preparation, anticipation of court procedures, and effective presentation of findings are important issues.

Forensic physical anthropology as both an academic specialty and a forensic science appears to be achieving the respect it deserves. Awareness and interest in our activities will increase in coming years. Cooperative research and integrated investigations in the legal areas will continue as mainstays in the mutual advancement of those concerned with human identification. Since learning is a process, we hope that this sampling of individual case studies by physical anthropologists will provide a base for learning for each other, students, our colleagues in academia and related forensic sciences, and law enforcement personnel.

REFERENCES

Bass, W. M. (1969). Recent developments in the identification of human skeletal material. *American Journal of Physical Anthropology, 30*:459–462.

———(1979). Developments in the identification of human skeletal material (1968–1978). *American Journal of Physical Anthropology, 51*:555–562.

Brooks, S. T. (1981). Teaching of forensic anthropology in the United States. *Journal of Forensic Sciences, 26(4)*:627–631.

Kerley, E. R. (1973). Forensic anthropology. In C. H. Wecht (Ed.), *Legal Medicine Annual 1973*. New York: Appleton-Century-Crofts, pp. 161–198.

———(1977). Forensic anthropology. In C. G. Tedeschi, W. G. Eckert, and L. G. Tedeschi (Eds.), *Physical trauma*. Forensic Medicine, vol. II. Philadelphia: W. B. Saunders, pp. 1101–1115.

———(1978). Recent developments in forensic anthropology. *Yearbook of Physical Anthropology, 21*:160–173.

Krogman, W. M. (1962). *The Human Skeleton in Forensic Medicine*. Springfield: Charles C Thomas.

Matte, P. J. (1970). Forensic science: profession or trade? The search for a unifying concept. *Journal of Forensic Science, 15(3)*:324–345.

Profile of an anthropologist—T. D. Stewart (1979). *Anthropology Newsletter*, September, *20*(*7*):26.

Profile of an anthropologist: anthropometry, assassination, and aircraft disasters; a career in forensic anthropology (1982). *Anthropology Newsletter*, September, *23* (6):11–12.

Rathbun, T. A. (1980). Forensic Physical Anthropology and the Undergraduate. Paper presented at the 32nd Annual Meeting of the American Academy of Forensic Sciences, Atlanta.

Snow, C. C. (1982). Forensic anthropology. *Annual Review of Anthropology, 11*:97–131.

Stewart, T. D. (1976). Identification by the skeletal structures. In F. E. Camps (Ed.), *Gradwohl's Legal Medicine*, 3rd ed., Bristol, Great Britain: John Wright and Sons, pp. 109–135.

_____ (1979). *Essentials of Forensic Anthropology*. Springfield: Charles C Thomas.

_____ (Ed.) (1970). *Personal Identification in Mass Disasters*. Washington: National Museum of Natural History.

Thompson, D. D. (1982). Forensic anthropology. In F. Spencer (Ed.), *A History of American Physical Anthropology*. New York: Academic Press, pp. 357–369.

Warren, C. P. (1983). Teaching Forensic Anthropology to Advanced Undergraduate and Graduate Students. Paper presented at the 35th Annual Meeting of the American Academy of Forensic Sciences, Cincinnati.

Chapter 1

PERSPECTIVE ON THE REPORTING OF FORENSIC CASES

T. DALE STEWART, M.D.

This book, in which some two dozen forensic anthropology cases are described, each by the principal expert(s) involved in its solution, is a novelty. Forensic cases usually appear in print singly and have traditionally come from forensic pathologists or medical examiners. Although a case study is occasionally sufficiently sensational to run to book length, as, for instance, the Ruxton case in England (Glaister and Brash, 1937), more often each is only unusual enough to warrant a journal article, as for instance the case of J.L. in India (Culbert and Law, 1927).

The case of J.L. is not as well known as the Ruxton case. Briefly, it involved an American man who drowned in India and whose deteriorated remains were identified by his doctors in New York through comparison of a mastoid operation scar on the skull with preoperative x-rays made seven years earlier. The Ruxton case is remembered primarily because the differentiation of the skulls of the two women victims was accomplished by superimposing skull outlines on portraits from life.

The contributing experts here are forensic anthropologists, who specialize in identifying skeletal remains, and are relative newcomers to the forensic field, which adds to the novelty of the book. For the most part they are members of the American Academy of Forensic Sciences and in particular of the Section of Physical Anthropology, which was created in 1972. It was about that time that the expression "forensic anthropology" first came into use in the United States. Although one known earlier reference to it appears in the American literature (Schwidetzy, 1954), the sense in which it was used then was paternity identification, an activity in Europe necessitated by the family disruptions caused by World War II.

The available evidence points to only one other book of first-hand forensic case reports: Sir Sydney Smith's *Mostly Murder* (1960). It differs from the present work in dealing with more than just skeletal remains and in being the product of one person's forensic practice, a practice, incidentally, that extended over some 40 years in Egypt and Scotland. This rarity of published examples suggests how seldom one deals with a case unusual enough to

write about. Although Sir Sydney was not a physical anthropologist—in his day (he died in 1969) he was considered one of the foremost authorities in forensic medicine—his publications show him to have been remarkably astute in skeletal identification.

Sir Sydney had a knack for writing up a case in an interesting and informative manner. This appears most clearly in his 13 "Studies in Identification" published in the *Police Journal of London* between 1938 and 1942 (seven of these are included, usually with less detail, in *Mostly Murder*). For the particular audience of that journal he made each "Study" a lesson in some aspect of identification, for which the analysis of the evidence served as an illustrative case. Because it is the teaching value of an unusual case that makes it worth reporting, the writer suggested to the editors of the present book that they reprint No. 3 (1939) of Sir Sydney's "Studies in Identification" as a classic example of this kind of reporting.

Study No. 3 actually includes not one but two cases in which asymmetries in the skulls indicated to Sir Sydney the long-standing presence of wryneck in one and of eye removal in the other. Although the illustrations of the two skulls are not reprinted here, this will not handicap the reader because the anatomical descriptions make the details perfectly clear.

Whatever the means and manner of reporting unusual forensic cases, some of them end up as illustrative cases in textbooks where, in addition to instructing, they sometimes provide an oasis of interest in otherwise dry text. Also, a review of some of the well-known textbooks reveals a tendency to republish some of the good cases. For example, the "Dobkin Baptist Church Cellar" murder case in London after World War II appears in the textbooks of both Sir Sydney (1955) and Keith Simpson (1979).

The Church case got its name because the remains of a woman were found buried in the cellar of a fire-bombed church during demolition. When the skeletal features suggested that she might be the missing wife of Dobkin, the man who served as the church's fire warden during the war, a positive identification was made by her dentist from the teeth in her skull.

On this side of the Atlantic a more remarkable example of reprinting at a far earlier date should be of interest. The Becks' textbook, which by 1860 had gone through 11 editions since 1823 (with one more to come), contains in the 11th edition a section on the skeleton that ends with four illustrative cases (vol. 2, pp. 33ff). According to the Becks' editor, one of these cases was taken from an 1827 issue of the *North American Medical and Surgical Journal*, which had taken it from a British source, which in turn had taken it from a French source. Orfila and Lesueur (1831) had also included it in their book on exhumations.

What made this case so interesting was that the only thing, other than age, known about the homicide victim—a Piedmontese soldier—was that he had

a sixth finger on his right hand and a sixth toe on his left foot. A Dr. Delmas, who directed the exhumation and conducted the skeletal examination, found the facets where these extra members articulated, but not the actual phalanges. Nevertheless, his observations led to a confession and a conviction.

While the forensic literature thus bears witness to the frequent use of forensic cases for illustrative purposes and that some of the cases have served this purpose overly long, innumerable other and perhaps more illustrative cases must never have been brought to the attention of general audiences. The validity of the latter statement would seem to be supported by the likelihood that not all of the cases reported in the present book would have appeared in print had it not been for the editors having solicited them.. The Academy of Forensic Sciences served to stimulate these efforts, as it also serves as a forum for the discussion of case histories and analytical procedures. In other words, a case can be made for the reporting of forensic cases being conditioned to a considerable extent by the availability of publishing media occurring in conjunction with circumstances creating interest in the subject.

A familiar set of circumstances that lends support to this generalization is the establishment of the crime laboratory in the FBI headquarters in Washington in 1932 and the creation soon thereafter (1935) of the *FBI Law Enforcement Bulletin*. The former brought the Smithsonian's physical anthropologists into the field of skeletal identification for forensic purposes, and the latter provided a convenient and accommodating publishing medium open to all for reporting unusual cases (for example, Angel, 1974; Cherry and Angel, 1977; Krogman, 1943; Stewart, 1959).

Going back in time once more, it is noteworthy that a set of circumstances somewhat like that of the FBI developed in Massachusetts in 1877. By that year, the coroner system throughout the state had fallen into disrepute, so the legislature passed a law abolishing the office of coroner and replacing it with a system of medical examiners. The latter officials were required to be members of the Massachusetts Medical Society. Also provided for was a category of Associates that, in the beginning, included such knowledgeable and public spirited men as Thomas Dwight and Oliver Wendell Holmes. These groups thereupon organized themselves into a Massachusetts Medico-Legal Society, the *Transactions* of which were intended to publicize the activities of the new system and report advances in the medicolegal field.

One result of this arrangement was that the second volume of the *Transactions* contains two reports of skeletal identifications (Abbott, 1893; Burns, 1897). Abbott's account concerns three cases that shed light on the "time since death." His third is particularly interesting, because it may be the earliest to report the finding of carrion beetles on recently skeletonized human remains. Burns's case, on the other hand, confirmed that Dwight's (1894) method of stature estimation from the skeleton yields reliable results.