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IDENTIFICATION OF DECEASED PERSONNEL

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Materials in appendix J from the American Journal of Physical Anthropology, with permission from the Wistar Institute Press.

CHAPTER 1

INTRODUCTION

1-1. Purpose

This manual provides guidance for the processing of remains to-determine the positive identification of deceased military and civilian personnel. It covers all remains processed through US Army facilities during both peacetime and wartime.

1-2. Scope

Because of the complexity of the subject matter, prescribed investigative procedures for the identification processing of each recovered remains cannot be established. However, this manual details the technical processing and investigative procedures used to arrive at a positive identification for each remains processed whether the remains is identifiable or unidentifiable.

1-3. Recommended Changes

Users of this publication are encouraged to suggest ways in which it can be improved. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended, Reasons should be given for each comment to insure clarity and complete evaluation. Comments should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and **forwarded direct to the Commandant, US Army Quartermaster school, ATTN: ATSM-CTD-TL, Fort Lee, Virginia 23801.**

1-4. Identification

The process of identifying a deceased person begins when a remains is recovered. Information from witnesses, the decedent's unit, and recovery personnel and medical, "dental, and fingerprint records are obtained immediately. This information and recorded data are evaluated throughout the recovery, evacuation, and identification processing stages. The remains and associated identifying media and personal effects are examined and the findings documented. The completed documentation makes up a remains case file. If the completed documentation shows that the remains is that of a named individual or an individual of a group and that all reasonable doubts of the identity have been resolved, final disposition is made of the remains. If the completed documentation shows that the remains cannot be positively identified, the case is continued in an active status so that further attempts at successful resolution can be made.

1-5. Responsibilities

a. The US Army Casualty and Memorial Affairs Directorate, TAGO, under the general staff supervision of the US Army Adjutant General Center, has Army staff responsibility for the care and disposition of remains and personal effects of deceased personnel of the Army, and, as directed, for the Navy and Air Force. The Director, Casualty and Memorial Affairs Directorate, TAGO, exercises staff and technical supervision relating to the disposition of personal effects and the final review of individual identification procedures,

b. Commanders of unified and specified com. mands are responsible for the supervision of the disposition of the remains and their personal effects within their commands, in accordance with policies and procedures established or approved by the US Army Casualty and Memorial Affairs Directorate, TAGO.

c. Subordinate commanders at all echelons are responsible for the preservation of all identifying media associated with the remains within their areas of responsibility. Such identifying media must not be removed from association with the remains until properly documented by qualified personnel during the identification process. Personal effects found in association with the remains are considered identifying media.

1-6. Policies and Procedures for Identifying Remains

The US Army Casualty and Memorial Affairs Directorate, TAGO, has established the following policies and procedures for identifying remains.

a. Policies.

(1) Eligible deceased personnel must be positively identified as quickly as possible by employing all available means and scientific resources.

(2) **Commingled remains must not be** separated arbitrarily.

(3) Remains must not be classified as unidentifiable until an identification specialist of the US Army Casualty and Memorial Affairs Directorate, TAGO, has made a complete review of the case.

(4) Information used to establish identity must be recorded. When available and applicable,

records must include a visual recognition statement: a description of the effects found on the remains; data on the physical condition of the remains; charts showing dental, fingerprint, and skeletal or anatomical data; the cause of death: the procedures used to recover the remains: and the conclusions reached in the identification process.

(5) All remains from an airplane crash or other major accident must be processed simultaneously.

(6) Information concerning the identification or shipment of remains must not be released to news media before positive identification has been established for all remains and next of kin have been notified. The responsible commander must submit interim progress reports to the Director, US Army Casualty and Memorial Affairs Directorate, TAGO.

b. Procedures. When a responsible commander is unable to establish the identity of a deceased person, he requests technical assistance from the US Army Casualty and Memorial Affairs Directorate, TAGO. When a deceased person cannot be identified, the procedures given below are followed:

(1) Prepare DA Form 2773-R (Statement of Identification) and supporting papers ((DD Form 565 (Statement of Recognition) and DD Forms 890 through 894 (Records of Identification Processing)), if possible. The mortuary officer or identification specialist signs the original DA Form 2773-R and distributes copies as indicated on the form. Appendixes B through G give instructions for completing DA Form 2773-R and DD Forms 890 through 894.

(2) Remove clothing from the remains and examine the clothing for laundry markings, sizes, stenciled names, and other information. Record data on DD Form 890 (Record of Identification Processing) (Effects and Physical Data).

(3) Examine remains for scars, tattoos, or other identifying media. Record data on DD Form 890, DD Form 892 (Record of Identification Processing–Skeletal Chart), and DD Form 893 (Record of Identification Processing-Anatomical Chart) as appropriate.

(4) Prepare a complete, accurate, and detailed dental chart on DD Form 891 (Record of Identification Processing—Dental Chart).

(5) If possible, record fingerprints on DD Form 894 (Record of Identification Processing-Fingerprint Chart) for comparison with existing records. If a comparison cannot be made within US Army Facilities, fingerprint impressions of deceased and fingerprint cards from military personnel files should be forwarded to the Director US Army Casualty and Memorial Affairs Directorate, TAGO with the request that the installation or command be advised of the results of a comparison of the fingerprints by the Federal Bureau of Investigation (FBI).

(6) Insure that fingerprints, if available, for nonviewable remains are sent to the FBI for verification as indicated below:

(a) Oversea deaths. Fingerprints must accompany remains to the CONUS port of entry (POE). At the POE, the fingerprints are forwarded to the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, by the most expeditious means for FBI verification before the POE releases the remains for shipment to final destination.

(b) *CONUS deaths.* The installation commander must forward the fingerprints of a decedent direct to the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, with the request that the installation or command be advised of the results of a comparison of the fingerprints by the Federal Bureau of Investigation (FBI).

(7) Request that the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, forward any additional data needed to identify the remains by the fastest means of communication available.

(8) Evaluate all identifying media recorded on DD Forms 890 through 893 and compare the media with medical and dental records obtained from the parent unit of each decedent.

(9) Insure that information on DA Form 2773. R and supporting documents (DD Forms 890 through 894) give conclusive evidence that the identity of the decedent is accurate. All supporting documents must accompany remains returned to the United States from overseas.

(10) After a thorough investigation, submit findings and recommendations for approval of the findings to a board of review appointed by the Director, US Army Casualty and Memorial Affairs Directorate, TAGO. When the board of review approves the findings, forward them to the US Army Casualty and Memorial Affairs Directorate, TAGO, for final approval. Each completed case is placed in one of the following categories:

(a) Identified remains. Remains are placed in this category when it is definitely concluded that identifying media compare favorably with a named individual. DA Form 2773-R is completed, including the name, grade, and social security number of the identified decedent.

(b) Unidentified remains. Remains are placed in this category if it is concluded that the identifying media do not compare favorably with any individual. An X-number is officially assigned to the remains.

(c) Group remains– known deceased. This category applies to remains of two or more know deceased personnel that cannot be individually identified.

(d) Group remains–unknown deceased. Remains of a group of two or more deceased personnel that cannot be associated with any known deceased are placed in this category.

1-7. Records

The US Army Casualty and Memorial Affairs Directorate, TAGO, is the office of record and the control point through which all information is disseminated in the identification of remains processed through Army facilities. All remains case files and personal effects case files must be kept fully documented at all times. Complete information on all actions taken pertinent to the investigation and resolution of a case must be a matter of record and available for examination. When all actions are completed on identified remains cases, a copy or an extract of the remains case file must be forwarded for inclusion in the casualty personal history file kept at the joint central graves registration office (JCGRO) or equivalent office. When disposition of personal effects is completed, a copy of the personal effects file or an extract of the inventory and disposition of the effects found on the remains are also forwarded to the JCGRO or equivalent office for inclusion in the casualty personal history file. A sample case file for a known remains case is given in appendix H; one for an unknown remains case is given in appendix I.

CHAPTER 2

THE CENTRAL IDENTIFICATION LABORATORY

Section I. GENERAL

2-1. Organization

The central identification laboratory (CIL) is the final processing point through which the remains of personnel of all military services are processed. At the laboratory, positive identification is verified or established before the remains are returned to CONUS or other places for final disposition. The CIL is organized for the final disposition of remains. The theater army commander in a theater of operations and the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, arrange for the CIL and carry out its functions. Central identification units and CIL's are organized under applicable tables of distribution, and allowances are as prescribed under Common Table of Allowances 50-926.

2-2. Functions

The functions of the CIL include recording a complete description of the remains; performing dental, fluoroscopic, and anthropological examinations; making chemical or scientific analyses: and fingerprinting. This information is entered on forms for identification processing. Because positive identification must be made if possible, extreme care is exercised in safeguarding the effects of the decedent and in maintaining the association of the effects with the remains. Particular emphasis is placed on the importance of examining and recording all identifying media on the remains and personal effects from the time the remains are received in the laboratory until they are processed. The following tasks are stressed in processing remains in the CIL:

a. All possible clues for identifying the remains must be examined thoroughly and resourcefully.

b. Care must be exercised in the preservation of all identifying media.

c. Identification forms and reports must be prepared completely and accurately.

2-3. Classification of Remains

Remains are classified as follows:

a. Current. Current remains are those received in a nondecomposed state within 72 hours after death.

b. Flesh Covered. Remains received in a state of decomposition but with no bones exposed.

c. Semiskeletal. Remains received with some flesh on the bones.

d. Skeletal. Remains received with no flesh.

2-4. Identifying Media

a. Categories of Identifying Media. Certain categories of identifying media are acceptable to memorial activities personnel for the initial association of remains with specific casualties. This evidence, however, is not considered conclusive for positive identification unless it is confirmed by additional evidence developed through exhaustive research and through analysis of documents. Categories of single-item and collective evidence are given below:

(1) *Single-item evidence.*

(a) Identification tags from around the neck of the deceased, in the pockets, or elsewhere on the deceased.

(b) An identification bracelet found on the wrist.

(c) A statement of recognition when an individual who knew the deceased and positively identified the remains signs DA Form 1155 (Witness Statement on Individual).

(d) An official identification card found on the deceased, for example, DD Form 2A (Armed Forces Identification Card).

(2) *Collectiue evidence.* When facts concerning the date, place, and cause of death of the deceased agree with a known casualty record, the facts, combined with one or more of the following means of identification, are used as the basis for the tentative association of a remains with a casualty:

(a) Identification tags found elsewhere than around the neck or in the pockets of the deceased.

(b) Motor vehicle operator's permit.

(c) Personal papers and letters, such as credit cards, a marriage certificate, a will, money orders, and unofficial identification cards.

(d) Engraved jewelry.

(e) Information obtained from local officials and residents or from civilian cemetery registers,

including information shown on temporary markers or crosses erected over temporary graves.

b. Inconclusive Evidence. Evidence other than that listed in a (1) above is insufficient for tentatively identifying remains when unsupported by other evidence. When evidence is inconclusive, the deceased is classified as an unknown. However, all records applicable to the deceased must bear the believed-to-be (BTB) identity, and information recorded on the records must support the BTB identity of the remains.

2-5. Receipt of Remains

Remains received for processing are listed on DD Form 1075 (Convoy List of Remains) if they are shipped in a group. Inprocessing personnel varify the list, sign the receipt, and enter information for each decedent in a laboratory register. Each decedent is assigned a processing number, tagged accordingly, and placed on an individual processing table. An embossed or hand-painted cardboard identification tag is attached to the pouch including the remains, and all items belonging to the remains are properly tagged. Care is taken to insure that identifying media are not lost.

2-6. Records of Identification Processing

Records if identification processing, DD Forms 890 through 894, are initialed in pencil for each remains when it enters the processing area. The processing number assigned a particular remains is entered on all processing records associated with the remains.

Section II. IDENTIFICATION PROCEDURES

2-7. Examination and Recording of Data

Persons engaged in processing operations must carefully examine and record exactly all identification data associated with a remains; they must also preserve all identifying media. These tasks are of vital importance to positive identification. Any item received with the remains that may furnish information that will lead to or confirm an identification is completely described and recorded on DD Form 890 (app C).

a. Individual Clothing and Equipment. All items of individual clothing and equipment are removed and carefully examined for clues that may be used in identifying the deceased. Particular attention is given to recording the type and size of clothing, distinctive insignia, and laundry markings. Items of individual clothing and equipment are examined and recorded as follows:

(1) All items of clothing are examined under the flouroscope and then usually examined for laundry markings and other clues. When markings are illegible, portions of the clothing are properly tagged and chemically treated to restore the markings.

(2) Official identification attached to the remains, such as identification tags, DD Form 1380 (US Field Medical Card), or death tags, are examined. Any discrepancies in information recorded on the tags are entered on processing records. Identification tags are imprinted in the space provided on DD Form 890. The identification tag is attached to the remains; and the DD Form 1380 or the death tag is attached to the case papers.

(3) Footgear, headgear, the web belt, and the helmet liner are examined for markings as required by AR 700-84. The size of items and any markings which may serve as clues to identification are annotated.

(4) When compared with military records, insignia, decorations, medals, and campaign badges provide means for identifying the deceased. Information recorded must include the type and full description of the item.

(5) Military equipment is examined for identification numbers assigned the equipment. A complete description of the equipment and the numbers assigned to the items are recorded.

(6) Military records are carefully examined and the name, grade, social security number, fingerprint record, or other data pertinent to the deceased recorded.

b. Personal Effects. Personal effects and the inventory of personal effects accompanying the remains are removed and carefully examined for identifying information. Particular attention should be given to the following:

(1) *Wallets.* Contents of the wallet which may indicate the identity of the deceased, and names or initials inscribed in the leather.

(2) *Watches.* Type of metal, make, movement number, case number, number of jewels, as well as dates, initials, or numbers scratched or inscribed on either the outside or inside of the watch.

[1]The permanent marking method used in Army fixed laundry plants provides an excellent medium of identification. The marking consists of the first letter of the customer's last name and the last four digits of his social security number. Thus, the clothing of a customer named Jones whose social security number is 296-38-8503 would be marked J8503.

(3) *Identification bracelet.* Type of metal, name, initials, social security number, or inscriptions.

(4) *Rings.* Design of ring: type of ring, metal, and stone; initials: and names and dates engraved on inside of band.

(5) *Pen and pencil sets.* Make and inscriptions, such as owner's name or initials.

(6) *Personal papers.* Name or names of persons indicated on club membership cards; clippings, letters, and notes: credit card numbers; or money order receipt numbers.

(7) *Books.* Names or other identifying information.

(8) *Photographs.* Names or initials written on photographs, the photographer's stamp, and the likeness on the photograph.

(9) *Keys.* Manufacturer's number on house and automobile keys, and identification number attached to keys which may be registered in the name of the owner.

2-8. Processing Remains

The identifying media used when the remains are processed are recorded on DD Forms 890 through 894. Reports that support recorded information, resulting from laboratory and anthropological examinations, accompany case papers as enclosures to DA Form 2773-R (app B). Extreme care must be used in recording observations made for each remains to prevent transposition of identifying data. In charting information on anatomy or dentition, it must be remembered that the right side of the charts, as the observer views them, represents the left side of the remains.

a. Physical Data. The physical description of remains is recorded on DD Form 890.

(1) *Height.* The condition of the remains determines the method used to obtain the height of the remains.

(a) Table measurement. The height of the remains of all current and semiskeletal cases is measured on the processing table when sufficient portions of the upper and lower extremities are intact. When a table measurement cannot be made of current or flesh-covered remains because of massive trauma, the height is estimated.

(b) Long bone measurement. The estimated height of skeletal remains is determined by measuring the maximum length of long bones and correlating the data obtained with the scale applicable to the race of the remains being observed (app J).

(2) *Age.* An age estimate if furnished for all remains. In skeletal cases, the estimated age may be determined from bone morphology (app K).

(3) *Race.* An identification specialist usually makes the racial determination for current evacuation cases. If he is unable to make the determination, the laboratory supervisor decides the race or nationality of the remains. The race of skeletal, semiskeletal, and commingled remains is determined by an anthropologist. He prepares a narrative describing the racial characteristics of the remains. When determining factors are indicative of two races, he points out the predominant racial characteristics.

(4) *Scars, tattoos, and other identifying marks.* A thorough examination is made of remains, and an accurate description is furnished of scars, tattoos, birthmarks, healed fractures, deformities, or any other distinctive identifying clues. Photographs taken of distinctive marks are attached to the case papers.

b. Dental Chart. A memorial activities specialist prepares DD Form 891 (app F) for each remains, except when a complete dental chart can be obtained only by mutilating the jaws. In the latter case, a partial dental chart is prepared indicating the dentition that can be recorded without mutilating the jaws. The specialist uses the front of the form to illustrate the defects and restorations as he views them and the back of the form to describe wear, alinement, dentures, and bridges.

c. *Anatomical Chart.* DD Form 893 (app D) is completed for flesh-covered remains. The condition of the remains is indicated in the space provided on the form. An accurate description is recorded of all identifying media, such as tattoos, scars, deformities, wounds, and injuries, to include the exact location of these features on the remains. When an *unknown* current remains has recognizable features, fullface and profile photographs are taken. Supporting evidence attached to DD Form 890, such as photographs and X-rays, accompany case papers.

d. Skeletal Chart. DD Form 892 (app E) is completed for skeletal remains. The remains are cleaned and laid out in anatomical sequence. The observer clearly indicated on the record the type and location of deformities, fractures, and shattered bones as well as missing portions of the remains. In recording skull fractures, it should be noted that three views of the skull are illustrated on DD Form 892; therefore, skull fractures affecting more than one view of the skull should be indicated to present a clear picture of the extent of injury observed. For example, a fracture extending from the left parietal region across the frontal surface and ending in the right parietal region must be depicted on all three views of the skull.

e. Fingerprints. DD Form 894 (app G) is used

to record impressions of all digits that will give a legible print. All remains are fingerprinted, if possible, regardless of other identifying media present. Every effort must be made to obtain clear legible prints. In all cases where there is an indication that the cause of death is due to other than natural causes or is of a questionable nature and may involve a CID investigation, major case prints should also be obtained from the deceased and released to the local CID office. The major case prints (finger-prints, palmprints, fingertips, and sides of fingers and palms) will be in addition to the fingerprints on DD Form 894 recorded for the US Army Casualty and Memorial Affairs Directorate, TAGO.

f. Footprinting. When the remains being processed is believed to be a member of the Air Force, foot impressions are made, if possible, by inking the toes and the balls of the feet and placing the impressions on bond paper. Any available information about the decedent, ineluding name, social security number, and processing number, is entered on the paper. The paper is mounted on a sponge rubber pad secured to a clipboard. After the foot is cleaned, an inked roller is run over it. Then the operator grasps the foot firmly across the instep and presses the clipboard against the entire foot at one time. Although it is not necessary to get an impression of the surfact of the entire foot, as much of it as possible should be obtained. Footprint impressions are submitted as an inclosure to DA Form 2773-R.

2-9. Blood Grouping of Remains

In cases of group casualties involving tank crews, airplane crashes, or other similar accidents (app L), laboratory tests of whole blood, tissue, or bone marrow may be conducted to determine the blood grouping of remains. The results of the tests along with other identifying media may be used to establish legal evidence that may assist in the identification. Blood grouping of the remains of a single casualty may be indicated when the identification of the individual is not fully supported. The blood of the remains should be type classified.

2-10. Photographing Remains

When other identifying media seem insufficient, photographs of the head and of distinguishing marks, such as tattoos and scars, are made for each unknown remains if any features are recognizable. A commissioned officer decides whether photographs are to be taken and screens them to make sure that good taste as well as the dignity of the individual remains has been preserved. Black and white photographs are made of the torso and the front and side of the head. Photographs are also taken of the fingerprints when suitable inked prints cannot be obtained. Color photographs are made of tattoos and unusual marks.

2-11. Anthropological Examination

An anthropologist examines all skeletal, semiskeletal, and commingled remains (app M). He prepares and enters a statement of his findings in the Remarks section of DD Form 892, or he incloses the statement with DA Form 2773-R. He makes sure that his statements are correct and complete and that they correspond to the case number. The anthropologist describes physical and other pertinent characteristics which, in his opinion, will assist in identifying the remains. He includes any findings on the evidence of wounds and his opinion that what appears to be healed fractures. In his summation, he includes a statement as to predominant racial characteristics. If the anthropologist finds that recorded information is insufficient to make a conclusive identification, he may resolve the case by superimposition, the technique of matching a life-portrait photograph with a similar one of the decedent (app N). In processing group burials or associated cases, the anthropologist processes the entire group simultaneously on adjacent tables. Separate DD Forms 892 are prepared for associated and commingled remains, and specific explanations are given to indicate the reasons for segregating or consolidating parts.

2-12. Extra Portions of Remains

Extra portions of remains can be kept to a minimum at the laboratory if associated remains from air crashes, tank accidents, or group burials are processed simultaneously. Extra portions of remains are segregated from the remains when parts are duplicated: when parts do not articulate (form a joint): and when race, size, or age differences exist in bone structure.

a. Parts or Portions That May Be Designated Extra. The following parts or portions of the human skeleton may be designated extra portions of remains:

(1) Mandible.
(2) Clavicle.
(3) Scapula.
(4) Humerus.
(5) Radius.
(6) Ulna.
(7) Femur.
(8) Tibia.
(9) Fibula.
(10) Patella.

(11) Sternum.
(12) All hand bones.
(13) All foot bones.
(14) Vertebrae, excluding the coccyx, may be designated as extra portions of remains if not more than eight vertebrae are segregated from the principal remains. When there are more than eight vertebrae, they are assigned an unknown X-number.
(15) Ribs may be designated as extra portions of remains if they do articulate with the vertebral column and are not in excess of eight ribs. When there are more than eight ribs or when they do not articulate with the vertebral column, the ribs are assigned an unknown X-number.
(16) Innominate bone (hipbone), either right or left, may be termed an extra portion of remains. When both innominate bones are segregated from the principal remains, they are assigned an unknown X-number.
(17) Skull bones, not to exceed one-fourth of the total surface of the skull, may be termed extra portions of remains. These portions are of occipital, parietal, temporal, and frontal portions are assigned an unknown X-number when the complete skull, or major portions thereof, is segregated from the principal remains.
(18) The sacrum may be designated as an extra portion of remains if it does not articulate with the vertebral column.

b. ***Classification.*** When conclusive evidence shown that extra portions of remains are a part of a remains already classified as known or unknown, the portions are given the same classification.

c. **Recording.** DD Form 892 is prepared on all extra portions of remains. The forms accompany case papers of the principal remains from which extra portions were segregated.

d. ***Storage.*** All extra portions of remains are tagged and stored. A quarterly inventory of all such cases indicating the part number and - the remains from which the portions were segregated is furnished, through channels, to US Army Casualty and Memorial Affairs Directorate, TAGO, or, when established, to the Chief, Armed Services Graves Registration Office–CONUS. One copy of DD Form 892 for each case added during the quarter is forwarded with the inventory.

Section III. LABORATORY EXAMINATIONS

2-13. X-Ray and Fluoroscopic Laboratory

The X-ray and fluoroscopic laboratory examines remains and clothing to determine the presence of metallic or other dense identifying media. In addition, the laboratory attempts, if necessary, proper segregation of commingled skeletal remains.

a. X-rays. X-rays are made of parts of the remains when considered necessary to determine healed fractures, bone malformation, abnormal dental structure, or other unusual conditions.

b. Fluoroscopic Examination. The fluoroscope reveals the presence of nonporous material, such as identification tags, loose teeth, rings, or wallets, that may contain information which can assist in identifying the remains.

(1) *Clothing.* All clothing removed during processing operations in hand carried to the fluoroscopic laboratory for examination.

(2) *Remains.* As appropriate, remains are given a fluoroscopic examination in an effort to detect objects which may have been overlooked during the physical processing of the remains. When attempts to segregate commingled skeletal remains have failed, the laboratory may be requested to assist in examining the remains by using the ultravoilet ray technique (app M).

c. Reports. Reports of X-ray and fluoroscopic examinations are submitted as inclosure to DD Form 890 along with the X-rays. Negative reports are made, as appropriate.

(1) When X-rays are made of parts of remains, the anthropologist examines the X-rays and submits a report of his findings.

(2) The X-ray techniciam furnishes a report giving the results of the fluoroscopic examination he conducted.

2-14. Chemical Laboratory

The chemical laboratory examines and treats material bearing identifying information that is illegible because of deterioration, fading, stains, or other causes.

a. Laboratory Operations.

(1) *Treating marks on clothing.* All laundry marks, stamps, and ink markings on clothing are examined visually. If a marking is covered by a stain, the marking can be brought out by applying an oxidizing agent. The agent affects the overlying strata but has little effect on the ink of the marking.

(a) Use of calcium hypochlorite. A 10-percent solution of calcium hypochlorite clarifies organic stains. Residual stains of a mineral origin, however, resist oxidation by the calcium

hypochlorite solution. Small amounts of nascent chlorine remove the stains if a small amount of the hypochlorite solution is applied to the material and a few drops of concentrated nitric acid are added with a pipette or dropper. The action of nascent chlorine should be observed closely, and when the desired effect has been accomplished, the material should be thoroughly washed with water. After the marking has been clarified, covering it with concentrated nitric acid sometimes aids the reading of it. The acid darkens the ink, particularly if it is stamp-pad ink.

(b) Photographic procedure. If the met hods followed in *(a)* above are ineffective, the material is transferred to the photographic laboratory where infrared photographs are taken. The photographic prints are attached to the case report.

(2) *Treating rnetallic objects.* Metallic objects, such as canteens, guns, wrist watches, rings, medals, and keys, are cleaned and examined for markings. The cleaning is accomplished mechanically or by applying a concentrated sodium hydroxide solution. If the cleaning reveals identifying information, a note is made on the chemical laboratory statement. Photographs are made of articles of questionable or foreign origin and are attached to the chemical laboratory statement.

(3) *Treating personal effects.* Personal effects not included in (2) above, such as letters and family photographs, are examined and cleaned. Papers are carefully separated. If the papers and wallet are matted together, they are soaked in water. A wetting agent added to the water helps to separate the papers. Any abrasive action should be avoided, as it removed surface strata along with any writing that may be present.

(4) *Treating writing on paper.* In treating faded markings, ultraviolet or infrared light, if available, should always be used and the results photographed before chemicals are applied. Inks containing iron may often be restored, but as a rule, aniline inks do not respond to chemical treatment.

(a) Silver nitrate solution. Silver nitrate is used on paper to disclose faded ink markings. After the paper is treated with a 3- to 4-percent silver nitrate solution, it is dried and exposed to strong sunlight or to ultraviolet light in cloudy weather. Chloride patterns develop, and as many inks contain chloride, the original marking is reproduced. Silver nitrate is generally more effective than other methods and should always be used first.

(b) Ammonium sulfide and polysulfide vapors. Steamed or otherwise moistened paper may be exposed to the vapors or ammonium sulfide and polysulfide. The vapors react with embedded iron deposit in the ink to form a brown or black sulfide. The marking usually shown on the paper unless the paper itself has a great deal of iron deposit.

(c) Ammonium sulfide and polysulfide liquids. When the vapors of ammonium sulfide and polysulfide do not bring results, ammonium sulfide and polysulfide liquids may be applied directly to the steamed or otherwise moistened paper. The liquids can be swabbed over the markings, but a general staining of the area treated may result.

(d) Iodine vapor or solution. Iodine, either in the form of vapor or a dilute solution of the tincture, sometimes improves the visibility of either pencil or ink markings on dry paper. Restorations should be photographed promptly.

(e) Tannic acid. A 2- or 3-percent solution of tannic acid is used on iron inks. Cloths or pieces of white blotting paper moistened with the acid are placed in contact with the markings and pressure applied for a few minutes.

(f) Ammonia fumes. Obliterated markings are sometimes restored by using ammonia fumes or by swabbing the markings with ammonium hydroxide.

b. Laboratory Report. The laboratory forwards the results of the chemical analysis with the case papers as an inclosure to DD Form 890.

2-15. Photographic Laboratory

The photographic laboratory is responsible for completing all photographic material in support of the CIL mission and for furnishing prints for inclusion in the case file.

a. Functions. The photographic laboratory photographs personal effects and remains for recording identifying media. Portions of remains which may be considered objectionable should be masked before photographing. Photographs include but are not limited to the following:

(1) Scars, tattoos, bone malformations, healed fractures, abnormal tooth formations, and wounds.

(2) Fullface and profile views of current unknown remains.

(3) Fingerprints.

(4) Personal effects bearing identifying data.

(5) Infrared photographs of any laundry marks which were not made visible by chemical processes.

b. Records. The photographic laboratory files and records each photograph taken. Negatives are labeled with the name, grade, social security number, or X-number, and the CIL case number assigned the remains in the laboratory. The file for each photograph contains a brief description of the photograph and the name of the photographer.

Section IV. REVIEW OF CASE PAPERS AND DISPOSITION OF REMAINS

2-16. Case Papers

After a remains has been completely processed, it is left on the table while the identification specialist reviews all case papers for conflicting information, omissions, and other inaccuracies. The officer in charge of the laboratory and the identification specialist decide whether to assign a name or unknown X-number to each case received and processed in the laboratory under an evacuation or a search and recovery number. The decision to assign a name or X-number is reached only after careful examination and evaluation of all available records received and developed in the laboratory. Case papers are prepared in the number of copies that are required in the local zone or area.

2-17. Disposition of Remains

The remains are wrapped appropriately and forwarded with all identifying items of clothing and equipment to the section responsible for preparing the remains for shipment or burial in a temporary or permanent cemetery.

CHAPTER 3

MAINTENANCE OF IDENTIFICATION DATA

3-1. Basic Recorded Data

Basic recorded data are contained in the following file and reports:

a. DA Form 201 (Military Personnel Records Jacket, US Army).

(1) Organization to which assigned.

(2) Date, place, and location of casualty.

(3) Medical, physical, dental, and fingerprint records.

(4) Pertinent data relative to the possible recovery location of the casualty.

b. Command Reports.

(1) Graves registration service records, accomplished during the initial phase of identification, contain complete information on the recovery, evacuation, and initial processing of remains for identification by memorial activities personnel.

(2) Central identification laboratory retards contain complete information on identifying media found on remains and effects as a result of final identification processing by technical personnel.

3-2. Establishment of Case Files

a. Casualty Personal History File (726-04). The casualty personal history file originates with the receipt of basic data indicating the status of an individual killed in action, missing in action, presumed dead, or prisoner of war. A file is established for each person by name, grade, and social security number. It contains case papers received or extracted from the 201 file relating to the decedent's organization; the date, place, and location where the casualty was reported killed or missing; statements of eyewitnesses; and other information pertinent to the deceased, including medical, dental, and fingerprint records and physical characteristics.

b. Remains Case File (726-04). The remains case file is initiated upon the receipt of each recovered remains. The file designation is the same as the name or X-number assigned the remains. Case papers contain cumulative information resulting from field investigations during the recovery, evacuation, interment/disinterment phase, and from processing of the remains at a CIL. Also, all additional information that the identification specialist assembled as he investigated the remains should be included.

3-3. Casualty Records

Upon receipt of a DD Form 1300 (Report of Casualty), the 201 file for each decedent is requested from his parent unit. Medical, dental, and physical data extracted from the file for each casualty are entered on DD Form 898 (Record Data (Deceased and Missing personnel)). Recorded information includes name, grade, social security number, organization, date, place and location of casualty (by country and map sheet), statements of witnesses, physical characteristics, dental data, and fingerprint records pertinent to the deceased. As new information is received, a revised DD Form 898 is prepared. The completed form is attached to the case file.

3-4. Assignment of Cases

A person who routinely identifies deceased personnel can be used to best advantage if he is assigned only those cases which originate from certain geographical areas. Such recurring assignments familiarize him with combat operations and casualties sustained in, or remains recovered from, the area involved.

CHAPTER 4

INVESTIGATION AND CASE RESOLUTION PROCEDURES

Section I. GENERAL

4-1. Identification Specialist

a. Responsibilities. The identification specialist is responsible for the review, analysis, interpretation, and evaluation of factual data contained in reports received from graves registration teams in the field and the central identification laboratory. The identification specialist uses the data to accomplish the following tasks:

(1) Verify the identification of remains.

(2) Establish the identification of unknown remains.

(3) Recommend certain remains be listed as unidentifiable.

(4) Recommend certain remains be listed as unrecoverable.

b. Duties. The identification specialist performs the following duties:

(1) Conducts necessary research to associate an unknown remains with a given casualty.

(2) Develops additional data required to substantiate or negate an association already established.

(3) Summarizes all evidence obtained and recommends to higher authority, on the basis of a case history, the appropriate action to be taken.

4-2. Analysis and Presentation of Completed Cases

a. Review of Case Papers. Case papers of all casualties sustained in the area are reviewed by the identification specialist. The purpose of the review is to gather information and clues that may be associated with the remains in question and that may be used in making a positive identification. The association is established by reviewing the military records of the casualties that occurred in the area and by comparing fingerprints, physical and dental characteristics, laundry markings, personal effects or equipment, and medical records.

b. Research Conducted. The extent of research conducted on a case depends on the amount of information available after the case papers have been examined in detail. When the results of the research are insufficient to warrant a positive association, an extensive investigation is made of field reports, military records, the recovery of associated remains and identified casualties, and any other source of information, as applicable, in an effort to strengthen the association.

c. Case Writeup. After a case has been thoroughly researched and analyzed, the identification specialist evaluates the data and prepares a comprehensive case history to support his findings. The case history is supplemented by DD Form 897 (Physical and Dental Comparison Chart) for remains recovered and casualties lost within the geographical area involved and by statements obtained from individuals possessing information pertinent to the case. Also included with the case history are military records, to include missing air crew reports, if applicable; cemetery records; cemetery or appropriate map sketches; enemy records; and any additional supporting information.

Section II. INVESTIGATIVE PROCEDURES

4-3. Using Identifying Media in the Final Processing of Remains

Identifying media include objects, records, or data which may provide information leading to the establishment of positive identification. Sufficient pertinent data on the remains must be available to furnish a basis for comparison, either positive or negative, before a particular medium can be used. A single source of identifying media is not considered conclusive evidence of identification of a remains; such a source must be supported by other identifying media. In addition to the use of identifying media, supporting data obtained from sources indicated in paragraphs 4-4 through 4-6 may furnish evidence to assist in establishing the identification. Principal identifying media consist of the following:

a. Fingerprints.

b. Identification tag or bracelet.

c. DD Form 1380.

d. DD Form 565.
e. Dental data.
f. Physical characteristics (race, height, weight, age, hair, and healed fractures).
g. Military service insignia.
h. Personal effects.
i. Military equipment, which usually identifies the branch of service. In air crashes, the type and identifying numbers of aircraft and equipment are of considerable value.
j. Statements of circumstances, such as geographic-location or eyewitness statements.
k. Title of organization and location at the time of casualty.

4-4. Field Reports and Records

Field reports and records furnish basic information for all cases, whether the remains are recovered or are nonrecoverable. If the case involves a recovered remains, the reports may consist of the following:
a. DD Form 551 (Record of Interment).
b. DD Form 565 (Statement of Recognition).
c. DD Form 567 (Record of Recovery of Remains).
d. DD Form 896 (Field Search Record).
e. DD Form 1076 (Record of Personal Effects—Military Operations).
f. DD Form 1380 (US Field Medical Card).
g. Missing aircraft reports, when applicable, which include the crew lists, type of aircraft and numbers, and other information.
h. Eyewitness statements, both by civilians and survivors.
i. Map overlay with grid coordinates.
j. Certificate of area clearance.
k. Unit historical and operations records.
l. G3 operations reports.
m. G2 periodic intelligence reports.
n. Operation and situation maps and overlays.
o. Chronological casualty listings, by unit.

4-5. Laboratory Reports

Reports of CIL findings (DD Forms 890 through 894) that result from the technical processing of remains accompany the material in field reports.

4-6. Search for Additional Supporting Data

The identification specialist seeks information, as circumstances require, from sources other than field and laboratory processing reports to support his findings in investigating a case. The sources include those given below:

a. Enemy Reports. Reports and records received or captured from the enemy are used. They include lists of prisoners of war, deceased, and escapees; records of interment; material for propaganda broadcasts; and reports of the International Red Cross. Search of these reports and records may reveal names of persons killed or missing in action and disclose valuable information that may be used in establishing a possible association between a casualty and a given deceased.

b. Operational and Organizational Reports. Operational reports furnish information on unit movements; organizational reports furnish the location of units by date and list unit personnel losses. This type of information may provide a tentative association between a casualty sustained in a specific geographical area and remains recovered from it.

c. Maps and Gazeteers. The geographical location of the casualty is pinpointed to a specific area by degrees and minutes of longitude and latitude and by grid coordinates. Use of gazeteers, map sheets, overlays, and other material is essential to correlate information from case papers.

d. Miscellaneous Records. Tentative associations between remains and casualties may be established by researching civilian and temporary military cemetery records, passenger and crew lists, military history publications, and other miscellaneous office records, including plot maps and indexes of recoveries by map sheet.

e. Governmental and Civilian Contacts. When essential data for substantiating or negating an association are missing, the US Army Casualty and Memorial Affairs Directorate, TAGO, or, when established, the Armed Services Graves Registration Office–CONUS, is responsible for obtaining the data. Actions by the US Army Casualty and Memorial Affairs Directorate, TAGO, include transmitting prints obtained from remains to the FBI for comparison with prints on file and contacting other sources of information for essential data not available from service records or case papers.

4-7. Recovered Remains Cases

a. Potentially Identifiable Cases. A potentially identifiable case may be a name case, a believed-to-be (BTB) case, or an unknown case.

(1) *Name case.* In a name case, the identifying information found on or with the remains warrants identification beyond a reasonable doubt.

(2) *Believed-to-be case.* Remains in a BTB case may be designated an X-number; however, the case papers reflect information indicating that a tentative identification was made at the time of initial recovery and burial. Investigation of a BTB case is confined to the following:

(a) Establishing the identifying media as furnished in the case papers.

(b) Requesting verification of fingerprints, if obtained, from the FBI.

(c) Reviewing and analyzing casualty

personal history file for dental records, physical characteristics, decedent's organization, location where casualty was reported killed or missing, statement of witnesses as indicated on DD Form 898, and any other information which would serve to substantiate or negate the association.

(d) Comparing location of recovery and location of casualty by geographic or grid coordinates.

(e) Analyzing operational reports of unit movements. Information obtained may be valuable in supporting an identification.

(f) Screening enemy records to eliminate contradictory information.

(g) Screening International Red Cross reports for prisoner-of-war lists.

(h) Initiating necessary correspondence to obtain data, such as dental and health records and X-rays, to support identification.

(3) *Unknown case.* A remains is designated unknown when initially recovered and interred without benefit of information which would permit establishment of an initial association with a specific casualty. However, as a result of laboratory processing, the remains may be subsequently identified. This type of case may involve a single or a group remains case. A single remains case involves one decedent, and identification may be established for a specific person. A group remains case involves two or more remains. Identifying data may be conclusive enough to warrant identification as a group of two or more deceased persons but inadequate to establish individual identification. Since case papers for an unknown remains have little or no information on which to base an association, the specialist lists tentative associations by narrowing the range of possible associations and eliminating impossible ones. He forms his lists of tentative associations by carrying out the following procedures:

(a) Reviews and analyzes identifying media and information on associated recoveries (DD Form 567), area sketch showing recovery and gravesites, and other records contained in case papers.

(b) Searches rosters and lists, as applicable, including organizational rosters, casualty listings, and civilian and temporary military cemetery records to obtain a list of possible associations among the casualties killed and missing in the area from which the unknown was recovered.

(c) Compares extracted identifying media for unresolved casualties and for unknown recovered remains with casualty rosters.

(d) Reviews and analyzes casualty personal history file for most logical association.

(e) Compares location of recovery of the unknown and location of casualty of the individual by geographic or grid coordinates.

(f) Checks operational reports of unit movements.

(g) Screens enemy reports and records, including lists of prisoners of war, deceased, and escapees, and records of interment.

(h) Initiates correspondence, as required, to obtain supporting identifying data.

b. Erroneously Identified Case. An erroneously identified case is one in which discrepancies are found in verifying the identification as originally established, or in attempting to establish identification in related cases. All evidence is carefully analyzed before concluding that identification as originally established is erroneous.

c. Foreign Remains Case. A foreign remains case is one in which the decedent is determined to be other than a US citizen or a member of the US military forces. This type of case is usually uncovered as a result of processing at a CIL.

d. Unidentifiable Case. An unidentifiable case is one in which the remains cannot be identified. Laboratory processing and investigation fail to establish conclusively whether the remains is of a single decedent or part of a group of two or more deceased. Investigative procedures for unidentifiable cases are as prescribed for unknown cases. A remains is determined to be unidentifiable when one of the following conditions exists:

(1) Circumstantial evidence is inadequate to support an identification.

(2) Pathological data are inadequate and unsupported by circumstantial evidence.

(3) All efforts to establish an identification have failed.

e. CIL (Extra Portions) Remains Case.

(1) *A* CIL remains case is one in which portions of remains are separated from a principal remains at the CIL and cannot be consolidated with the principal remains because of one of the following reasons:

(a) Anatomical deficiencies or differences.

(b) Unavailability of principal remains.

(c) Nonrecovery of principal remains.

(2) When remains under investigation are determined to be extra portions of remains and meet the criteria for possible CIL designation, a recommendation is made that the remains be designated CIL remains and that disposition be made according to established policies.

4-8. Unrecovered Remains Cases

Unrecovered remains cases are classified as either deferred-search or nonrecoverable cases.

a. Deferred-Search Case. A deferred-search case

is one in which the specific burial or recovery location is known. Case records may show the remains were interred in a civilian cemetery, an isolated grave, or a temporary military cemetery that an allied or military force established. Although the location of the recovery is known, the area is temporarily inaccessible to graves registration personnel because recovery attempts may endanger the lives of recovery personnel.

(1) *Criteria for deferring search.* The criteria for deferring the search for remains because an area is temporarily inaccessible are based on such local conditions as follows:

(a) Hazardous terrain.

(b) Climatic conditions, such as monsoon season or extreme cold, which delay recovery efforts.

(c) Mined areas.

(d) Guerrilla activities that endanger the lives of recovery personnel.

(e) Burial in enemy-controlled territory or in the territory of an unfriendly foreign power that has refused admission of recovery teams.

(2) *Investigation.* Investigative procedures outlined for unknown cases are followed, as appropriate, for deferred-search cases. Pending final resolution of deferred-search cases, all files of such cases are kept fully documented, and a roster is maintained, by map sheet area, on casualties for whom search has been suspended. Final resolution of deferred-search cases takes place after all reasonable efforts have been made to recover the remains. Remains recovered are investigated and classified as either identified or unidentifiable. l

b. Nonrecoverable Case. A nonrecoverable case is investigated by reviewing and analyzing data the same as for an unknown remains. Any additional information which would further support the findings is also used.

(1) *Basis for determination.* A remains is determined nonrecoverable based on one or more of the following reasons:

(a) The deceased was lost at sea or over water.

(b) Death resulted from the explosion of a mine, ammunition ship, airplane, or invasion craft.

(c) The remains was incinerated and the ashes not recovered.

(d) The remains disappeared because of terrain or climatic conditions.

(e) The remains was not recovered because of the hazardous nature of the terrain.

(f) The area was inaccessible to recovery operations because of geographic or political

(g) The remains was recovered from the original site by an unknown agency.

(h) The remains was disposed of by the enemy in an undetermined manner.

(i) Information as to the whereabouts of the remains is insufficient or erroneous.

(2) *Reinvestigation.* A finding of nonrecoverability of remains may be approved; however, the case is never considered permanently closed. In the event additional information or developments warrant, a nonrecoverable case is reopened for further investigative action.

Section III. CASE RESOLUTION

4-9. Board of Review

A board of review, composed of disinterested officers, is appointed in CONUS by the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, to review findings of the identification specialist. The board is appointed according to requirements of AR 15-6. Three board members constitute a quorum.

4-10. Material for Board of Review

The identification specialist is responsible for preparing material for the board of review. All facts are presented in proper sequence to permit an orderly review by the board. The following is the general sequence of criteria that should be included in the investigation.

a. Identifiable (Name, BTB, and Unknown Cases).

(1) Recovery information for remains being identified.

(2) Casualty information for the casualty being identified, including, if available, pertinent data relative to military units, their tactical operations, and battle losses.

(3) Basis for the association of the casualty with the remains.

(4) Factors which tend to conflict with the association, with clarifying explanations as to why they are not considered disqualifying.

(5) Extent and results of screening process when other casualties or remains are eliminated as bearing on the proposed identification. When possible, the extent of screening should be clearly defined by listing map sheets or geographical areas with the number of unresolved casualties or

remains cases that were considered from each area. The extent of research required in this portion of the investigation is basically dependent upon the accuracy and completeness or other affirmative identifying media.

(6) Extent and results of search for prisoner-of-war information.

b. Unidentifiables.

(1) Recovery information for the remains.

(2) Evidence found on or with remains which establishes, beyond a reasonable doubt, that the decedent was a citizen of the United States.

(3) Circumstantial evidence and evidence concerning physical characteristics are insufficient to permit comparison of the remains with other remains of unresolved identity.

(4) Circumstantial evidence and physical characteristics of the remains compare negatively with all unresolved casualties.

(5) Anthropological statement which indicates that the remains is of a single decedent and not a previously identified decedent.

(6) Indication that search and recovery activities in the area of original recovery have been completed.

c. Nonrecoverables.

(1) Complete and detailed casualty data on the decedent.

(2) Available physical and casualty data for the deceased compare negatively with similar data for all unknown remains.

(3) Area in which the casualty is presumed to have occurred has been either thoroughly searched or closed to further search activity.

(4) All reasonable efforts to recover the remains have failed.

4-11. Review and Acceptance of Identification Specialist Findings

The identification specialist submits his findings to the board of review which reviews the findings and decides whether a case should be classified as identified, unidentified, or nonrecoverable. Final approval of the board's decision is made by the Director, US Army Casualty and Memorial Affairs Directorate, TAGO, or his designated representative.

APPENDIX A

REFERENCES

A-1. Army Regulations (AR)

10-5	Organization and Functions, Department of the Army
10-33	United States Army Memorial Affairs Agency
15-6	Procedure for Investigating Officers and Board of Officers Conducting Investigations
310-25	Dictionary of United States Army Terms
310-50	Authorized Abbreviations and Brevity Codes
600-10	The Army Casualty System
606-5	Identification Cards, Tags, and Badges
638-1	Disposition of Personal Effects of Deceased and Missing Persons
638-25	Armed Services Graves Registration Office
638-30	Graves Registration Organization and Functions in Support of Major Military Operations
638-40	Care and Disposition of Remains
638-42	Care and Disposition of Remains When Multiple Deaths of Members of Two or More Services Occur as Result of Disaster or Major Accident
700-84	Issue and Sale of Personal Clothing.
746-1	Color, Marking, and Preparation of Equipment for Shipment

A-2. Department of the Army Pamphlets (DA Pam)

310-series	Military Publication Indexes (as applicable)

A-3. Field Manuals (FM)

10-17	Army Fixed Laundry Organization and Operations
10-63	Handling of Deceased Personnel in Theaters of Operations

A-4. Technical Manuals (TM)

8-225	Dental Specialist
8-230	Army Medical Department Handbook of Basic Nursing

A-5. Technical Bulletin (TB)

MED 250	Recording Dental Examinations, Diagnosis, and Treatments

6. Table of Allowances (CTA)

50-926	American Graves Registration Service

7. Other Government Agency Publication

Federal Bureau of Investigation	"The Science of Fingerprints, Classification and Uses," Washington, US Department of Justice, 1971

8. Civilian Publications

Goff, Charles M., editor	*Gray's Anatomy of the Human Body*, 29th edition, Philadelphia, Lea and Febiger, 1973
Romanes, G. J., editor	*Cunningham's Textbook of Anatomy*, 11th edition, London, Oxford University Press, 1972
Trotter, Mildred, and Gleser, Goldine C.	1951a. The Effect of Ageing on Stature. *American Journal of Physical Anthropology*, 9:311-324.
	1951b. Trends in Stature of American Whites and Negroes Born Between 1840 and 1924. *American Journal of Physical Anthropology*, 9:427-440.
	1952. Estimation of Stature from Long Bones of American Whites and Negroes. *American Journal of Physical Anthropology*, 10:463-514.
	1958. A re-evaluation of Estimation of Stature Based on Measurement of Stature Taken During Life and of Long Bones after Death. *American Journal of Physical Anthropology*, 16:79-123.

APPENDIX B

PREPARATION OF DA FORM 2773-R (STATEMENT OF IDENTIFICATION)

B-1. General

DA Form 2773-R (fig. B-1 and B-2) is prepared in detail for each remains when there is any question of a decedent's identity. The statements on the form specify the circumstances, date, and place of death: the date, recovery location, and condition of the remains: and the parent unit association of the remains as a specific casualty. Also, the statements provide a review of all matching physical and dental characteristics and other data that can help to verify identification. Paragraphs B-2 through B-6 below refer to entries on the front of the form: paragraphs B-7 through B-11 refer to entries on its reverse.

STATEMENT OF IDENTIFICATION
(AR 638-40)

INSTRUCTIONS: 1. Prepare in triplicate and distribute as follows:
a. Original to Director, Memorial Affairs Directorate, ATTN: DAAG-MED
b. Copy to Army Command
c. Copy retained at preparing installation

2. This statement will be supplemented by signed copies of appropriate Records of Identification Processing (DD Forms 890 through 894).

NAME OF DECEASED (Last, First, Middle)	GRADE	SERVICE NUMBER
POOLE, Richard C.	WO1	260 76 6887

BRANCH OF SERVICE	ORGANIZATION AND BASE
Army	Btry C, 65th Arty, 47th Air Mbl Div

DATE OF DEATH	PLACE OF DEATH
8 JUL 71	VIC Coords: YU069, near Coma Outpost

CONDITION OF REMAINS (Describe Briefly in Remarks)

	Recognizable		Evidence of Decomposition
X	Not Recognizable	X	Mangled or Mutilated
	Commingled	X	Evidence of Burns

MEANS OF IDENTIFICATION (Check all Appropriate Boxes and Indicate Appropriate Inclosures. Specify Supporting Data in Remarks)

	Identification Tags		INCLOSURES
	Personal Effects		DD Form 890
X	Dental Comparison	X	DD Form 891 and SF 603
	Skeletal & Anatomical Comparison	X	DD Form 892 and/or DD Form 893
	Fingerprints		DD Form 894
	Visual Recognition		
X	Other (Specify in Remarks)		

REMARKS (If additional space is required, continue on separate sheet)

Circumstances: OH-6A aircraft on which WO1 Poole was the manifested pilot and one of the three persons aboard the helicopter when it went down near the command outpost (YU069 460) on 8 July 1971.

Condition of Remains: The partial remains of WO1 Poole was severely mutilated and charred when received 10 July 1971. Portions missing were right forearm, left arm from just above the elbow, both hands, left knee, distal half left lower leg, and left foot.

Basis for Identification: Identification of this remains as WO1 Poole is based on the following observations:

Race--Caucasian (WO1 Poole was Caucasian)
Estimated height--68.3 inches (WO1 Poole was 69" tall)
(Right humerus--33.0 cm)
Hair--Brown leg hair (WO1 Poole had brown hair)
Fingerprints were unobtainable because both hands were missing.
The tooth chart prepared for this remains agrees with the dental records and X-rays for WO1 Poole and contradicts the records of the other two associated casualties.
ID tags/ID card--None received.
Clothing on remains--A right leather boot marked "Dick Poo.."
--1 OD sock
--Charred remains of NOMEX flight suit w/US Army tape and no other markings

To the best of my knowledge & belief, the statements made herein are correct & true.

(Date)	TYPED NAME, GRADE, AND TITLE OF IDENTIFYING OFFICER
11 July 1971	MORTON G. ALLEN, GS-12, Identification Officer
	SIGNATURE OF IDENTIFYING OFFICER: Morton G. Allen

NAME AND ADDRESS OF INSTALLATION
US ARMY MORTUARY, SAIGON

DA FORM 2773-R, 1 Mar 65 Replaces DA Form 2773, 1 Feb 64, which may be used.

Figure B-1. DA Form 2773-R (Statement of Identification) (front).

FOR USE OF IDENTIFICATION SPECIALISTS ONLY

SUMMARY

Because recovery of remains was made at the crash site of aircraft on which WO1 POOLE was the manifested pilot; the race, height, hair, teeth, and boot marking match the recorded data for WO1 POOLE; and no contradictory evidence is present, it is concluded that this is the remains of WO1 Richard G. Poole, 260 76 6887, US Army.

REMARKS

PERSONNEL KILLED IN THIS CRASH:

WO1 POOLE, Richard C.	TSN 8768-71
WO1 HARDFORD, Allen A.	TSN 8769-71
SP5 MANN, George H.	TSN 8770-71

Other items found on body:
Gold-plated Elgin wristwatch with Roman numerals.
Small iron cross with letters SA scratched on each side.
Gold high school ring containing initials R.C.P. (John F. Kennedy High)

RECOMMENDATIONS

It is recommended that this remains be declared officially identified as WO1 Richard C. Poole, 260 76 6887, US Army. It is also recommended that the remains be held in the morgue temporarily until further disposition is determined.

RECOMMENDATIONS PRESENTED

TYPED NAME AND TITLE OF IDENTIFICATION SPECIALIST	NAME AND ADDRESS OF INSTALLATION
Morton G. Allen, GS-13, Identification Officer	US ARMY MORTUARY, SAIGON
DATE: 11 July 1971	SIGNATURE OF IDENTIFICATION SPECIALIST: Morton G. Allen

RECOMMENDATIONS ACCEPTED

TYPED NAME, GRADE AND TITLE OF ACCEPTING OFFICER	NAME AND ADDRESS OF INSTALLATION
Alfred B. Quale, CPT, QMC, Mortuary Services Officer	US ARMY MORTUARY, SAIGON
DATE: 11 July 1971	SIGNATURE OF ACCEPTING OFFICER: Alfred B. Quale

Figure B-2. DA Form 2773-R (Statement of Identification) (reverse).

B-2. Personal Data of the Deceased

Make entries in Name of Deceased, Grade, Service Number, Branch of Service, Organization and Base, Date of Death, and Place of Death blocks. If any information is unknown, enter Unknown or Unk.

B-3. Condition of Remains Block

Mark with an X any boxes relevant to the condition of the remains.

B-4. Means of Identification Block

Check appropriate boxes as instructed.

B-5. Remarks Block

Enter a description of the remains along with a comparison of evidence for use in making a positive identification. The following steps may be used as a guide:

a. State the date the remains was received, the location from which it was received, and the circumstances surrounding or causing death if known.

b. In narrative form, describe the remains as received. Use data marked under Condition of Remains and any other observations made.

c. Note any statements of recognition or verification of identity.

d. Compare data obtained from remains and that from official records believed to be those of the decedent.

B-6. Date and Certification Blocks

Enter the date that the statement was completed and make the required certification. Show name and location of installation.

B-7. Summary Block

Summarize those items from the comparison drawn under Remarks on the front of the form which are felt to be most conclusive for identification, and state whether identification is to be considered positive or negative.

B-8. Remarks Block

Enter any additional data about the remains for which no immediate comparisons exist but with which future comparisons may possibly be made. List other personnel whose remains were found with that of the decedent.

B-9. Recommendations Block

State whether it is recommended that the remains be declared officially identified. Recommend further disposition of the case if warranted.

B-19. Recommendations Presented Block

Enter the date the recommendations are presented and other data as indicated.

B-11. Recommendations Accepted Block

Enter date recommendations are accepted and complete other blocks as indicated. The accepting officer makes these entries.

APPENDIX C

PREPARATION OF DD FORM 890

(RECORD OF IDENTIFICATION PROCESSING

(EFFECTS AND PHYSICAL DATA))

C-1. General

DD Form 890 (fig C-1) is used to record identifying media at the cemetery, mortuary, or central identification laboratory (CIL). Exactness of entries during processing operations is vitally important to the final identification of remains. Some entries require information from other records, and others require information obtained by examining the remains. All blocks must be completed. When the information cannot be provided, None, None found, or NA (not applicable) is entered.

RECORD OF IDENTIFICATION PROCESSING
(Effects and Physical Data)

DATE: 10 May 19__

LAST NAME - FIRST NAME - MIDDLE INITIAL (Or unknown number)	GRADE	SERVICE NO./SSAN	CIL CASE NUMBER (If applicable)
HACKER, Laurance H.	PFC	253 82 3249	912

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
US Army Mortuary, Saigon	NA	NA	NA

RECEIVED FROM: NA

IMPRINT OF IDENTIFICATION TAG

HACKER
LAURANCE H
O+ 253 82 3249
CATHOLIC

OFFICIAL IDENTIFICATION FOUND WITH REMAINS (Include personal effects aiding identification)

Two identification tags found, one in pocket of trousers, one on cross.

ITEMS OF CLOTHING AND EQUIPMENT FOUND WITH REMAINS (Indicate type, color, size, markings, service, etc. If laundry marks are indistinct, follow procedures outlined in TM 10-286)

Clothing found on remains:
Jacket, cotton, size 40
Trousers, cotton, size 36/32
Socks, wool
Undershorts, cotton, size 36, with marking H3249
Undershirt, cotton, size 40, with marking H3249

FINGERPRINTS TAKEN	X-RAYS MADE	FLUROSCOPE STATEMENT ATTACHED
☐ YES ☒ NO	☒ YES ☐ NO	☒ YES ☐ NO
PHOTOGRAPHS TAKEN	**ANTHROPOLOGICAL STATEMENT MADE**	**CHEMICAL STATEMENT ATTACHED**
☐ YES ☒ NO	☒ YES ☐ NO	☐ YES ☒ NO

PHYSICAL DESCRIPTION

ESTIMATED HEIGHT	MUSCULARITY	COLOR OF HAIR	RACE OR NATIVITY
Fem + Fib = 6'0''	Large	Brown	Caucasian

TATTOOS, SCARS OR MARKS ON BODY

Decomposition prevents findings.

EVIDENCE OF HEALED FRACTURES AND BONE MALFORMATIONS

None.

WOUNDS OR INJURIES

Decomposition prevents findings.

I HAVE PERSONALLY VIEWED THE REMAINS OF THIS DECEASED AND ALL RESULTING INFORMATION HAS BEEN RECORDED TO THE BEST OF MY KNOWLEDGE.

NAME, GRADE, AND ORGANIZATION	SIGNATURE
Herbert R. Catz, 1LT, QMC, Co. A, 207th S&S Bn	Herbert R. Catz

DD FORM 1 JAN 68 890 — PREVIOUS EDITION OF THIS FORM IS OBSOLETE. — GPO 1968 O—360951

Figure C-1. DD Form 890 (Record of Identification Processing (Effects and Physical Data)).

C-2. Date Block

Enter the date the form is completed.

C-3. Name Block

Enter the name of the decedent in the order indicated. If unknown, enter Unknown or Unk and Unknown X-number.

C-4. Grade and Service Number (Social Security Number) Blocks

Make entries as directed. If unknown, enter Unknown or Unk.

C-5. CIL Case Number Block

Enter CIL case number if applicable. If not applicable, enter NA.

C-6. Name of Cemetery, Evacuation Number, or Search and Recovery Number Block

Complete as indicated unless the remains is processed at a CIL. If at a CIL, enter its name.

C-7. Plot, Row, Grave Blocks

Unless unit is a cemetery, enter NA.

C-8. Received From Block

Indicate if remains was obtained through evacuation or search and recovery. If remains was received from cemetery, enter NA.

C-9. Imprint of Identification Tag Block

Enter imprint of the ID tag here. If the ID tag is missing, enter Missing. If the tag is too mutilated to imprint, enter Mutilated followed by the information from the tag.

C-10. Official Identification Found With Remains Block

Enter all information qualifying as official identifying media. Some examples are as follows:

a. ID tags. If found, indicate where they were found on the remains.

b. Official identification card (DD Form 2A (Armed Forces Identification Card)).

c. DD Form 1380 (US Field Medical Card).

d. Motor vehicle operator's permit, credit cards, marriage certificate, will, money orders.

e. Objects bearing name and/or service number.

C-11. Items of Clothing and Equipment Found With Remains Block

Enter the following to the extent available.

a. Size and type of clothing, distinctive insignia, and laundry markings.

b. Any nonporous substances found in clothing during fluoroscopic examination.

c. Any markings discovered in footgear, headgear, web belt, and helmet liner, as detailed in AR 700-84.

d. Full description of insignia, decorations, medals, and campaign badges.

e. Complete description of military equipment, including identification numbers.

f. Data from decedent's military records, including name, grade, and service or social security number, along with other pertinent data.

C-12. Technological Tests and Comments Blocks (Fingerprints, Photographs, etc.)

Mark an X in the appropriate block, indicating that a test was performed, Attach any relevant pictures or statements resulting from the tests.

C-13. Physical Description Blocks

Enter information, using data taken from DD Forms 892 and 893 or obtained by direct observation.

C-14. Name, Grade, Organization, and Signature Blocks

Enter name, grade, and unit of the preparer of the form. The preparer signs the form in the Signature block.

APPENDIX D

PREPARATION OF DD FORM 893 (RECORD OF IDENTIFICATION PROCESSING—ANATOMICAL CHART)

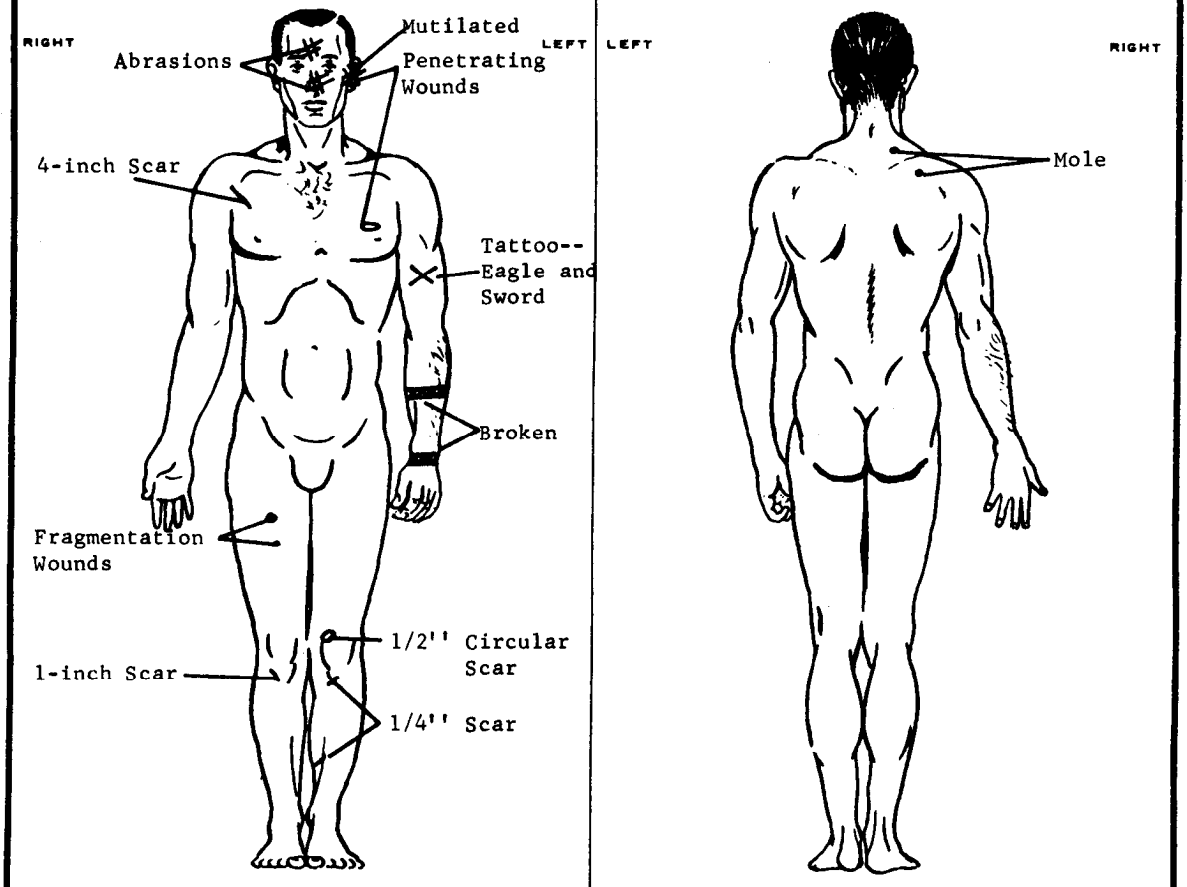
D-1. General

DD Form 893 (fig D-1) should be completed for flesh. covered remains. Extreme care should be taken to record observations accurately for each remains. In charting identifying data, it must be remembered that the right side of the charts, as viewed by the observer, represents the left side of the remains.

RECORD OF IDENTIFICATION PROCESSING
ANATOMICAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL (or unknown number)		GRADE		SERVICE NUMBER
HANSON, William A.		E-4		223 55 8945
NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NO.	**PLOT**	**ROW**	**GRAVE**	**ESTIMATED AGE (Yrs)** / **ESTIMATED HEIGHT**
EVAC No. 3284	NA	NA	NA	22-24 / 68''

BLACK OUT PORTIONS NOT RECOVERED



CONDITION OF REMAINS (Check pertinent blocks) [X] INTACT [ ] DECOMPOSED [ ] SEMI-SKELETAL [X] FLESH COVERED [ ] BURNED (Degree: [ ] 1st [ ] 2d [ ] 3d)

REMARKS (Continue on reverse if additional space is required)

Body--Complete
Race--Caucasian
Table measurement--68''
Both hands fingerprinted at US Army Mortuary TSN--Right and left index prints match those on DD Form 2A for: HANSON, William A. SSN 223 55 8945
ID card--Received with paperwork for HANSON, William A., SSN 223 55 8945
ID tags--None received
Clothing on remains--One jungle fatigue shirt, size med-short; US Army tape. One pr jungle fatigue trousers, size med-reg; one pr jungle boots, size med-reg. No other markings found.

NAME OF PREPARING OFFICIAL (Print or type)	SIGNATURE
Herbert W. Caplain	Herbert W. Caplain

DD FORM 1 FEB 56 893

U. S. GOVERNMENT PRINTING OFFICE : 1956 O - 377962

Figure D-1. DD Form 893 (Record of Identification Processing—Anatomical Chart).

D-2. Name Block

Enter last name, first name, and middle initial of the deceased. If unknown, write Unknown or Unk and the unknown X-number assigned the case.

D-3. Grade and Service Number Blocks

Enter grade and social security number of the deceased. If unknown, write Unknown or Unk.

D-4. Name of Cemetery Block

Enter the name of the unit at which the form is completed. If applicable, state the evacuation number or the search and recovery number which accompanied the remains to the unit. State the processing number which was assigned the remains, for example, the CIL number.

D-5. Plot, Row, Grave Blocks

If the remains is being processed for burial in a temporary cemetery, state the plot, row, and grave in which it is to be interred. If the remains is not to be buried at this unit, indicate NA in these blocks .

D-6. Age Block

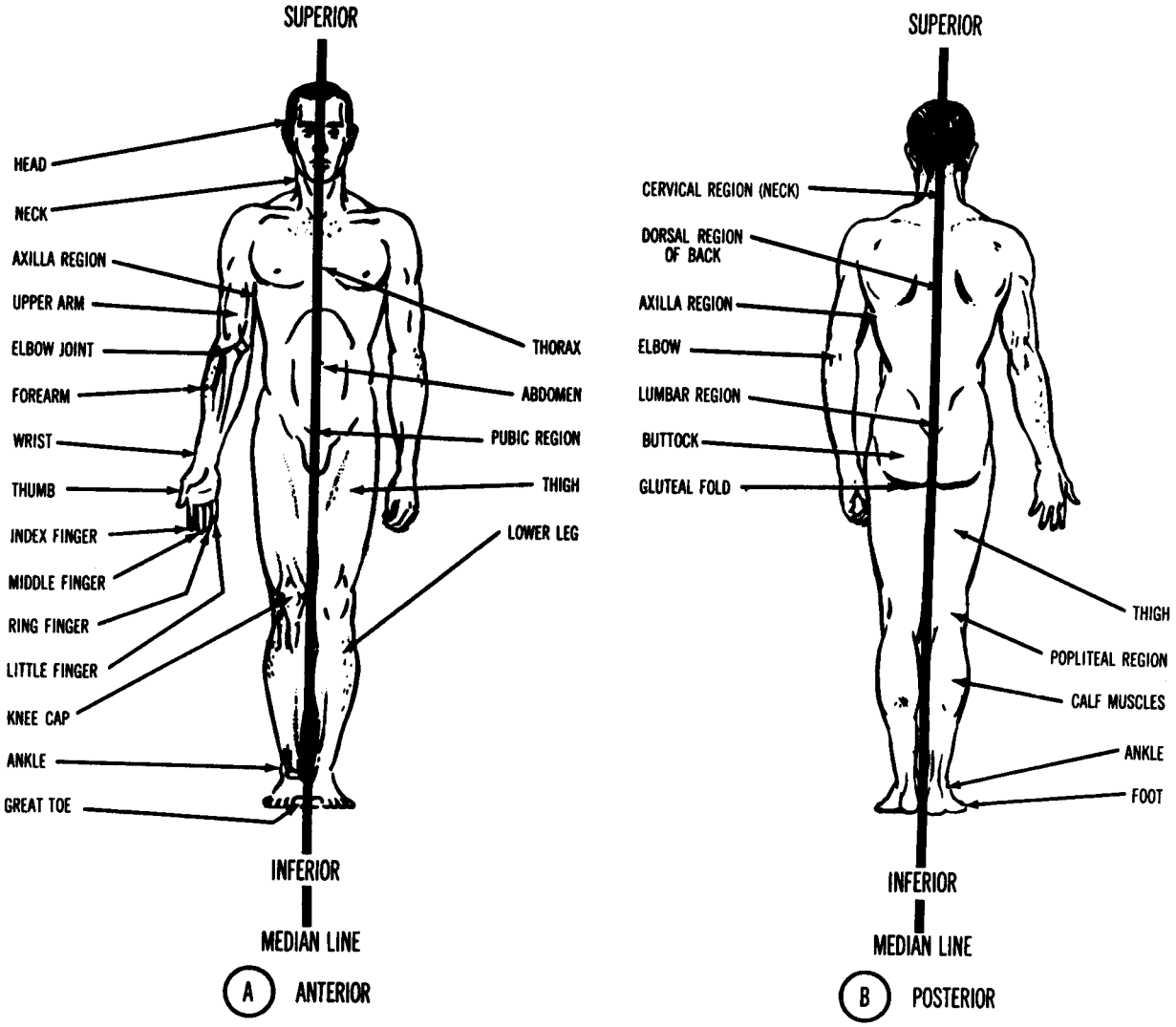
Enter the estimated age of the deceased as determined from visual examination of the remains.

D-7. Height Block

State the estimated height of the remains as obtained by table measurement. Remains are measured from the top of the head to the bottom of the heel.

D-8. Anatomical Chart Block

Indicate such identifying media as tattoos, scars, deformities, wounds, and injuries in the exact corresponding locations on the charts. Use the descriptive terms for body parts as given in figure D-2; both anterior and posterior views are shown. Typical entries on an anatomical chart are given in figure D-3.



A. Anterior.
B. Posterior.

Figure D-2. Descriptive terms for body parts.

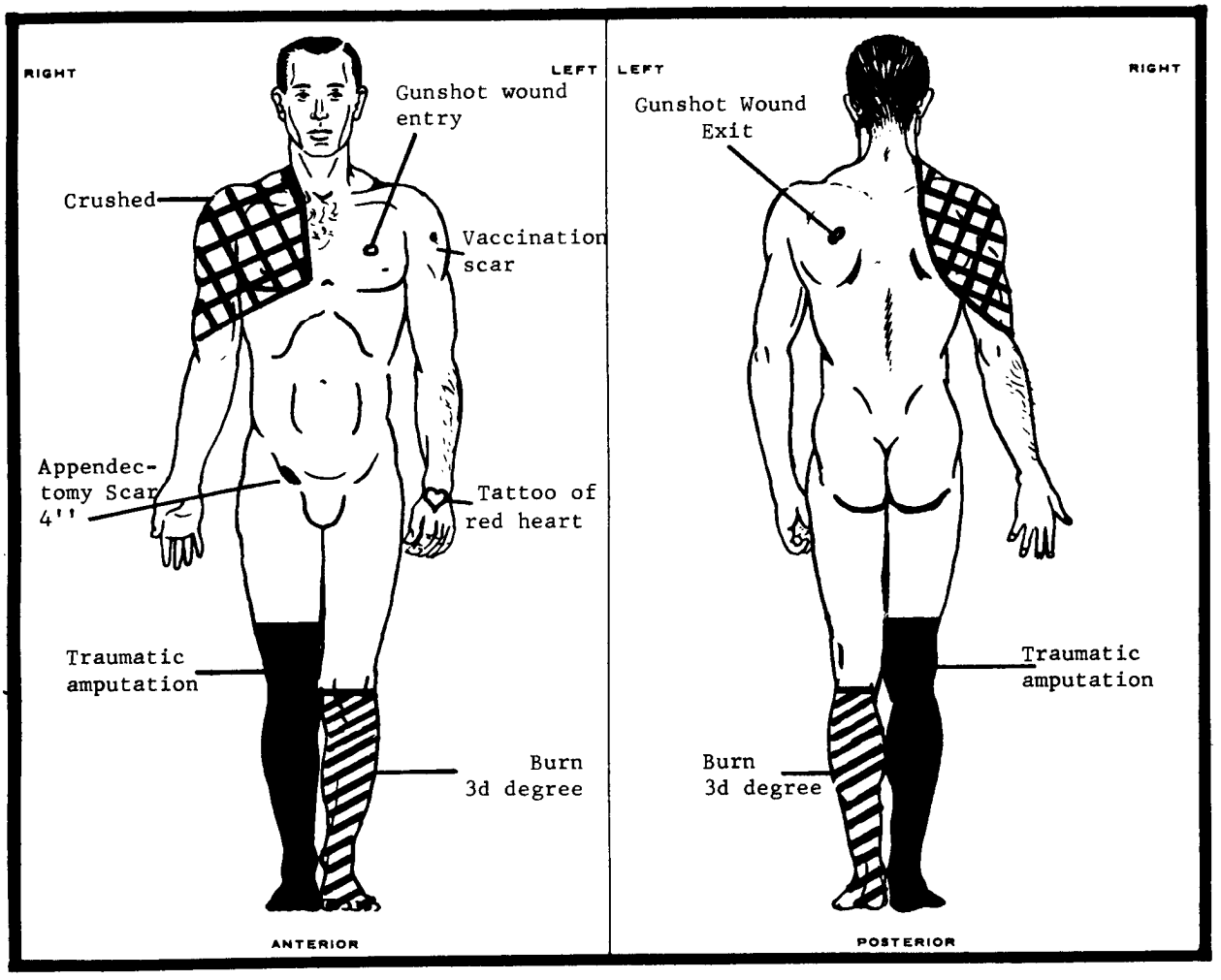


Figure D-3. Typical entries on anatomical chart.

a. Burns. Indicate a burn by crosshatching the involved area on the charts and write in the degree of burn (fig D-3).

b. Missing Portions. Indicate missing body portions on the chart by blacking them out (figD-3). Beside each blacked-out portion, enter either traumatic amputation or surgical amputation. Generally, a traumatic amputation is one performed when the fatal incident occurs or as a result of the incident; a surgical amputation is one performed at an earlier time and is in no way associated with the time and cause of death.

c. Crushed or Abraded Areas. Indicate crushed or abraded areas by crosshatching and counter-crosshatching on the chart (fig. D-3). Write in the word "crushed" or "abraded." If the decedent is extremely disfigured, the anthropologist uses scientific means to reveal such invisible physical characteristics as scars and tattoos.

D-9. Condition of Remains Block

Place a checkmark in the applicable blocks.

D-10. Remarks Block

Enter information obtained during the processing of the remains, such as color of hair, markings on clothing, location of ID tags if found, method of obtaining height, and any other data which may assist the anthropologist in determining a positive identification.

D-11. Name of Preparing Official and Signature Blocks

print or type name, grade, and title of person preparing the form. The preparer signs his name as indicated.

APPENDIX E

SKELETAL IDENTIFICATION

E-1. General

Positive identification of a remains can be made through a knowledge of the skeletal system. Identification as to race, sex, age, and height is possible through applying a knowledge of the human skeleton. By studying the bones and the number of bones found in a common grave, one can also determine the number of remains buried there.

E-2. The Skeletal System

The skeletal system, as shown in the anterior view of a human skeleton in figure E-1, includes the bones and the joints (articulations) where separate bones come together. This appendix, however, covers only the bones of the skeletal system. For study purposes, the 206 bones of the adult are divided into the bones of the axial skeleton (80 bones) and the appendicular skeleton (126 bones). The axial skeleton includes the skull, vertebral column, ribs, and sternum. The appendicular skeleton includes the bones of the shoulder girdle, upper limb, pelvic girdle, and lower limb.

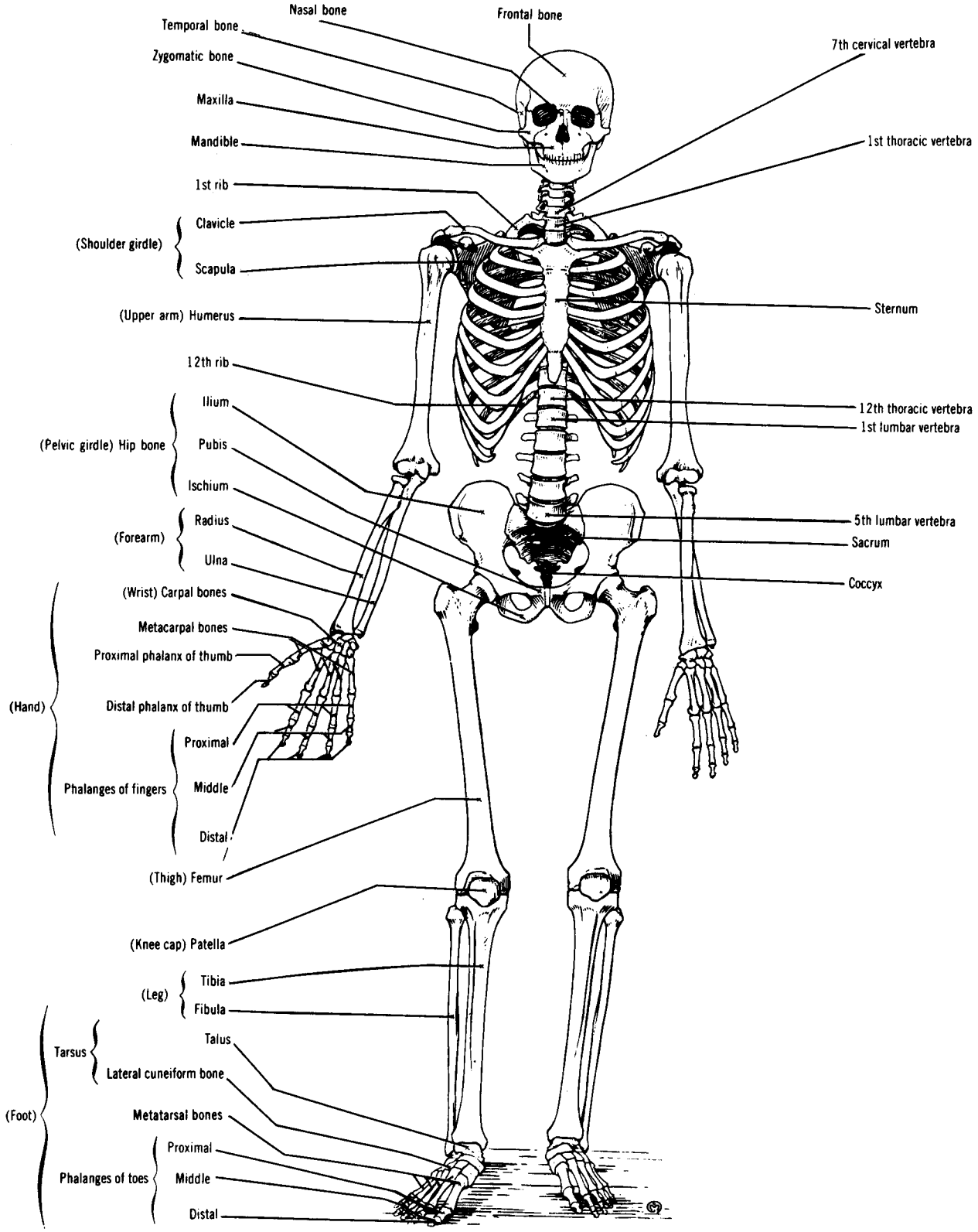


Figure E-1. Human skeleton, anterior view.

E-3. Bone Classification

Bones are classified by their shape as long, short, flat, and irregular. Long bones are in the extremities and act as levers to produce motion when acted on by muscles. Short bones, strong and compact, are in the wrists and ankles. Flat bones form protective plates and provide broad surfaces for muscle attachments, for example, the shoulder blades. Irregular bones have many surfaces and fit into many locations, for example, the facial, vertebral, and pelvic bones.

E-4. Terminology

a. Bone Characteristics. Bones have holes, air spaces, projections, ridges, and other characteristics. Each has a function, for example, in joint formation, for muscle attachments, or as passageways for blood vessels and nerves. Also, such characteristics are used as points of reference. The terms include the following:

(1) Foramen—an opening, a hole.
(2) Sinus—an air space.
(3) Head—a rounded ball end.
(4) Neck—a constricted portion.
(5) Condyle—a projection fitting into a joint.
(6) Fossa—a socket.
(7) Crest—a ridge.
(8) Spine—a sharp projection.

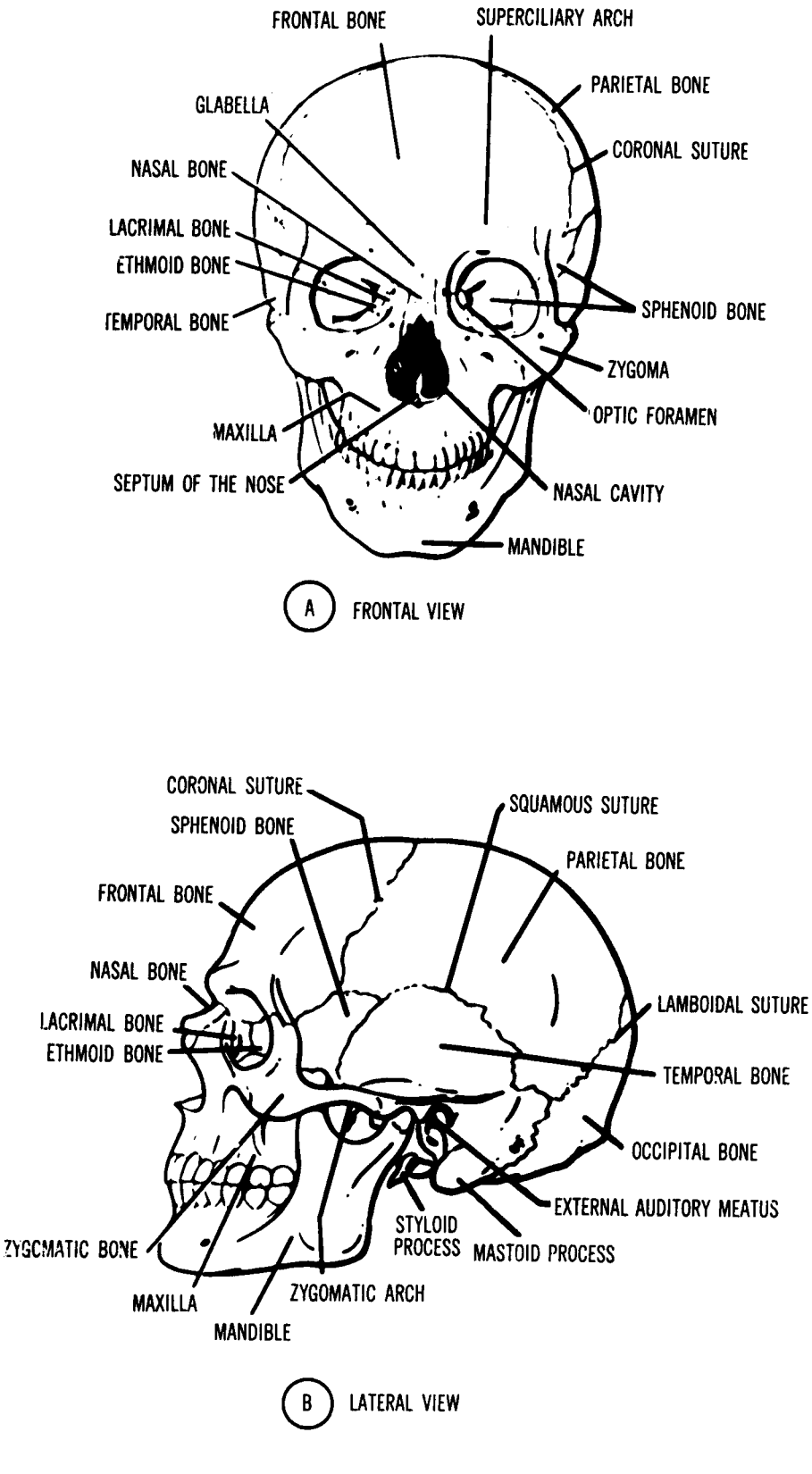
b. Anatomical Terminology. Some of the terms used in anatomy to describe positions and to define directions and locations should prove helpful to a better understanding of the information in this appendix.

(1) Anatomical position—the body standing erect, arms at side, palms of hand facing forward. The right forearm and hand in figure E-1 are in anatomical position. This is the position of reference when terms of direction and location are used. The opposite position is the position of pronation resulting from a medial rotation of the hand and radius around the ulna so that the palm is turned downward. The left forearm and hand in figure E-1 is in the position of pronation.

(2) Superior—toward the head (cranial).
(3) Inferior—toward the feet (caudal).
(4) Anterior—toward the front (ventral – the belly side).
(5) Posterior—toward the back (dorsal – the backbone side).
(6) Medial—toward the midline.
(7) Lateral—to right or left of midline.
(8) Proximal—near point of reference.
(9) Distal—far away from point of reference.

E-5. The Skull

The skull forms the framework of the head. Frontal and lateral views of the skull are illustrated in figure E-2. The skull has 29 bones—eight cranial; fourteen facial; six ossicles, the malleus, incus, and stapes bones in each ear; and one hyoid, a single bone between the skull and neck area.



A. Frontal view B. Lateral view

Figure E-2. The skull.

a. Cranial Bones. The cranial bones support and protect the brain. They fuse together after birth in firmly united joints called sutures. The eight cranial bones include one frontal, two parietal, one occipital, two temporal, one ethmoid, and one sphenoid. The frontal bone, which forms the forehead, part of the eye socket, and part of the nose, is jointed posteriorly with the parietal bones. The parietal bones form the dome of the skull and the upper side walls. The occipital bone forms the back and base of the skull, incloses the foramen magnum (para E-6), and articulates with the superior facets of the atlas or first vertebra. The temporal bones form the lower part of each side of the skull and contain the essential organs of hearing and balance in the middle and inner parts of the ear.

b. Facial Bones. The 14 facial bones fit together like a complicated jigsaw puzzle. For example, parts of seven different cranial and facial bones form each orbital cavity; two maxillary bones, the upper jaw; two zygomatic, the upper cheeks; and one mandible, the lower jaw (fig, E-2). The maxillary bones support the upper teeth; the mandible supports the lower teeth and is the strongest bone in the face. The joints formed by the mandible and temporal bones permit jaw movement. Nine smaller facial bones complete the nose and roof of the mouth – two nasal, two turbinate, one vomer, two lacrimal, and two maxilla.

c. Ossicles. The middle ear, or tympanic cavity, is an irregular space in the temporal bone. The tympanic cavity is filled with air and contains the three ossicles of the ear (fig, E-3)—the malleus (hammer), the incus (anvil), and the stapes (stirrup) bones.

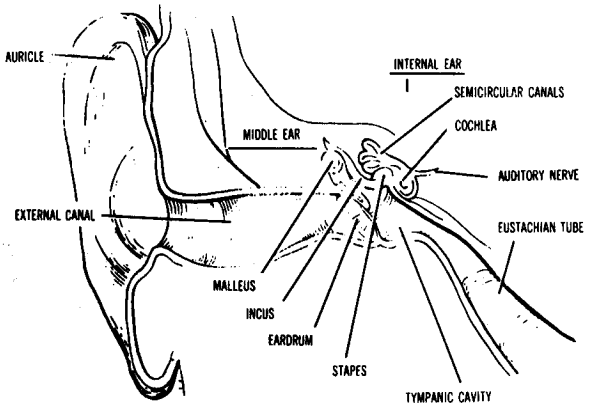


Figure E-3. Ear ossicles.

d. Hyoid. The hyoid (fig, E-4), a small, U-shaped bone in the throat, is located below the tongue and above the larynx. It is attached to the tongue and moves up and down with it during swallowing.

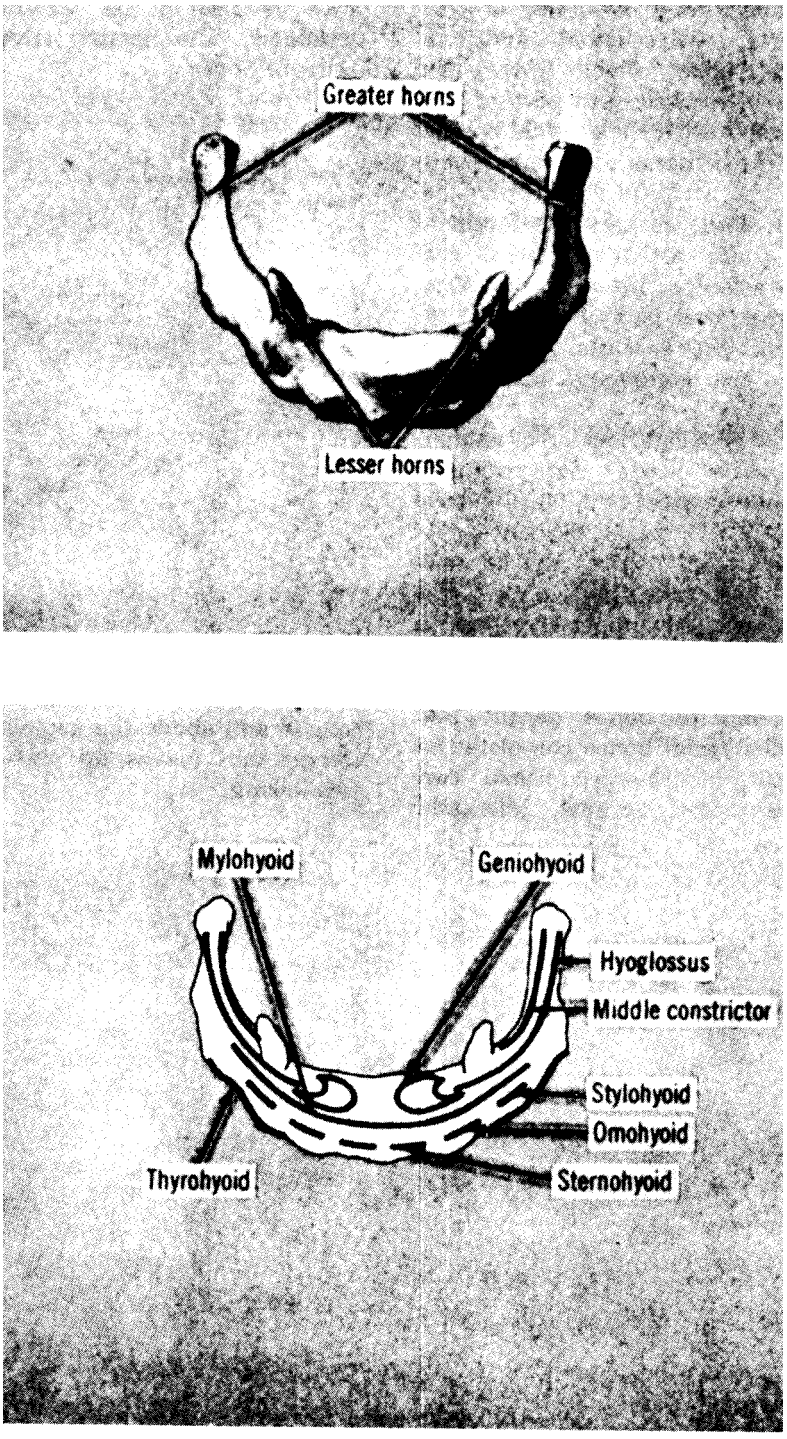


Figure E-4. Hyoid.

E-6. The Vertebral Column

The 26 bones of the vertebral column (backbone) (fig, E-5) form a flexible structure that supports the head, the thorax, and the upper extremities. The arrangement of the vertebrae provides a protected passageway, the spinal or vertebral

canal, for the spinal cord. The passageway begins with the foramen magnum, the large hole in the lower part of the occipital bone (B, fig, E-2). A typical vertebra (fig, E-6) has an anterior portion – the body, and a posterior portion – the arch. The body and the arch encircle the spinal canal. Vertebral bones are classified according to the four regions in which they are located: cervical (neck), thoracic (chest), lumbar (lower back), and sacral-coccygeal (pelvic) bones.

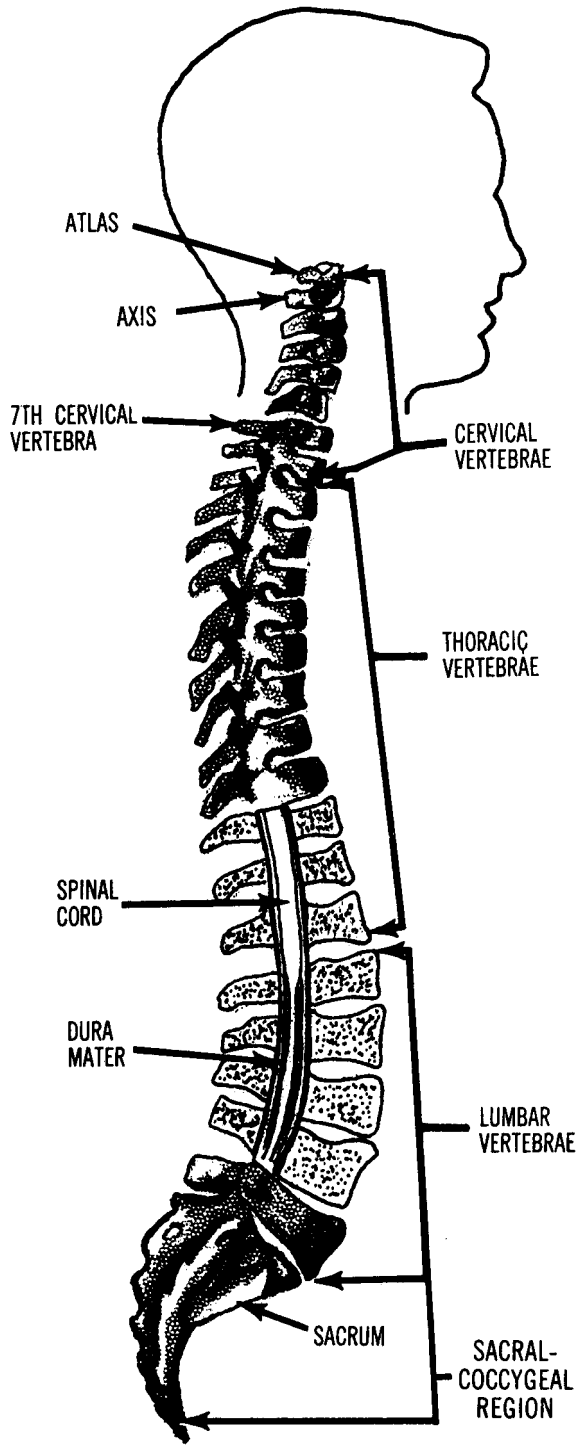


Figure E-5. Vertebral column.

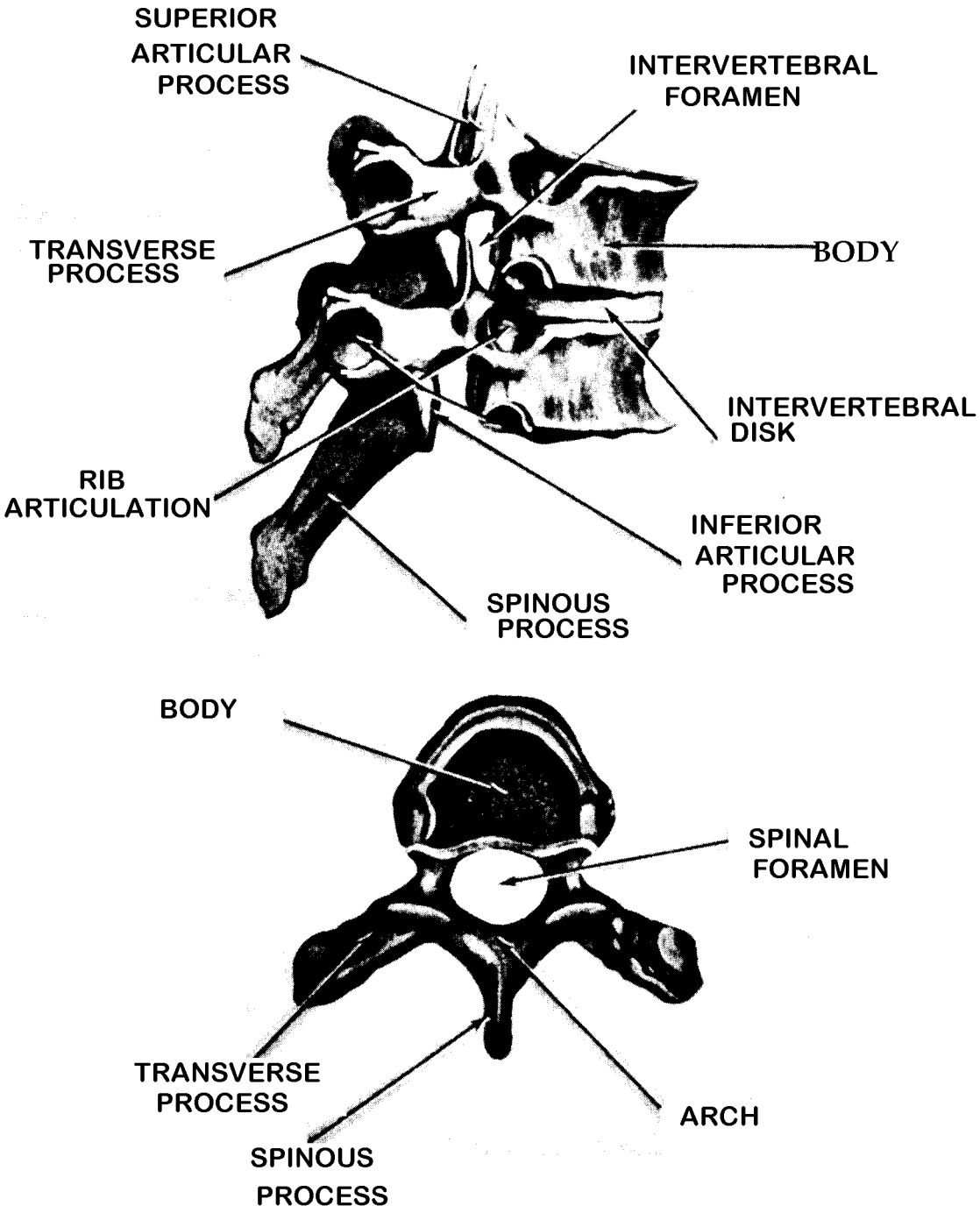
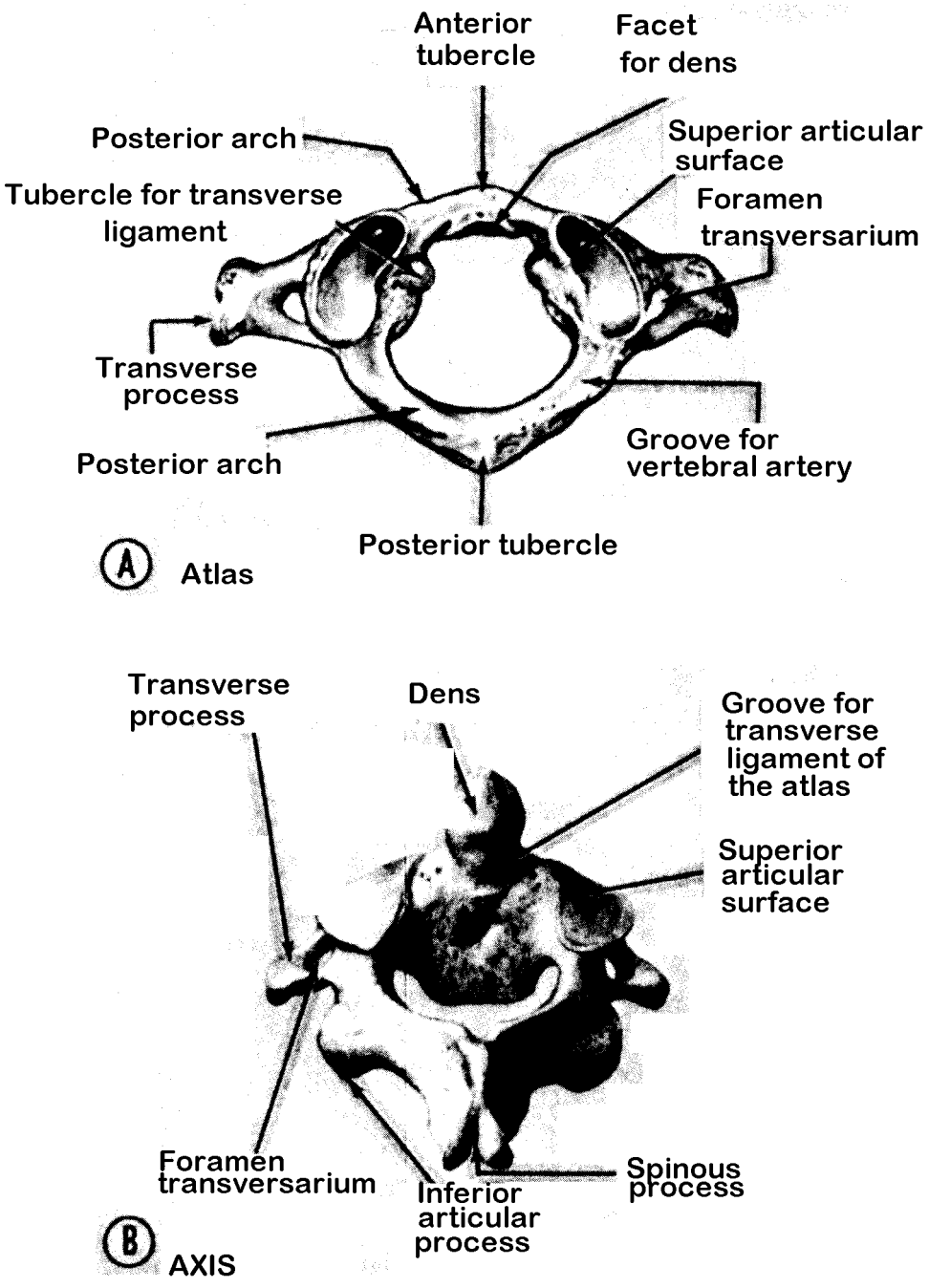


Figure E-6. Typical vertebra.

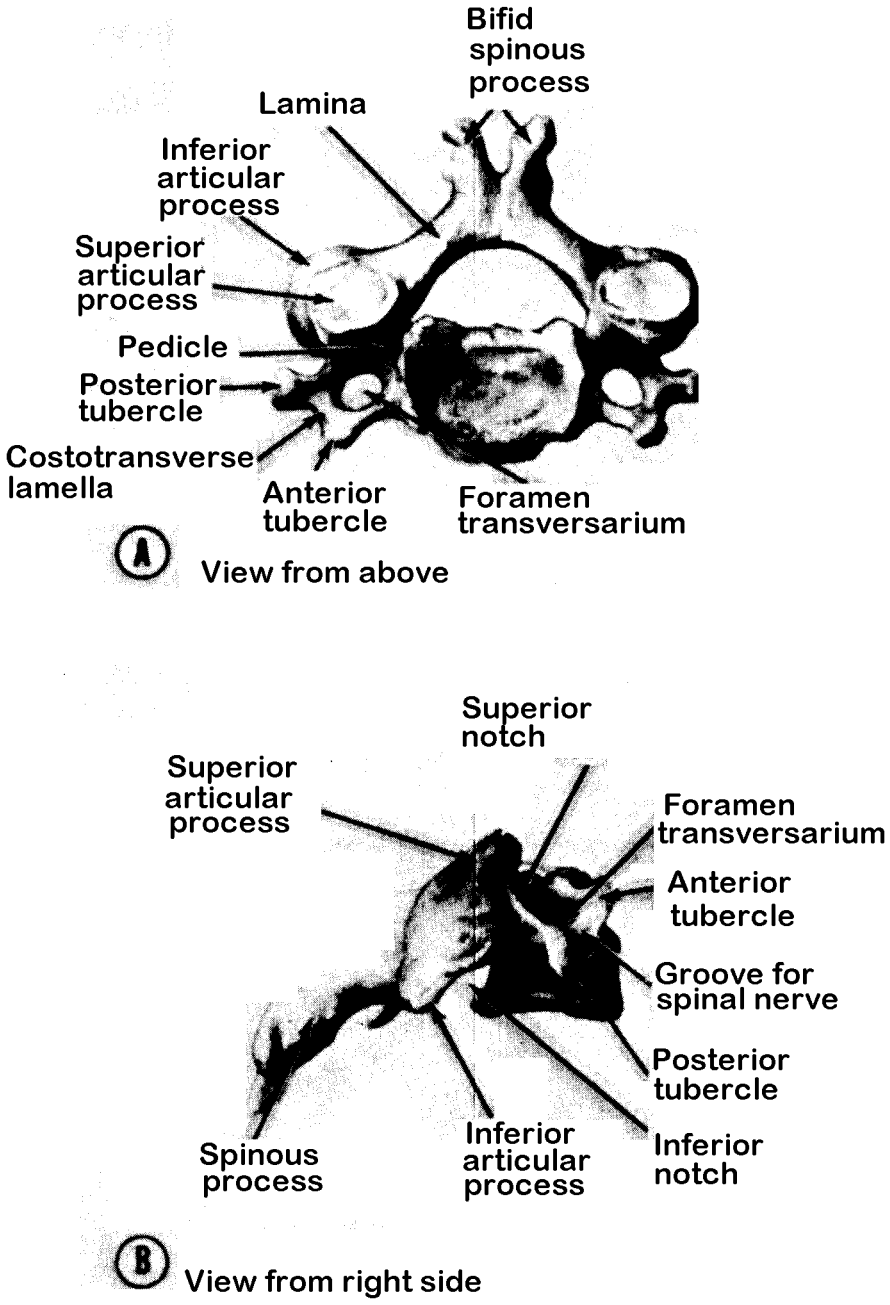
a. Cervical Vertebrae. The seven cervical vertebrae are in the neck region. The first cervical vertebra is called the atlas (a, fig, E-7); the second, the axis (B). These are the only named vertebrae as all other vertebrae are numbered according to region. The skull rests on the atlas vertebra and rotates on the axis vertebra. The toothlike part, or dens, of the axis, known as the

odontoid process, projects upward to lie within the "ring" of the atlas. The remaining cervical vertebrae are similar in outline to the fourth cervical vertebra shown in figure E-8. The prominent knob at the base of the neck is formed by the spinous process of the seventh cervical vertebra.



A. Atlas
B. Axis

Figure E-7. First two cervical vertebrae.



A. From above
B. From right side

Figure E-8. Fourth cervical vertebra.

b. Thoracic Vertebrae. The 12 thoracic vertebrae form the posterior wall of the chest, and each thoracic vertebra articulates with one pair of ribs. Typical thoracic vertebra articulates with one pair of ribs. Typical thoracic vertebrae are shown in figure E-9. These heart-shaped thoracic vertebrae, beginning with the third one, become increasingly larger in size. The first four resemble the cervical vertebrae above them while the last four resemble the lumbar vertebrae below them.

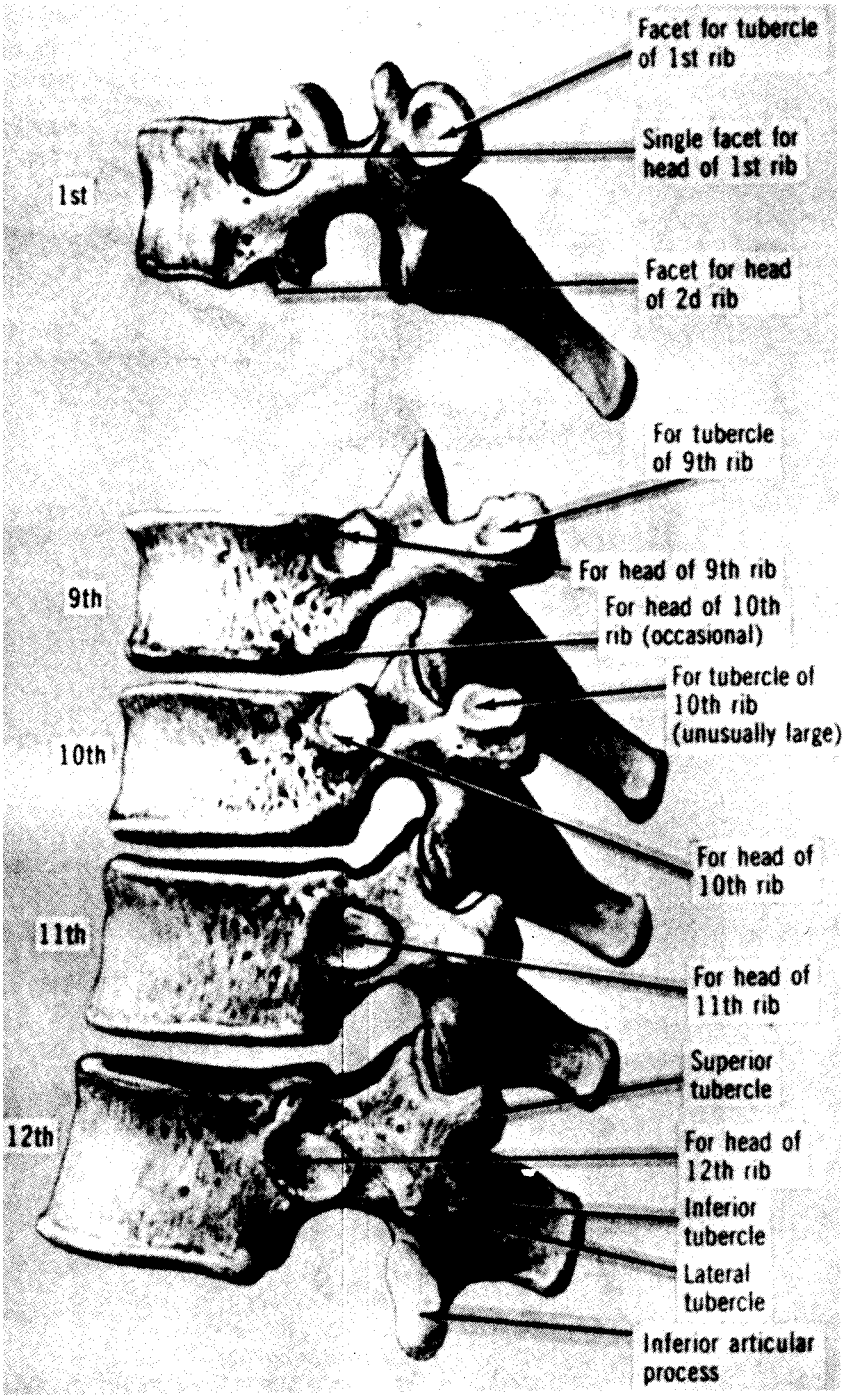
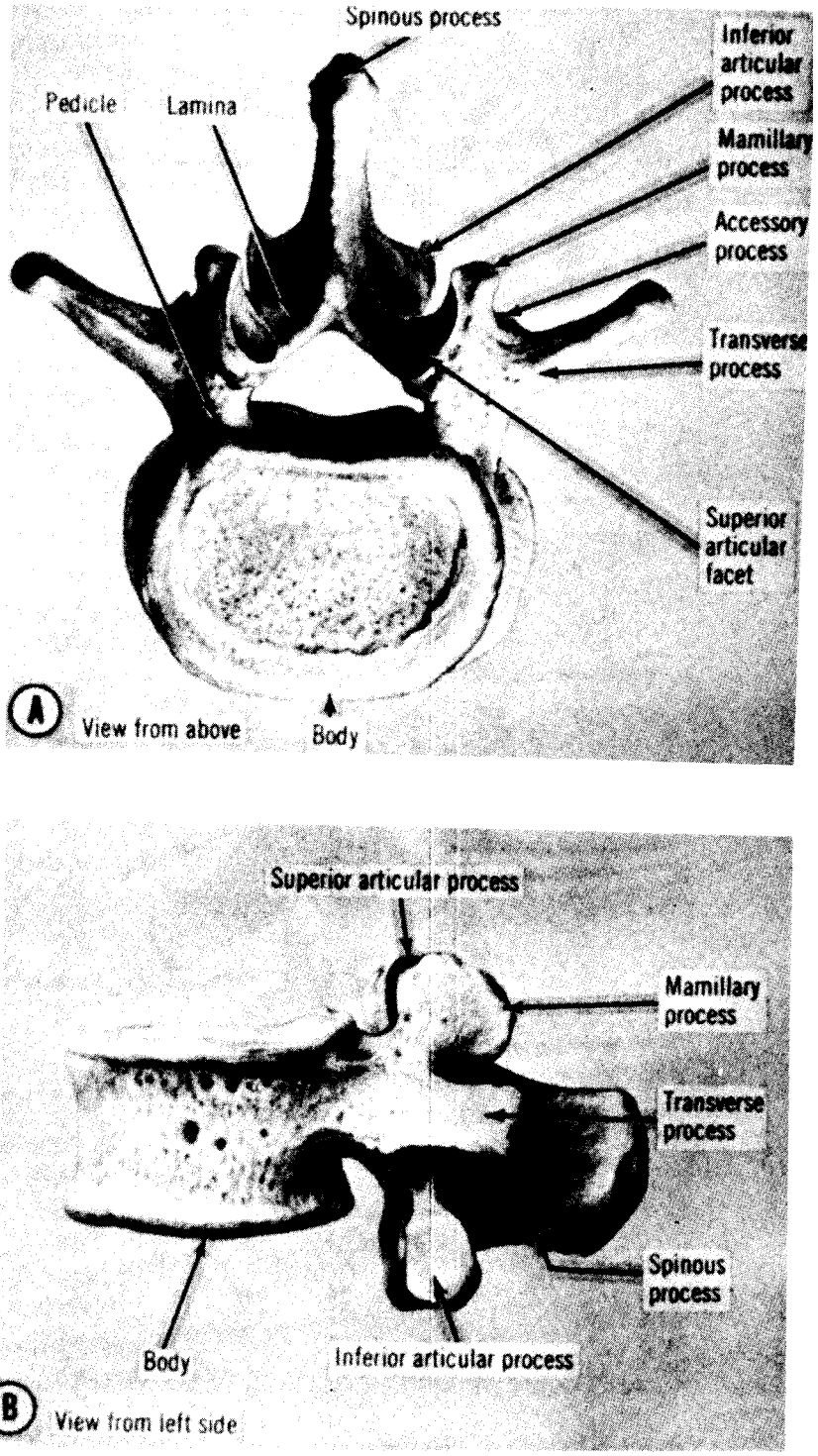


Figure E-9. Thoracic vertebrae.

c. Lumbar Vertebrae. The five lumbar vertebrae are in the lower back—the small of the back. They support the posterior abdominal wall. The first four resemble each other closely; however, the first one is smaller than the rest. They are kidney shaped, flat, and almost parallel to each other. Views from above and from the left side of the third lumbar vertebra are shown in figure E-10. The fifth lumbar vertebra differs from the others in that it is deeper in front than behind. Lumbar vertebrae do not have articular facets for ribs nor do they have foramina transversaris (holes for nerves to go through).



A. From above
B. From left side

Figure E-10. Third lumbar vertebra.

d. Sacrum. The sacrum (fig, E-11), a flat, spade-shaped bone, forms the posterior part of the pelvic girdle. In the adult, five sacral bones fuse to form the sacrum. In the female, the sacrum is often wider in proportion to its length than in the male.

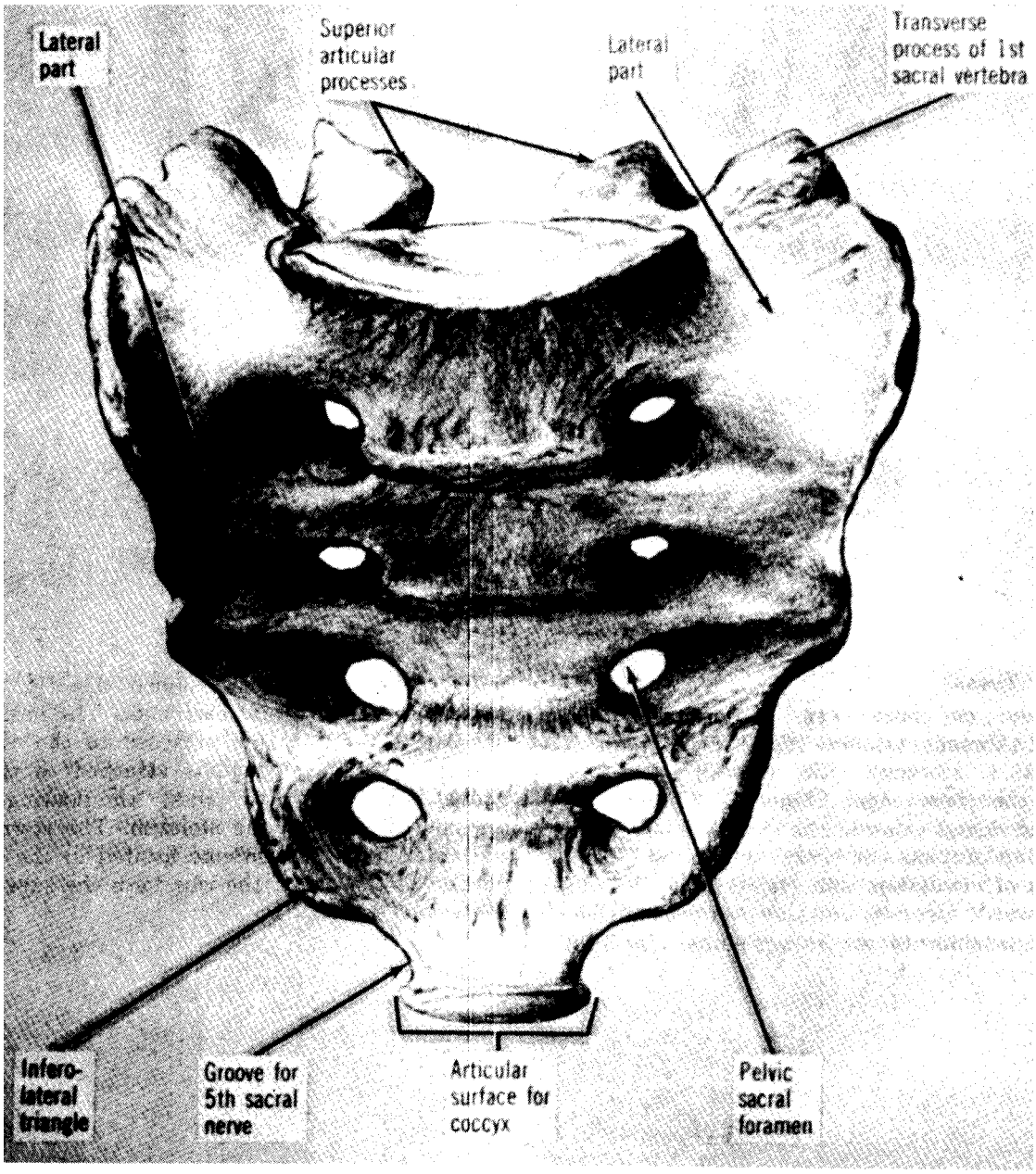
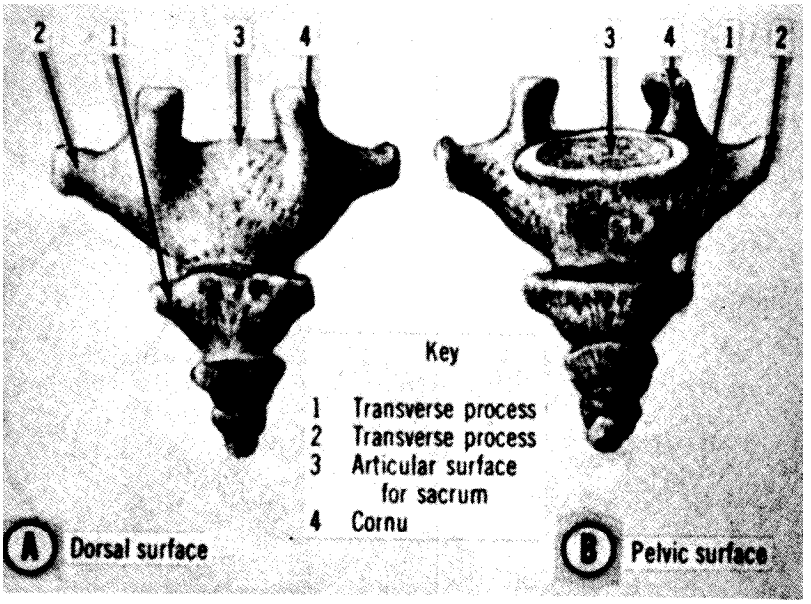


Figure E-11. Sacrum, pelvic surface.

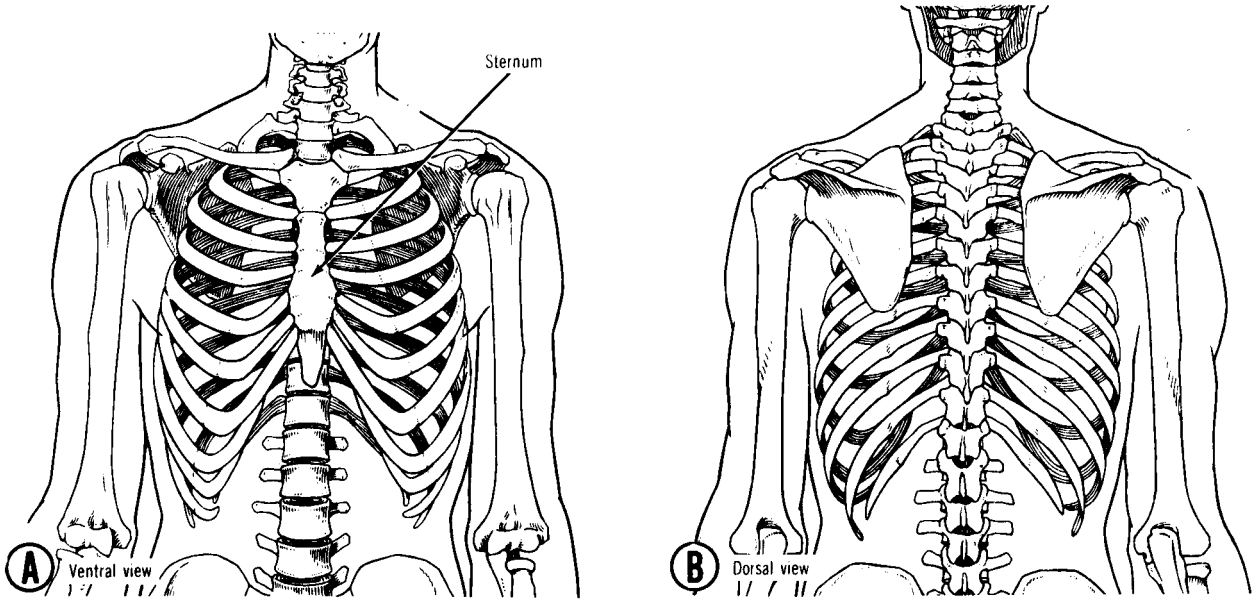
e. Coccyx. The coccyx, or tail bone is the thin, curving end of the vertebral column below the sacrum. In the adult, four coccygeal bones fuse to form the coccyx. In the adult male, the coccyx is longer and more convex than in the adult female. Figure E-12 illustrates the dorsal (A) and pelvic (B) surfaces of the coccyx. The coccyx articulates with the sacrum at the surface shown at 3.



A. Dorsal surface
B. Pelvic surface
Figure E-12. Coccyx.

E-7. The Thorax

The thorax, or chest cage, is formed by 25 bones—12 thoracic vertebrae (fig, E-5), 12 pairs of ribs, and 1 sternum. Rib (costal) cartilages complete the chest cage. Figure E-13 illustrates ventral and dorsal views of the thorax. The thorax contains and protects the heart, lungs, and related structures of circulation and respiration. The ribs curve outward, forward, and downward from their posterior attachments to the vertebrae. The first seven pairs of ribs are joined directly to the sternum by their costal cartilages. The next three pairs (8, 9, and 10) are attached to the sternum indirectly—each cartilage is attached to the one above, but the last two pairs, "the floating ribs," are not attached to the sternum. The sternum is the anterior flat breastbone located in the middle portion of the chest; the ribs form the expandable chest cage wall.



A. Ventral view
B. Dorsal view

Figure E-13. Thorax.

E-8. The Shoulder Girdle and Upper Limbs

The shoulder girdle (fig, E-14) is a flexible yoke that suspends and supports the arms. Held in place by muscles, it has only one point of attachment to the axial skeleton—the joint between the clavicle and sternum. The shoulder girdle is formed by two scapulae posteriorly and two clavicles anteriorly. The bones of the shoulder and upper limb include the scapula (shoulder blade); clavicle (collarbone); humerus (upper arm bone); radius and ulna (forearm bones); carpals (wrist-bones); metacarpal (hand bones); and phalanges (finger bones).

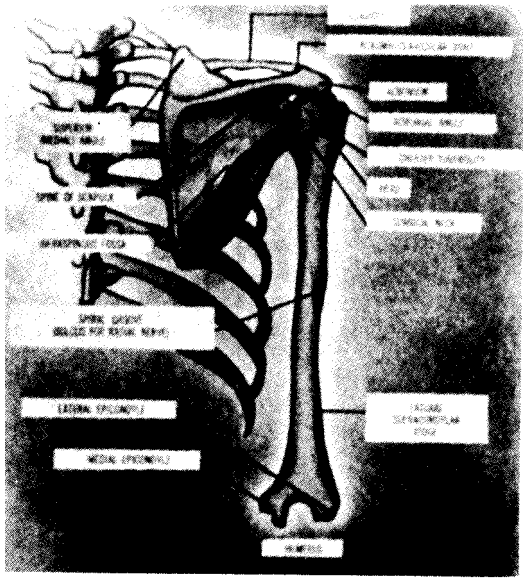
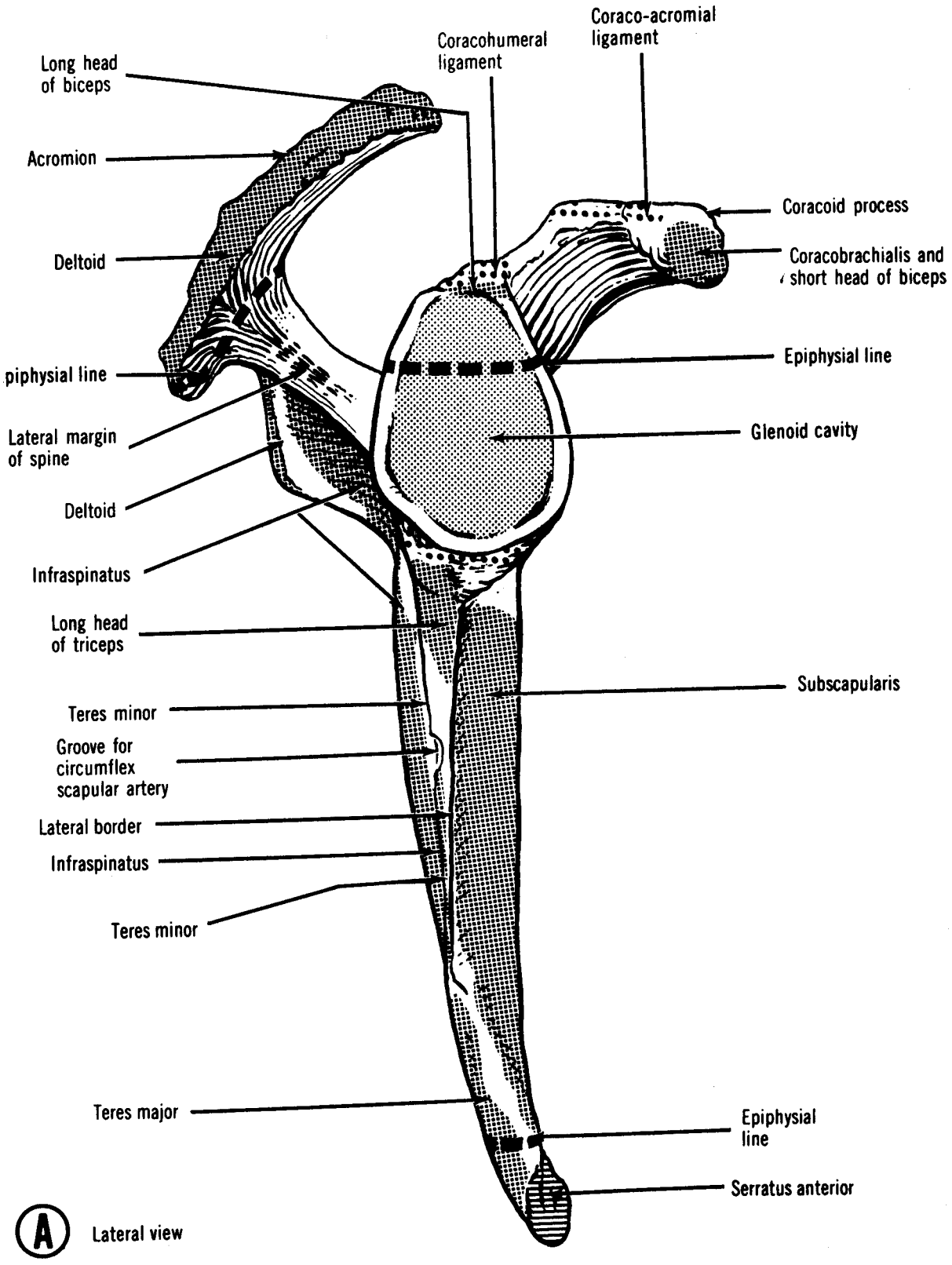


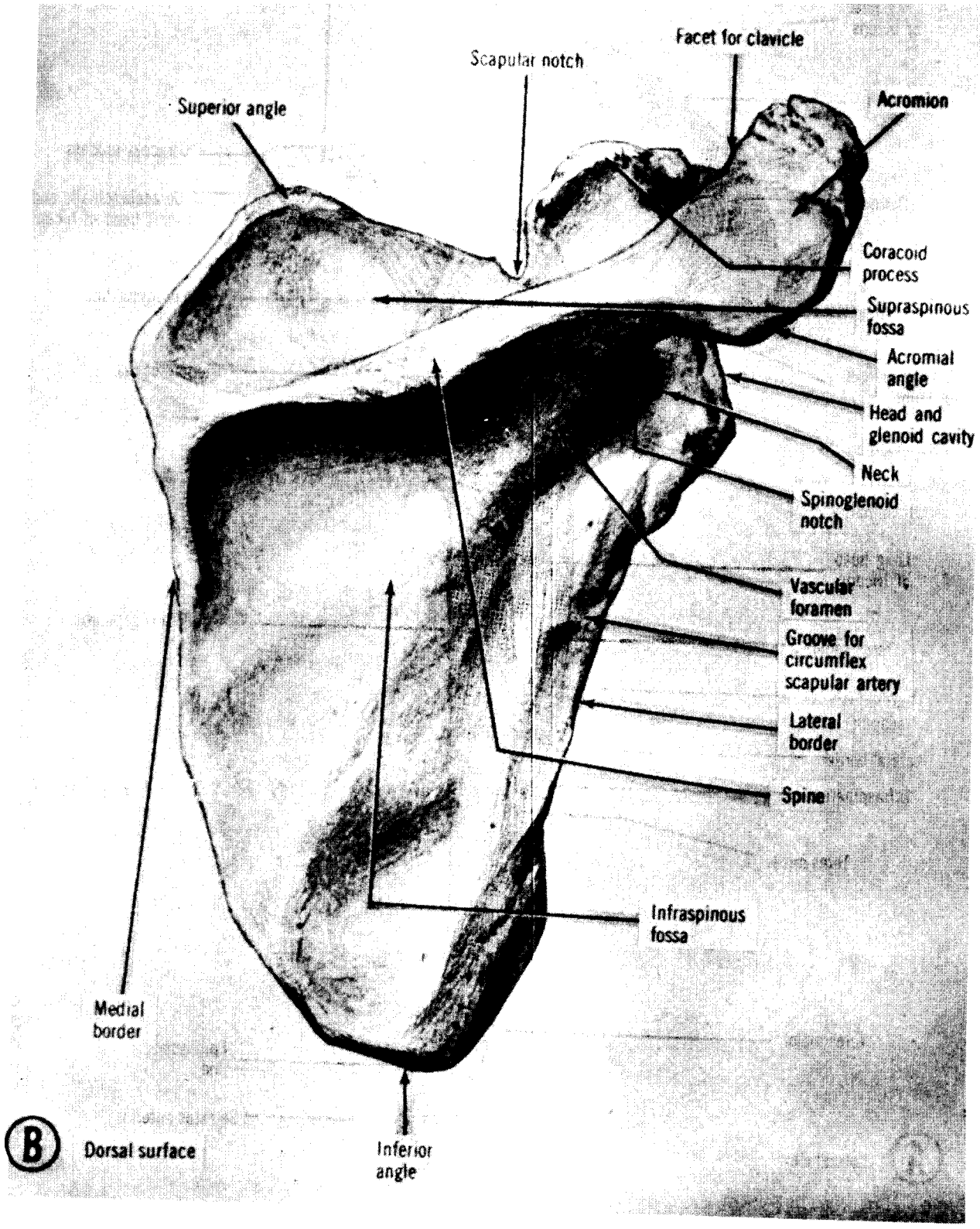
Figure E-14. Shoulder girdle.

a. Scapula. The scapula, or shoulder blade, is a large triangular bone extending from the second to the seventh or eight ribs, posteriorly. Figure E-15 illustrates the lateral view (A), the dorsal surface (B), and the costal surface (C) of the scapula. The heavy ridge extending across the upper surface of the scapula ends in a process called the acromion, which forms the tip of the shoulder and the joint with the clavicle, anteriorly. A socket for the head of the humerus is on the lateral surface of the scapula. The anterior portion of the scapula is concave; the posterior portion is convex and is divided by a spinelike ridge identified as spine (B).



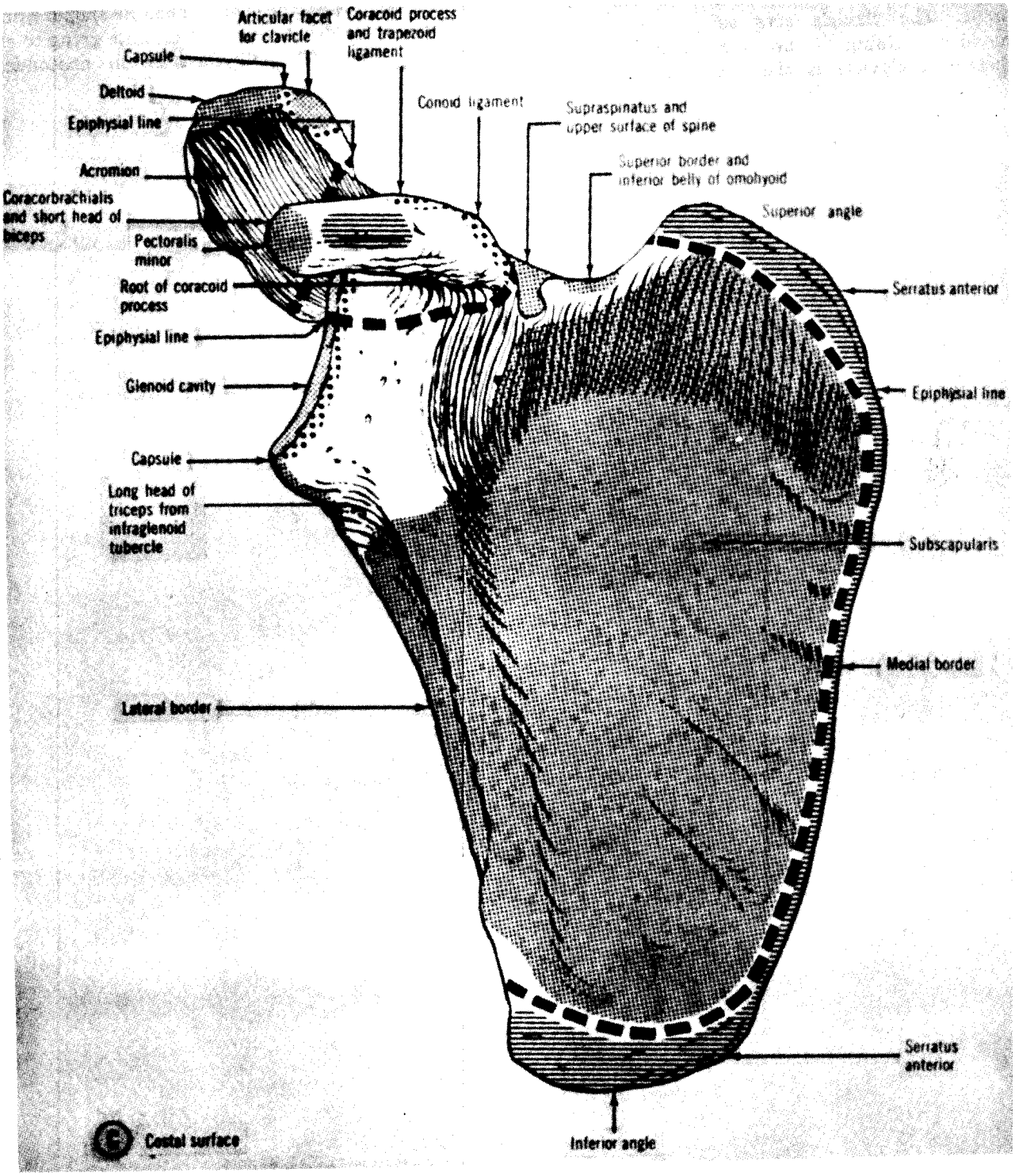
A. Lateral view

Figure E-15. Scapula



B. Dorsal surface

Figure E-15— Continued

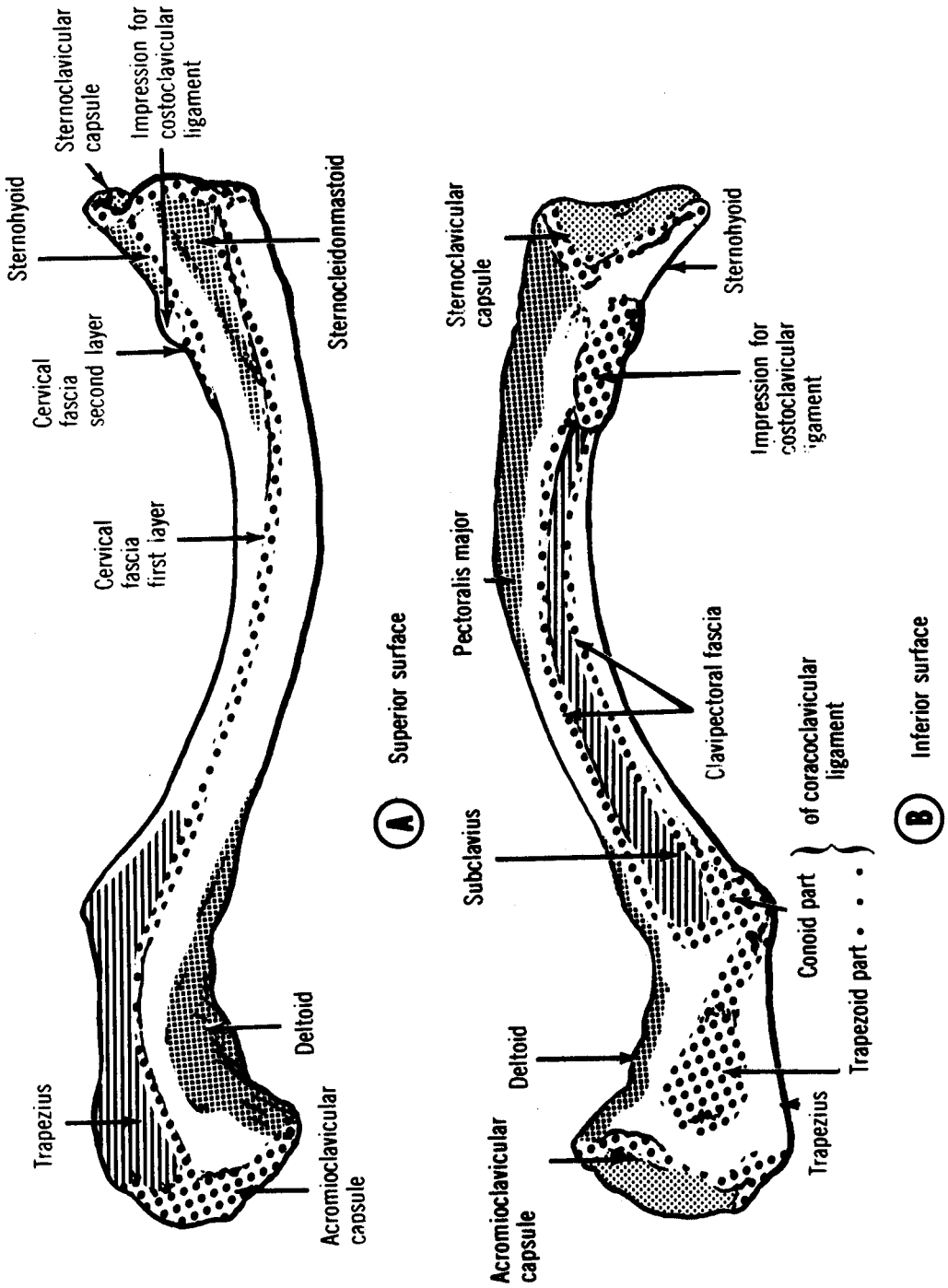


C. Costal surface

Figure E-15—Continued

b. Clavicle. The clavicle, or collarbone, is a slender, S-curved bone lying horizontally above the first rib. Figure E-16 illustrates the superior (A) and inferior (B) surfaces of the right clavicle. The lateral end of the clavicle forms a joint with the scapula as seen in figure E-14. The medial end of

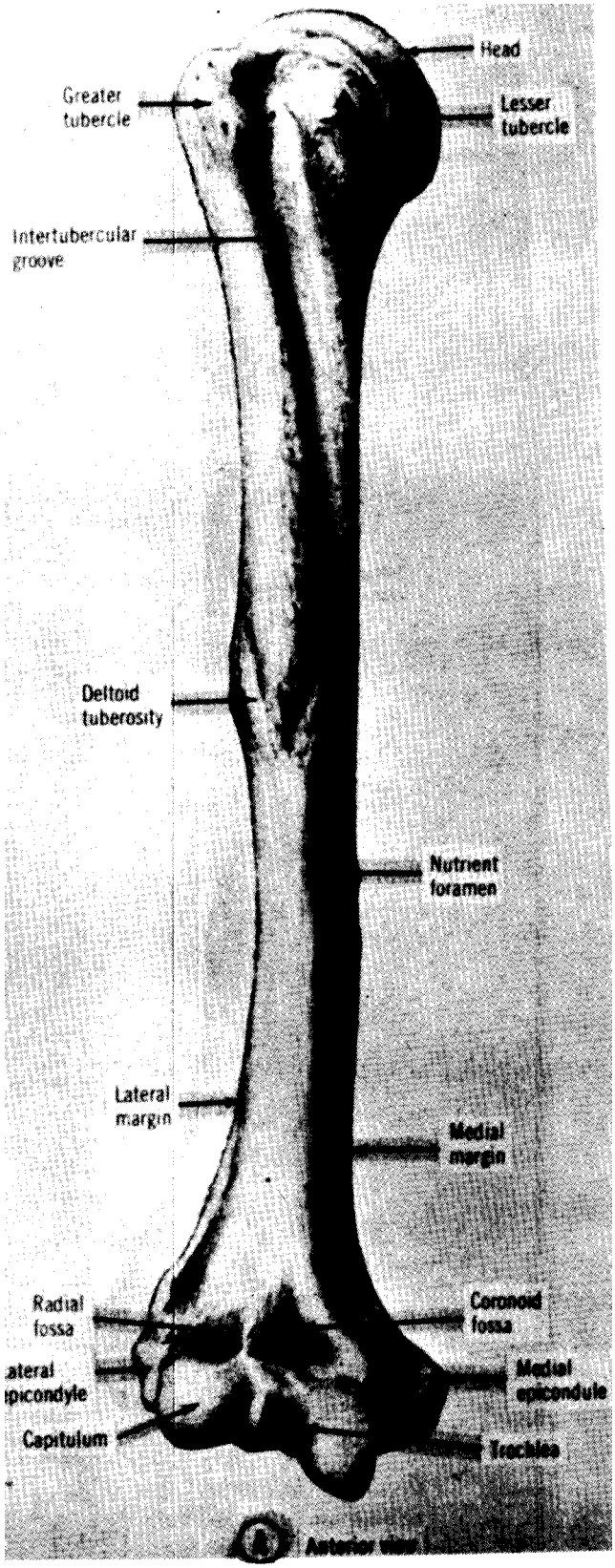
the clavicle forms a joint with the sternum at the sterno-clavicular joint, which can be felt as the knob on either side of the notch at the base of the throat. The clavicle acts as a brace for the shoulder, holding it up and back. To decide whether a clavicle is the left or right one, the viewer should hold it by the rounded (medial) end with the spoonlike groove in the top of the hook that curves toward his body. Then he should bring the bone toward his chin as if he were going to sip from it; the bone will then be in anatomical position.



A. Superior surface
B. Inferior surface

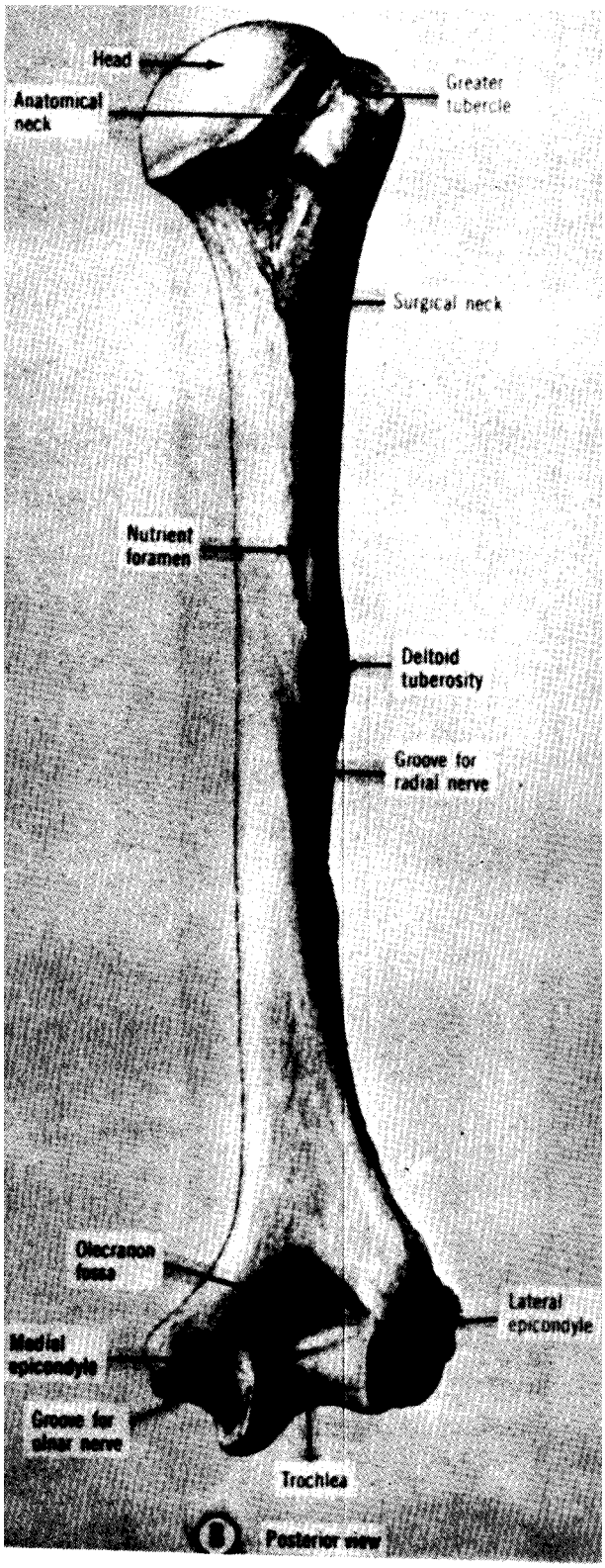
Figure E-16. Right clavicle.

c. Humerus. The humerus (fig, E-14 and E-17), a heavy long bone in the arm extending from the shoulder to the elbow, is the longest and largest bone of the upper extremity. The rounded proximal end fits into the scapula in a socket called the glenoid cavity (A, fig, E-15). The distal end of the humerus forms the elbow joint, articulating with the ulna and part of the radius. The lower end is somewhat flat, and its broad articular surface is divided into two parts by a ridge. The lateral projection is the capitulum and the medial portion is the trochlea illustrated in both the anterior view (A) and the posterior view (B) in figure E-17.



A. Anterior view

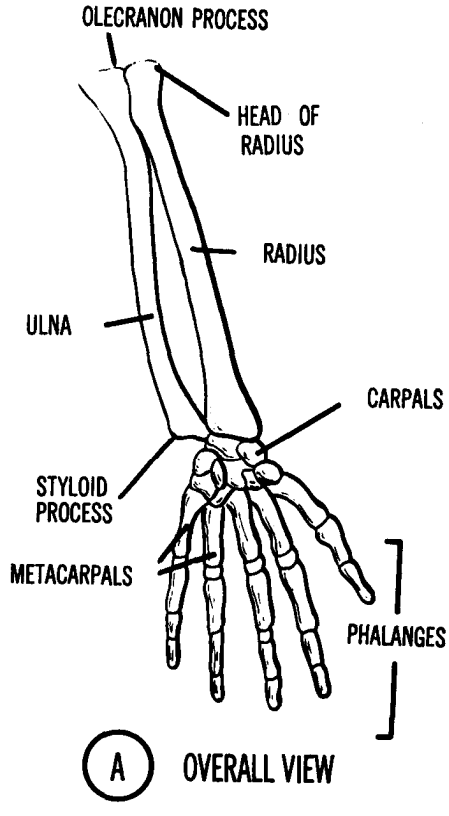
Figure E-17. Humerus.



B. Posterior view

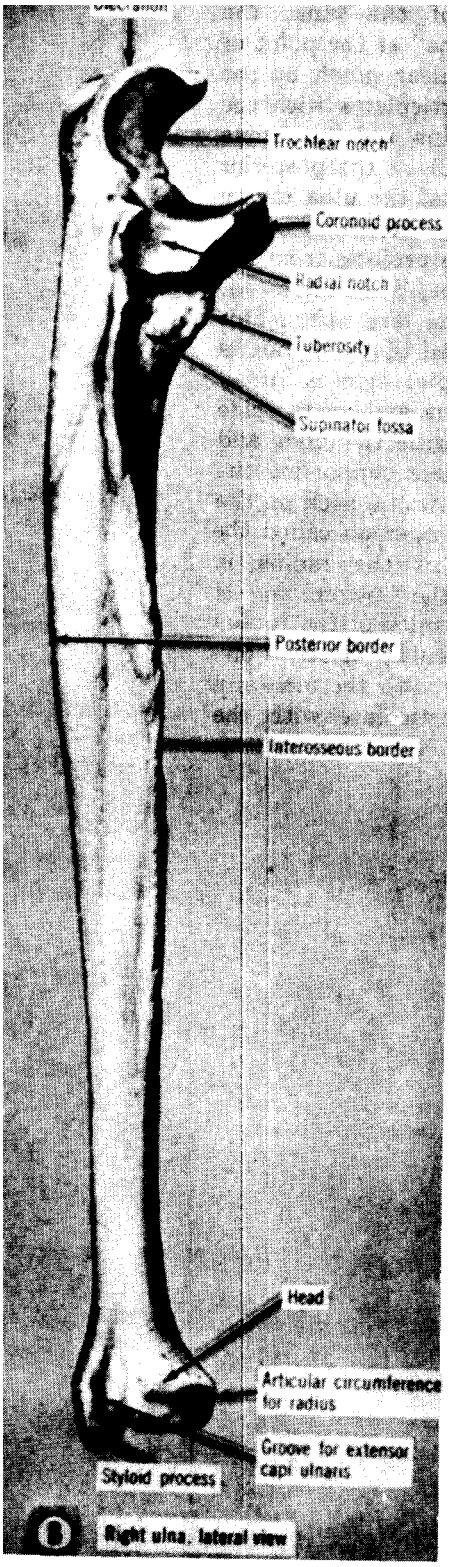
Figure E-17—Continued

d. Ulna and Radius. The ulna and the radius are the bones of the forearm as identified in the overall view (A, fig, E-18). The ulna is the longer of the two. The ulna, (B, C, and D) on the little finger side, forms the major part of the elbow joint with the humerus. A projection of the ulna, the olecranon (B), is the "funny bone" at the point of the elbow. The semilunar trochlear notch at the head of the ulna is where it articulates with the trochlea of the humerus. The ulna and the radius articulate at the radial notch (C) on the posterior of the ulna. The body or shaft of the ulna tapers from top to bottom. At the lower extremity of the ulna is the styloid process which projects from the medial and back part of the bone. The radius (A), on the thumb side of the forearm, forms the major part of the wrist joint. The head of the radius is small and cylindrical. Its medial side is broad where it articulates with the ulna and medial side is broad where it articulates with the ulna and narrow at other portions. The neck supporting the head is round and smooth. Below the neck on the medial side of the radius is a projection called the radial tuberosity. The body of the radius is narrower at the top than at the bottom and is slightly curved. The lower extremity of the radius is large where there are two articular surfaces— one on the medial side to articulate with the ulna and one on the bottom edge to articulate with the carpus (wrist bone).



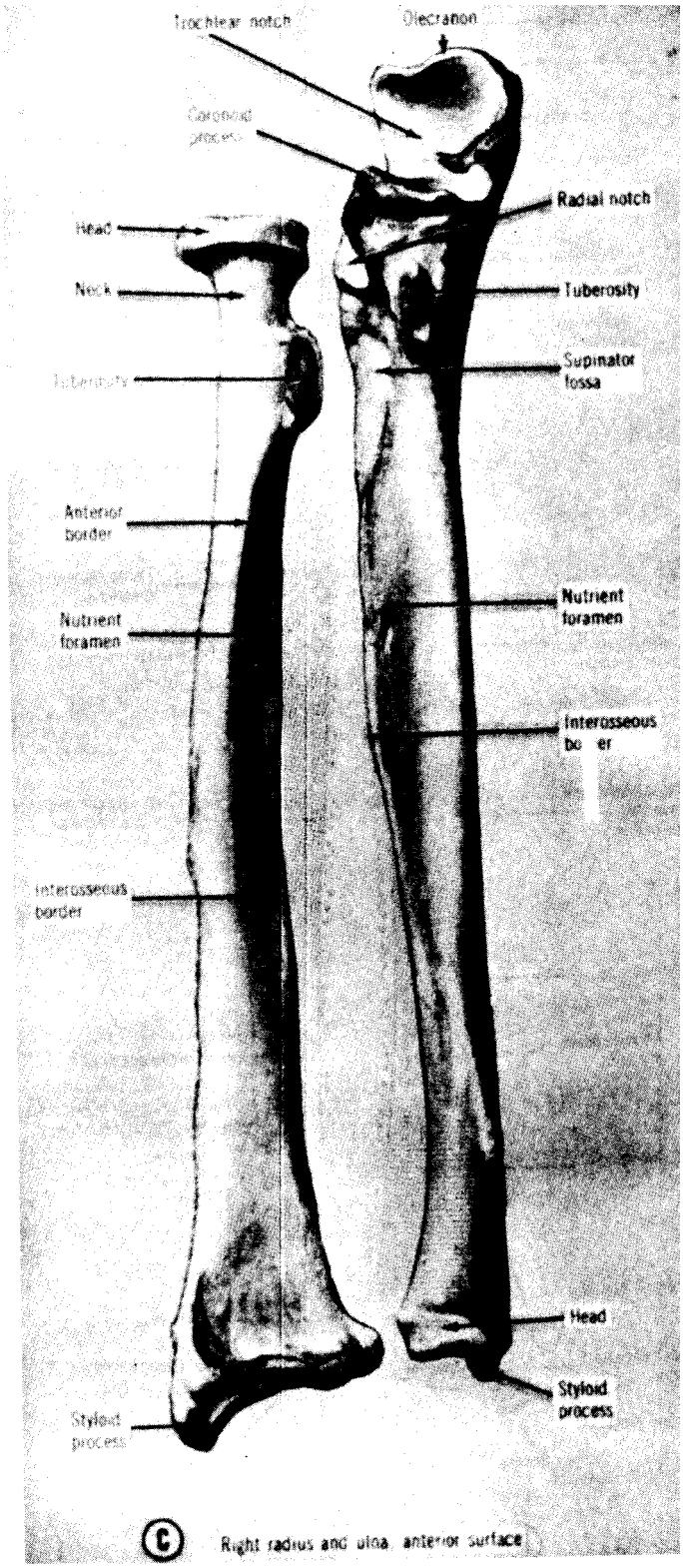
A. Overall view.

Figure E-18. The forearm.



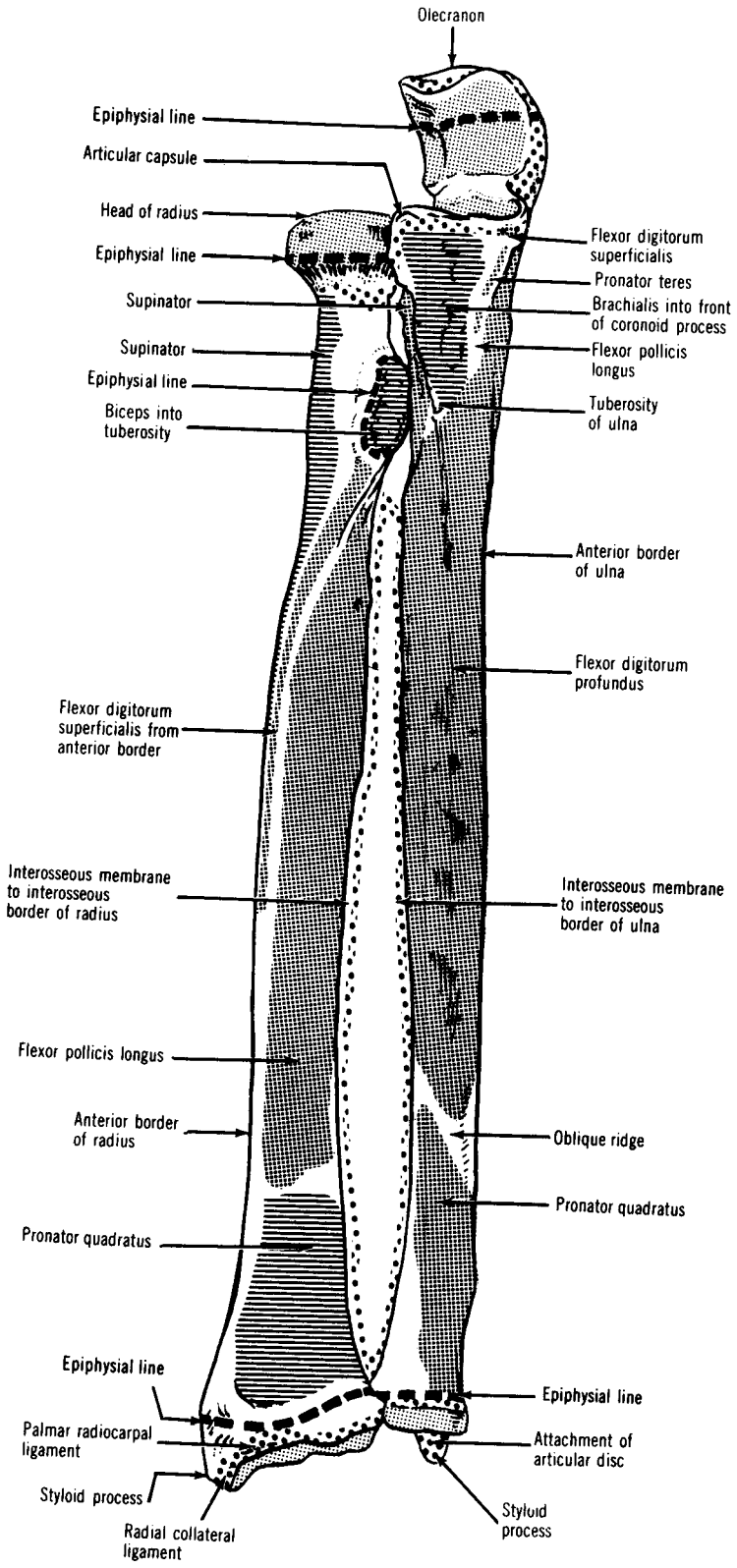
B. Right Ulna, lateral view.

Figure E-18—Continued



C. Right radius and ulna, anterior surface.

Figure E-18—Continued



(D) Right radius and ulna, anterior view

D. Right radius and ulna, anterior view

Figure E-18—Continued

e. Wrist and Hand. The wrist consists of the eight small carpal bones arranged in two rows of four each (A, fig, E-18). The carpals articulate with each other and with the bones of the hand and forearm. Also articulating with the carpals are five metacarpal which form the bony structure of the palm of the hand. The 14 phalanges in each hand are the finger bones, 3 in each finger and 2 in each thumb.

E-9. The Pelvis and Lower Limbs

The two hip bones form the pelvic girdle or pelvis (fig, E-19) which provides articulation in the lower limbs. The pelvis, jointed by the hip bones, sacrum, and coccyx, forms a strong bony basin which supports the trunk and protects the contents of the abdomino-pelvic cavity. The bones of the pelvis and lower extremity are the innominate or os coxa (hip bone), femur (thigh bone), patella (knee cap), thibia and fibula (leg bones), tarsals (ankle bones), metatarsal (foot bones), and phalanges (toe bones).

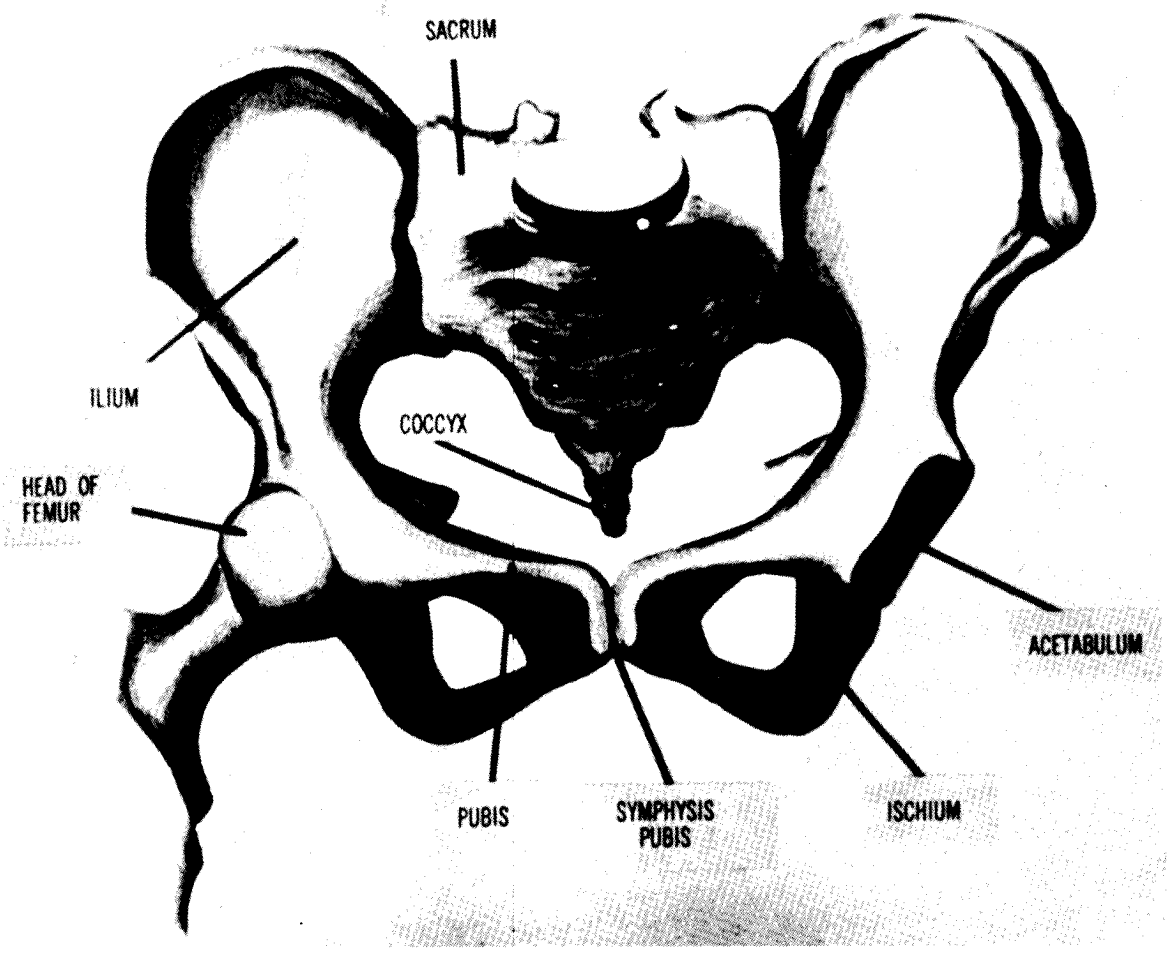
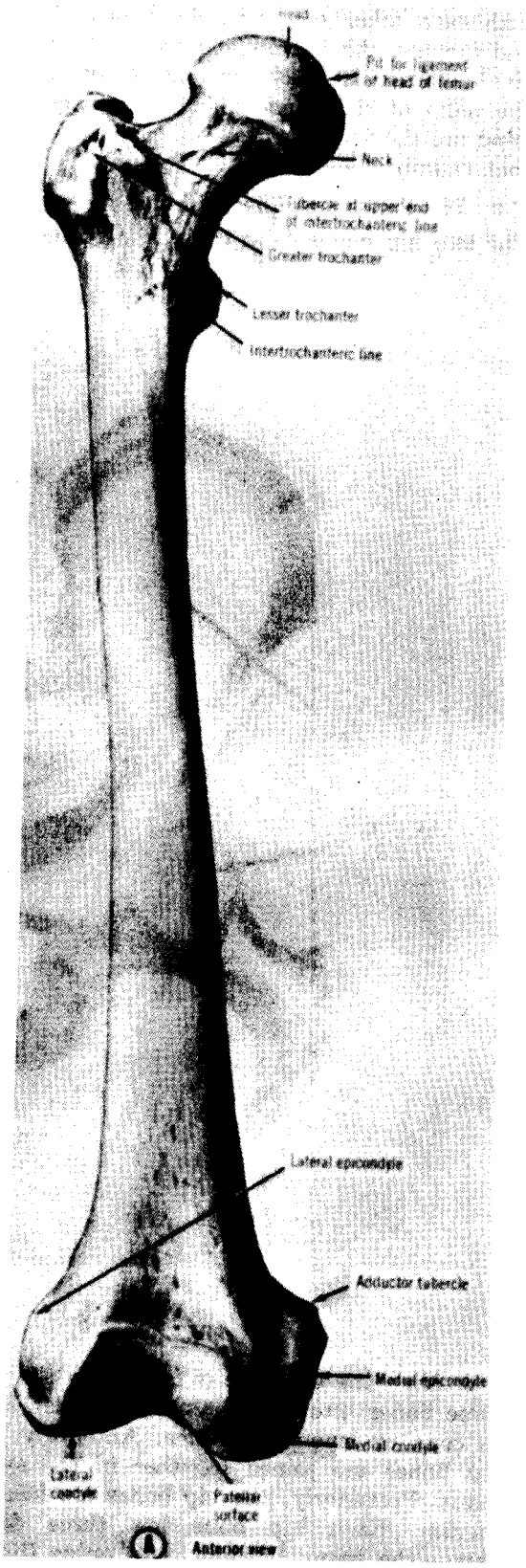


Figure E-19. Pelvis.

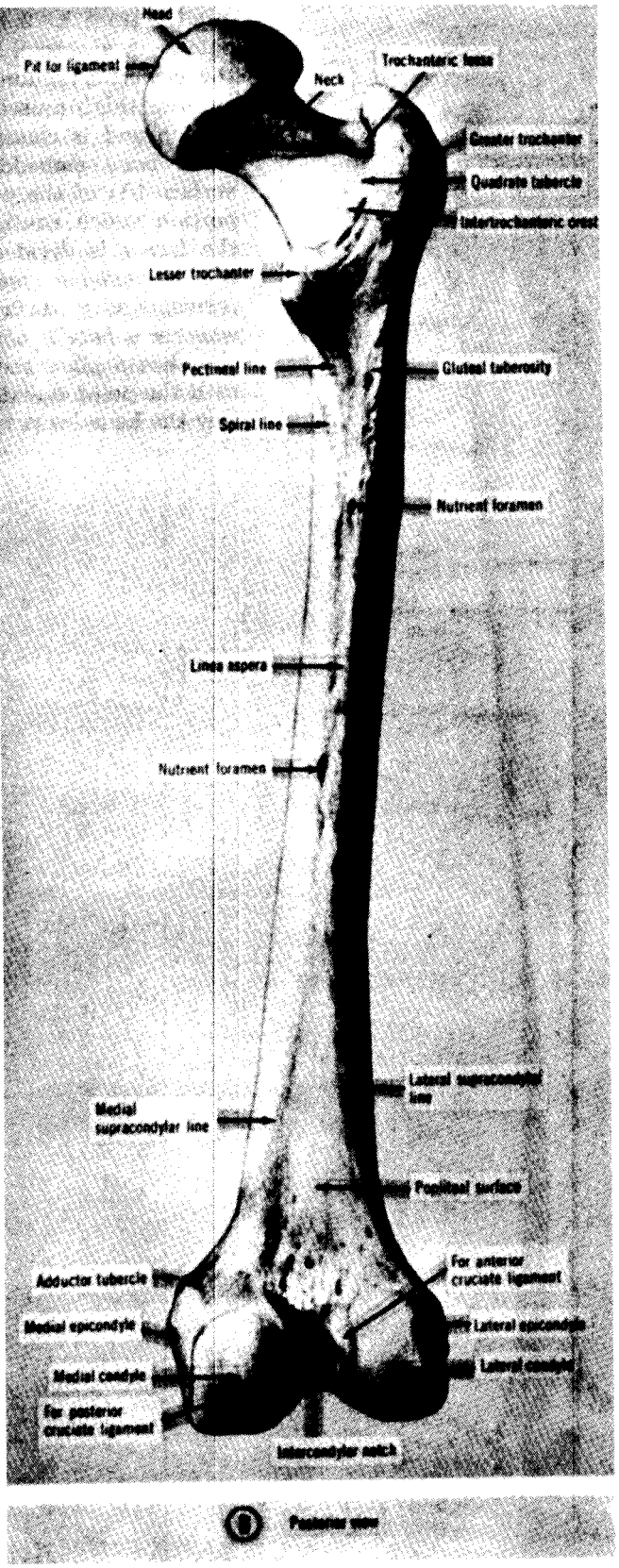
a. Hip. The hip bone is formed by the fusion of three bones into one massive, irregular bone, the os coxa or innominate bone. Anteriorly, the two hip bones are joined together in the symphysis pubis. Posteriorly, the hip bones are fused to the sacrum. Each hip bone has three distinctive parts—the ilium, ischium, and pubis (fig, E-19). The ilium is the broad, flaring upper part of the hip. The ischium is the lower, posterior portion on which one sits. The pubis is the anterior portion of the hip. A deep, cup-shaped socket, the acetabulum, is located on the lower lateral surface of each hip bone. The cup shape of the acetabulum fits the head of the femur to form the hip joint.

b. Femur. The femur or thigh bone is the longest, strongest bone in the body. Figure E-20 illustrates anterior (a) and posterior (B) views of a right femur. The head of the femur fits into the acetabulum of the hip bone. The distal end of the femur articulates with the tibia (fig, E-21) to form the knee joint. A large projection at the junction of the shaft and neck of the femur is the greater trochanter (A, B). A similar but smaller projection at the inferior end of the intertrochanteric crest is the lesser trochanter (A, B).



A. Anterior view

Figure E-20. Right femur.



B. Posterior view.

Figure E-20 continued.

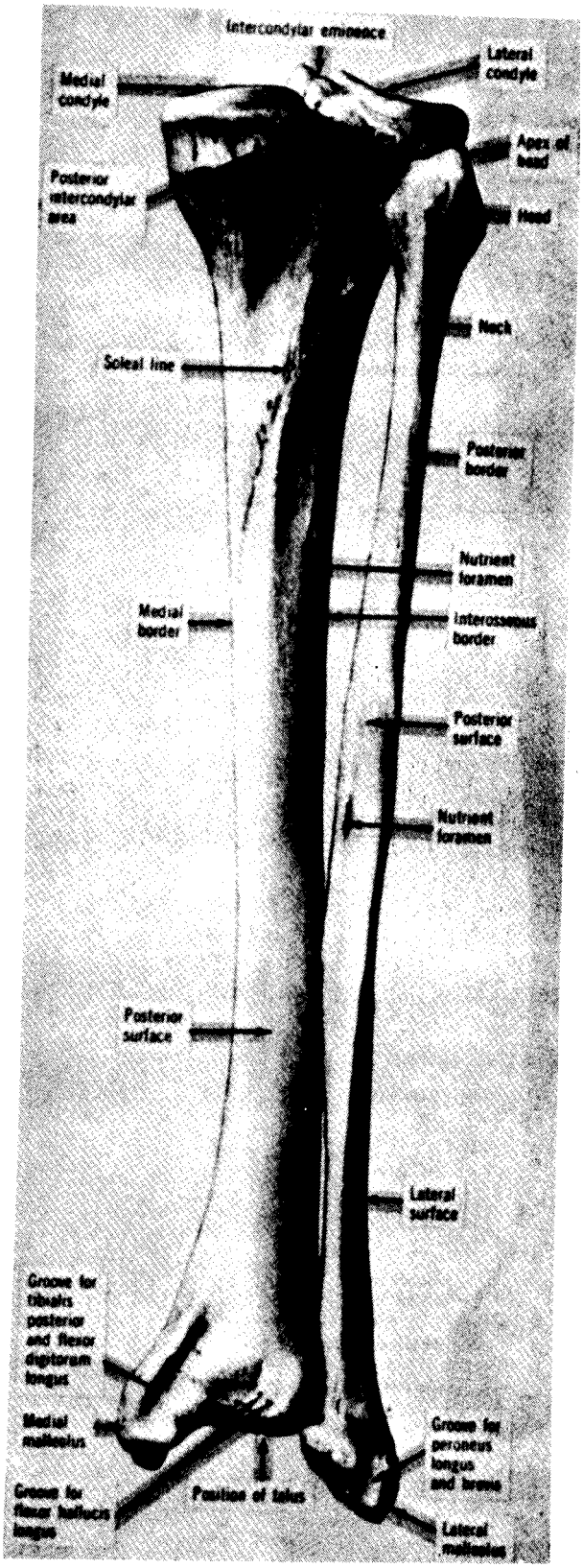
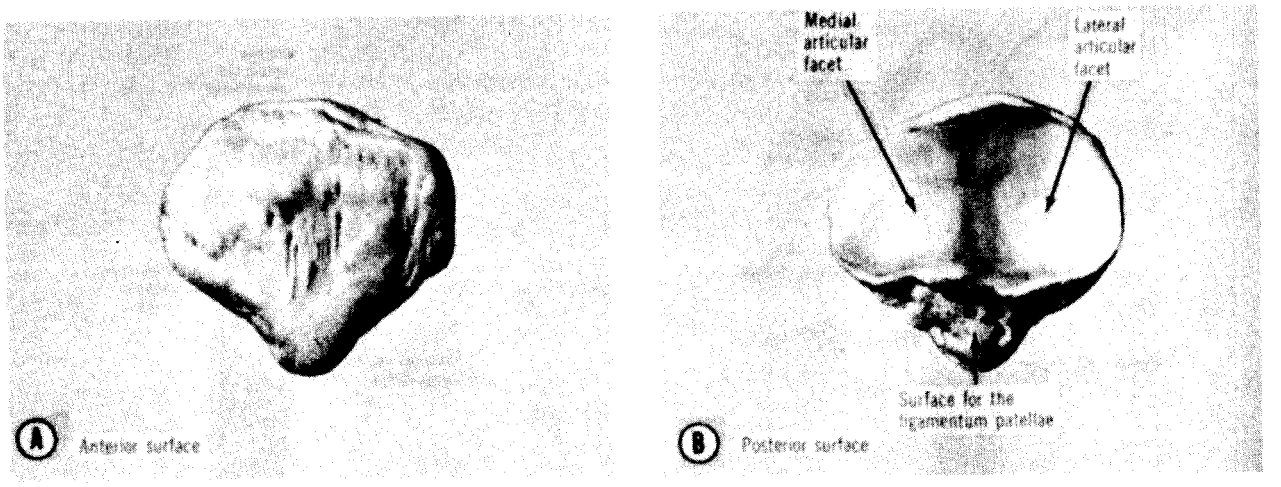


Figure E-21. Tibia.

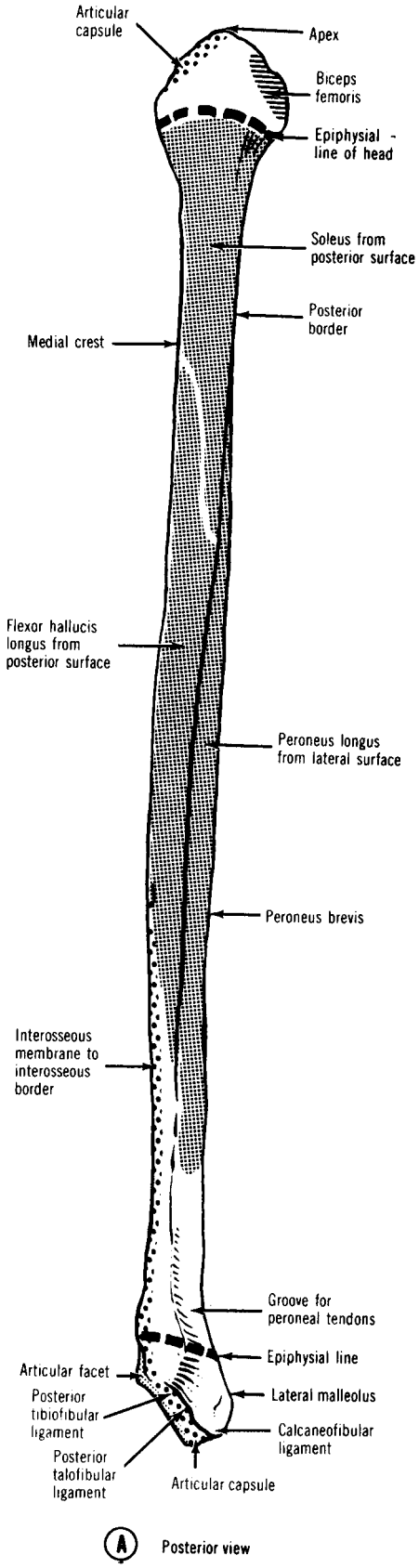
c. Patella. The patella, or knee cap, is the flat, triangular bone that protects the front of the knee joint. Figure E-22 illustrates a right patella. The patella is a special kind of bone embedded within the powerful tendon that extends from the strong anterior thigh muscles. The patella is oval in cross section and is classified as a sesamoid bone, that is, a bone embedded in tendons. The anterior surface (A) of the patella is convex. The posterior portion which contains the articular facet (B) for the femur is divided into a large lateral condyle and a smaller medial condyle to match the corresponding surfaces of the femur. To decide whether a patella bone is from the left or right leg, one should place the bone on its posterior surface with the pointed end toward the viewer. Whichever way the bone leans is the side on which it belongs.



A. Anterior surface
B. Posterior surface

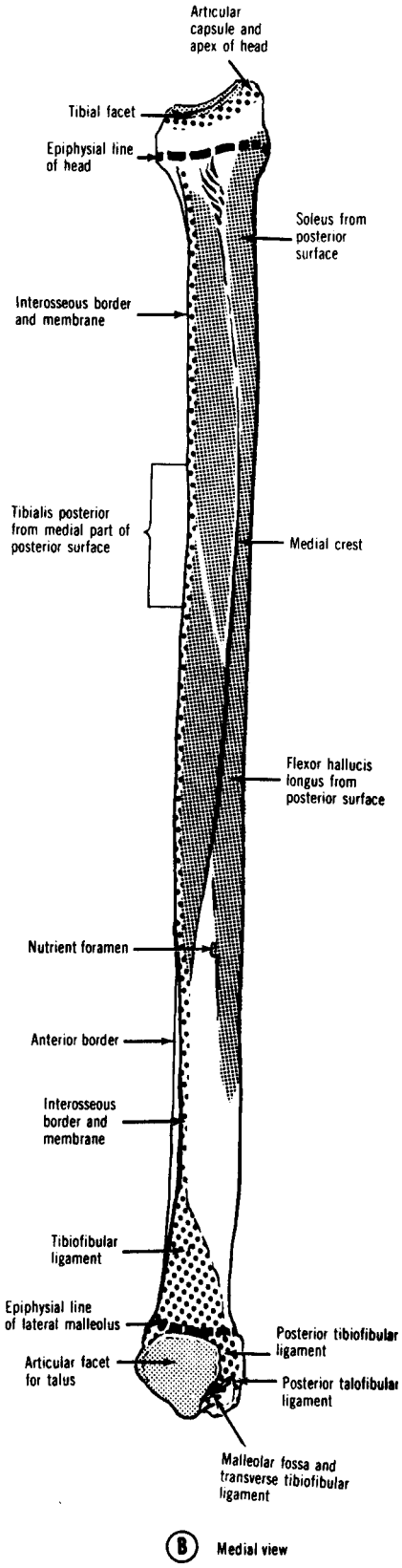
Figure E-22. Right patella.

d. Tibia and Fibula. The tibia (fig, E-21) and fibula are the two bones in the leg. The tibia, which is thicker and stronger than the fibula, is the shinbone and is located on the medial side of the body. It supports body weight and articulates with the femur in the knee joint. The body of the tibia is pyramidal with the medial side being convex in the center and becoming concave at the lower extremity. The projection at the lower extremity of the tibia is the medial malleolus, the inner ankle bone. The fibula, commonly known as the calf bone, is the lateral leg bone and is joined to the tibia at its proximal end but not to the femur. A right fibula is shown in figure E-23. The fibula is approximately the same length as the tibia. At the upper extremity of the fibula, its irregular-shaped quadrant head articulates with the tibia (at the tibial facet (A)) but does not reach the knee joint. The lower extremity of the fibula slopes off to the lateral side to form the lateral malleolus (a), or the outer ankle bone, which protrudes below the tibia. Both the tibia and the fibula articulate with the talus at the articular facet for talus (B). The position of the talus is indicated in figure E-21.



A. Posterior view B. Medial view

Figure E-23. Right fibula.

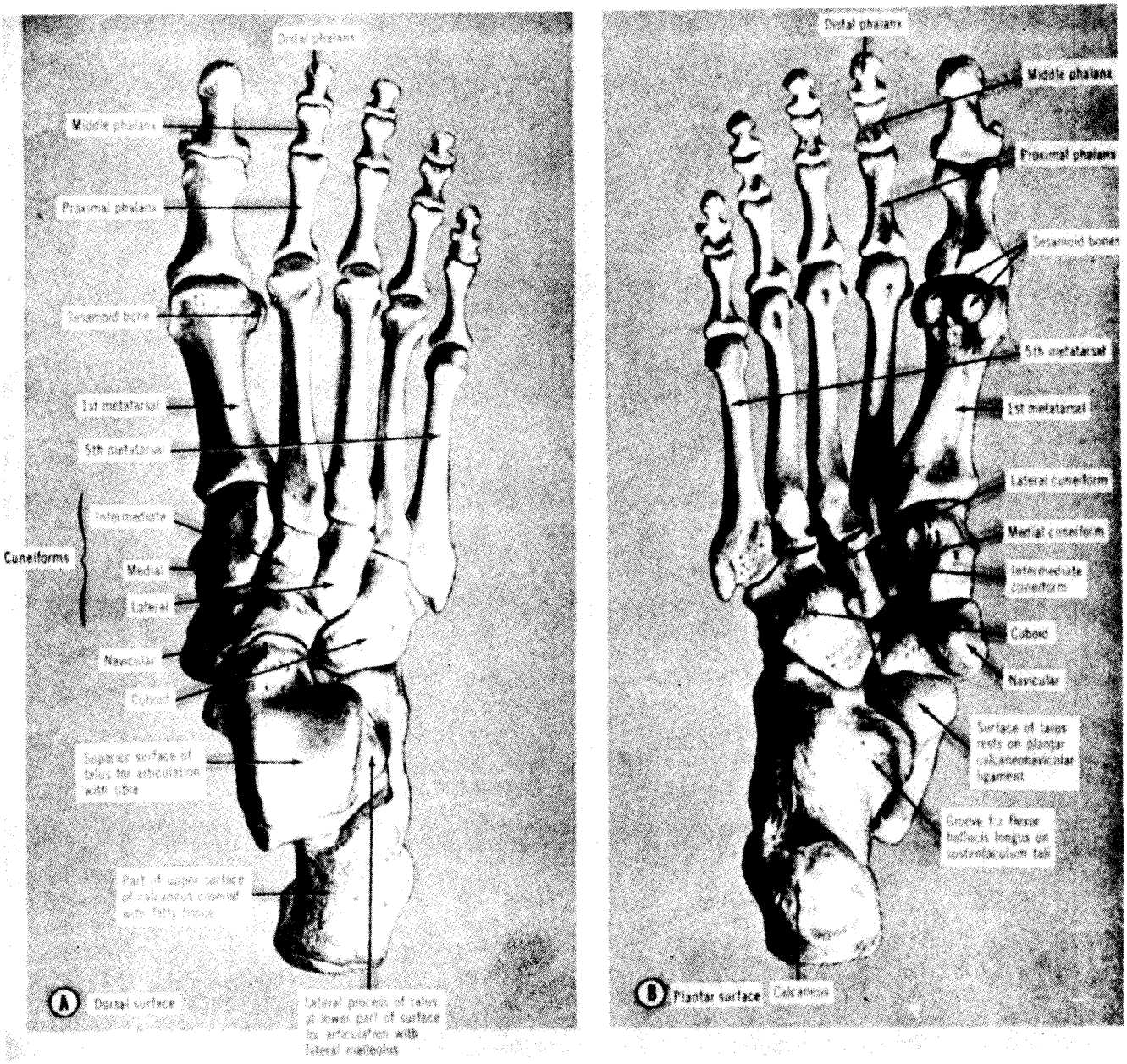


B. Medial view

Figure E-23—Continued

e. Foot. The skeleton of the foot consists of the tarsals, the metatarsal, and the phalanges. Figure E-24 illustrates the dorsal (A) and plantar (inferior) (B) surfaces of a right foot. Seven tarsals (cuneiform) form the ankle, heel, and posterior half of the instep. The talus is the largest ankle bone, and the calcaneus is the heel bone.

Five metatarsal form the anterior half of the instep. The tarsals and metatarsal together form the arch of the foot. The 14 phalanges of the toes are similar to finger bones.



A. Dorsal surface
B. Plantar surface

Figure E-24. Right foot.

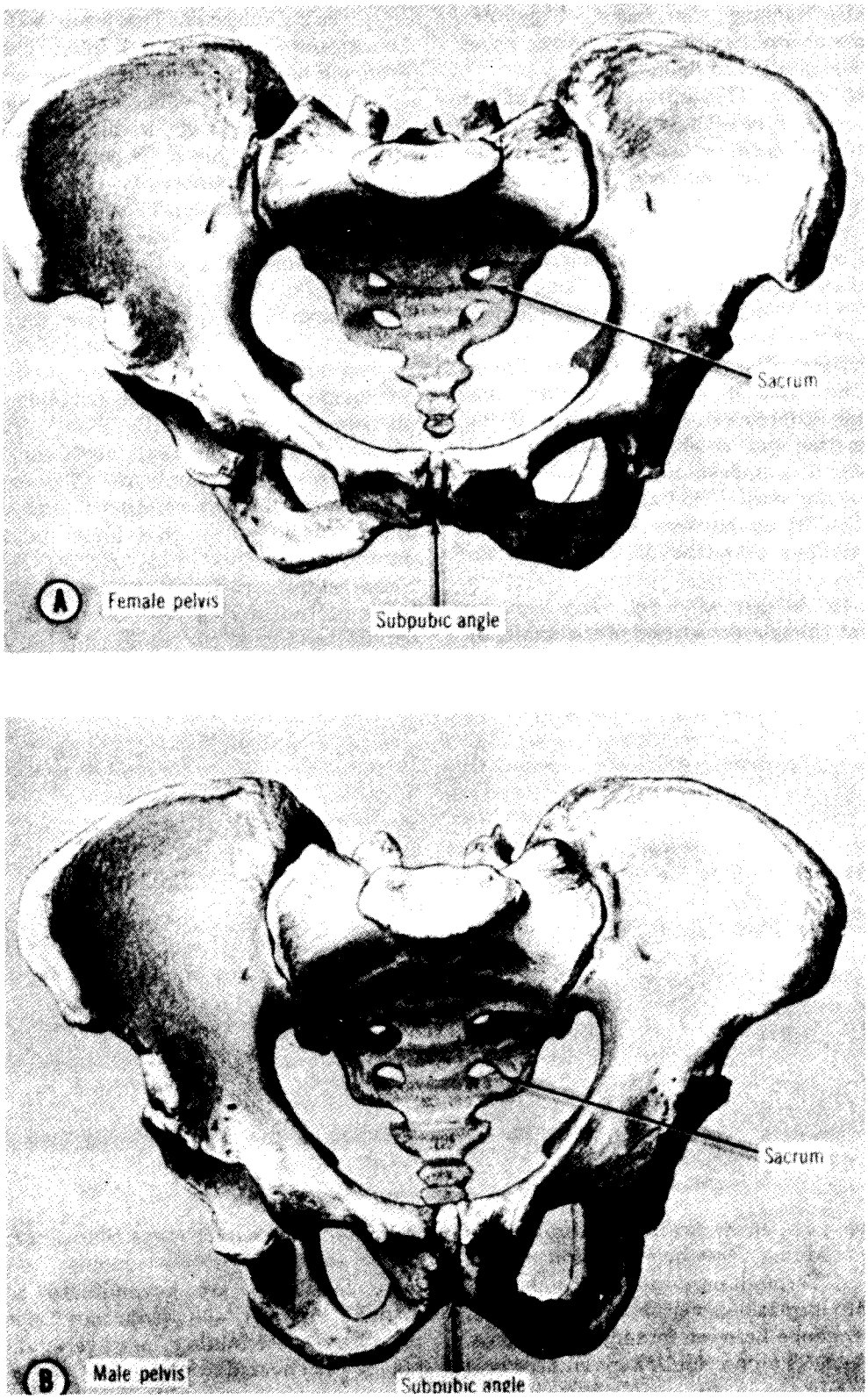
E-10. Identifying Skeletal Remains

a. General. Persons assigned to carry out the identification of deceased personnel must be able not only to identify bones and place them in anatomical order but also to identify the sex, race, height, and age of skeletal remains.

b. Sex. To determine the sex of a skeletal remains, one relies mainly on his knowledge of the

differences between the pelvic regions (fig, E-25) of the two sexes. The overall female pelvic region (A) appears less massive and is broader and more shallow than that of the male (B). The bones of the female pelvis are more delicate than those of the male. The female pubic arch is wider and more rounded than the more angular one of the male.

The female sacrum (A) is straight rather than slanted inward as is the male sacrum (B). The subpubic angle of the female pelvis (a) forms an inverted U; the male pelvis (B) forms an inverted V. The female coccyx is shorter and not as slanted as is the male coccyx. The upper surface of the female coccyx is rounded and slanted outwardly.



A. Female pelvis
B. Male pelvis

Figure E-25. Pelvic regions.

c. Race. The three primary races are Caucasian, Negroid, and Mongolian; the two classifications are American Indian and mixed. Some skeletal differences exist among the races. They are restricted to the orbital cavities, long bones, nasal ridge, back of the skull, and hair. [1]

(1) *Orbital cavity.* The orbital cavities of the three primary races differ. Those of Caucasians are square with rounded corners; those of Negroids are rectangular with rounded corners; and those of Mongoloids are oval.

(2) *Long bones.* The long bones of a member of the Negroid race are relatively longer than those of a member of the Caucasian race. The long bones of a member of the Mongolian race range in length between those of the other two races.

(3) *Nasal ridge.* The nasal ridge, the edge of the bone at the base of the nasal cavity, has noticeable racial differences. In a member of the Caucasian race, the edge is sharp; in a member of the Negroid race, it is smooth or dull.

(4) *Back of the skull.* The back of the skull of a member of the Mongolian race is relatively flat as compared to that of either of the other two races.

(5) *Hair.* In a general way, race can be determined from the characteristics of the shaft, or free portion, of hair strands. However, since hair characteristics of the races overlap, they should not be the only evidence used in determining the race of the remains.

(a) *Caucasian.* The wavy and curly hair of Caucasians is smooth and silky. The color varies from ash blond to black, including red.

(b) *Negroid.* The hair of members of the Negroid race is frizzly, woolly, and peppercorn and either brown or black in color. Also, the hair is typically coarse and crisp.

(c) *Mongolian.* The hair of members of the Mongolian race is typically straight, limp, and coarse and either dark brown or black in color,

d. Height. The height of a skeletal remains is determined by measuring the long bones – the humerus, radius, ulna, femur, tibia, and fibula. Beginning with the long bones of the lower limbs, an operator measures each available long bone on an osteometric board (fig, E-26). He makes sure that both the upper and lower ends of the bone touch the ends of the board. The board reading in centimeters is then compared with the tables in appendix J, which give more details on determining the height of a skeletal remains. Since these tables are based on measurements grouped by race, the race of the skeletal remains must be determined before the tables can be used.

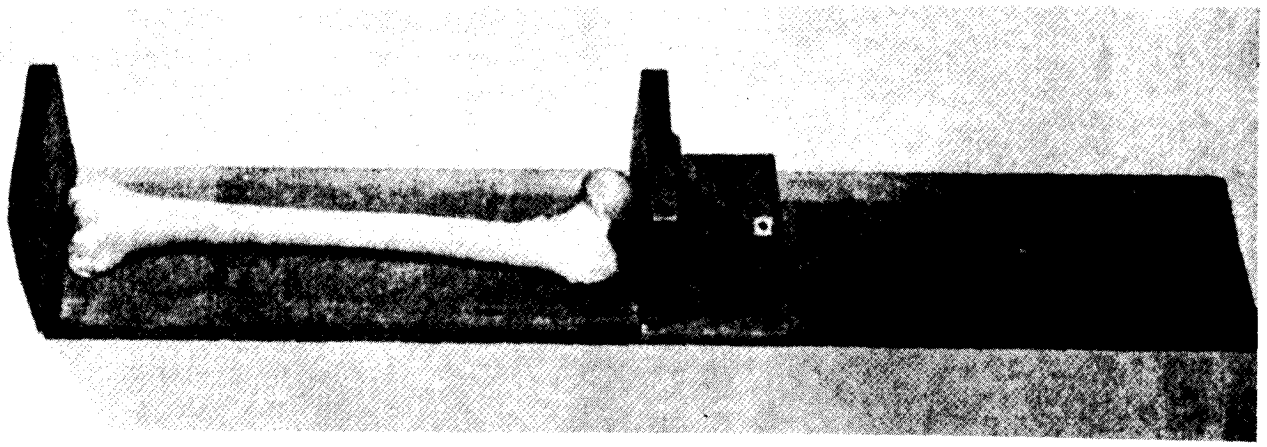


Figure E-26. Osteometric board.

e. Age. The age of a skeletal remains is determined by studying the whole skeleton rather than a few bones. Through ossification, the natural process of bone formation, various parts of the skeletal system change between infancy and as late as 50 years of age. The descriptions given here are restricted to those changes that occur in the skull. Other so-called sutures (unions) and changes in bone formation are beyond the scope of this manual: however, the reader may refer to appendix K where determining age through bone morphology is covered.

[1] Hair is an appendage of the dermis, not a part of the skeletal system. It is included here because hair is likely to be found with skeletal remains and should be studied at the same time as the bones.

(1) *Coronal suture.* The coronal suture identified in the illustration of the top of the skull (fig, E-27) is located on the posterior side of the frontal bone and separates the parietal from the frontal bones. The coronal suture begins to close at age 21 and continues until about age 50.

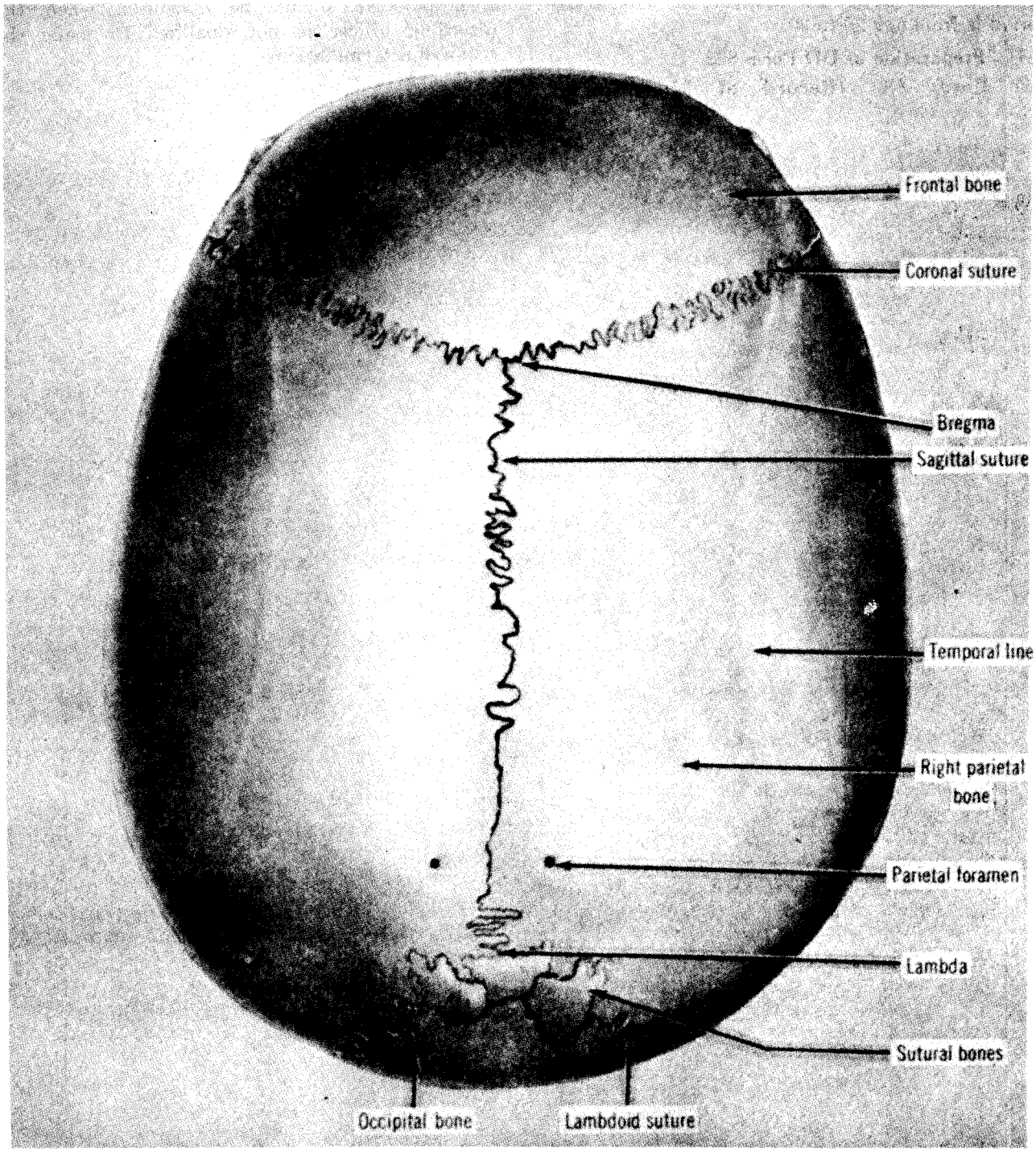


Figure E-27. Top of the skull.

(2) *Sagittal suture.* The sagittal suture (fig, E-27) is located in the center of the skull and divides the two parietal bones. It extends from its meeting point with the coronal suture to the apex of the triangular part of the occipital bone. The sagittal suture begins to close at age 21 and is closed by age 31 or 32.

(3) *Lambdoid suture.* The lambdoid suture

(fig, E-27) is located at the anterior side of the occipital bone that forms the back of the skull. This suture separates the parietal and the temporal bones from the occipital bone. The lambdoid suture begins to close at age 21; however, the most active period is from age 26 to 30.

E-11. Preparation of DD Form 892

DD Form 892 (Record of Identification Processing—Skeletal Chart) is prepared as illustrated in figure E-28 for known remains. The form is prepared as illustrated in figure E-29 for unknown remains. All entries must be factual. An anthropologist should be consulted when the recording officer is not qualified to make the required determinations.

RECORD OF IDENTIFICATION PROCESSING
SKELETAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL *(or unknown number)*
HARTFORD, George T.

GRADE	SERVICE NUMBER
SP4	842-36-5662

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER
US Army Mortuary Saigon

PLOT	ROW	GRAVE
NA	NA	NA

ESTIMATED AGE *(Years)*	ESTIMATED HEIGHT
25-27	Fem + Fib = 6' 2½'' Fem + Tib = 6' 2''

SKELETAL MEASUREMENTS *(Centimeters)*

SKELETAL MEMBER	METHOD	RIGHT	LEFT
SKULL			
HUMERUS	Osteometric Board (OB)	38.2	38.2
ULNA	OB	30.8	30.8
RADIUS	OB	28.8	28.7
FEMUR	OB	49.7	49.0
TIBIA	OB	46.8	46.8
FIBULA	OB	47.3	47.0

REMARKS OR STATEMENT OF ANTHROPOLOGIST *(Continue on reverse if more space is required)*

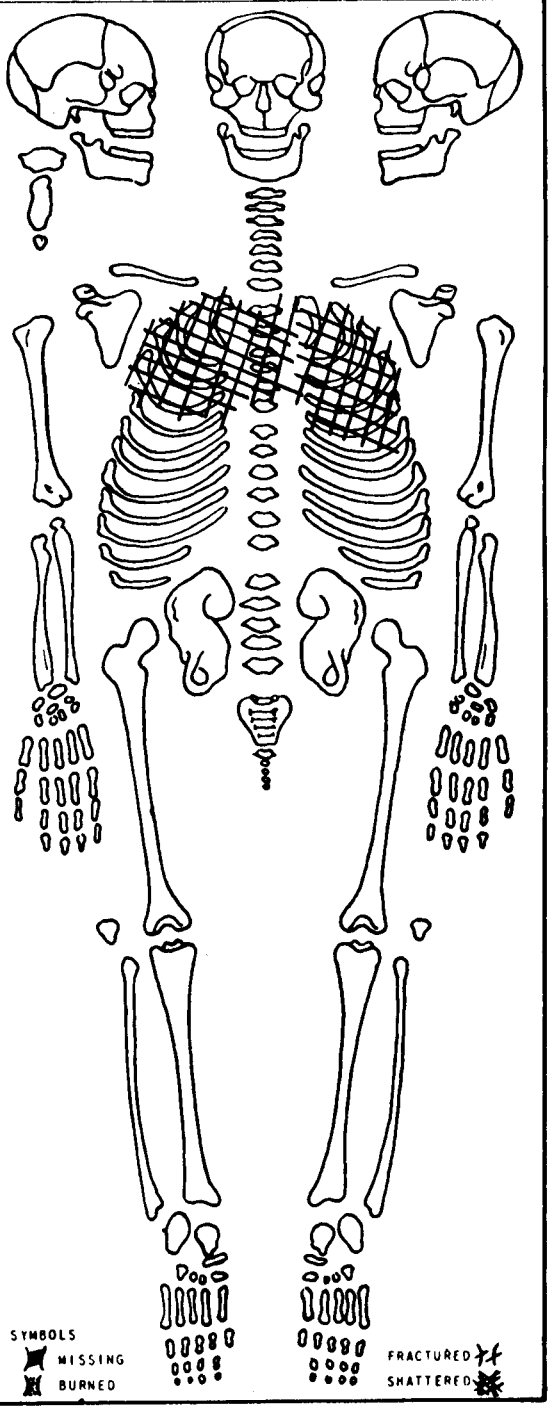
Complete skeletal remains. Shattered condition of upper rib structure indicates crushing or impact wound as cause of death.
Race--Caucasian.
Estimated height--74"
Estimated age--25-27 years.
Hair--Brown
ID tags/ID card--recovered.
Clothing on remains--white cotton T-shirt, Army fatigues (cotton), combat boots.
Examination of T-shirt under UV-light revealed initials GHX laundry mark.

THE PARTS PRESENT AS INDICATED ON THIS SKELETAL CHART REPRESENTS ONE AND THE SAME INDIVIDUAL

PHYSICAL ANTHROPOLOGIST *(Name)*
Henry A. Harrison,
DAC, Iden. Spec.

SIGNATURE
Henry A. Harrison

BLACK OUT PORTIONS NOT RECOVERED



DD FORM 1 FEB 66 892 REPLACES QMC FORM 1044, 18 MAR 47, WHICH IS OBSOLETE. GPO 906748

Figure E-28. DD Form 892 (Record of Identification Processing—Skeletal Chart) (known remains).

RECORD OF IDENTIFICATION PROCESSING
SKELETAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL *(or unknown number)*
Unknown X-6090

GRADE	SERVICE NUMBER
Unk	Unk

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER
EVAC No. 2462

PLOT	ROW	GRAVE
NA	NA	NA

ESTIMATED AGE *(Years)*	ESTIMATED HEIGHT
19-21	Fem + Fib = 5'8 1/3'' Fem + Tib = 5'8 1/2''

SKELETAL MEASUREMENTS *(Centimeters)*

SKELETAL MEMBER	METHOD	RIGHT	LEFT
SKULL			
HUMERUS	Osteometric Board (OB)	31.7	31.3
ULNA	OB	27.8	
RADIUS	OB	25.4	
FEMUR	OB	46.1	
TIBIA	OB	38.8	
FIBULA	OB	38.2	

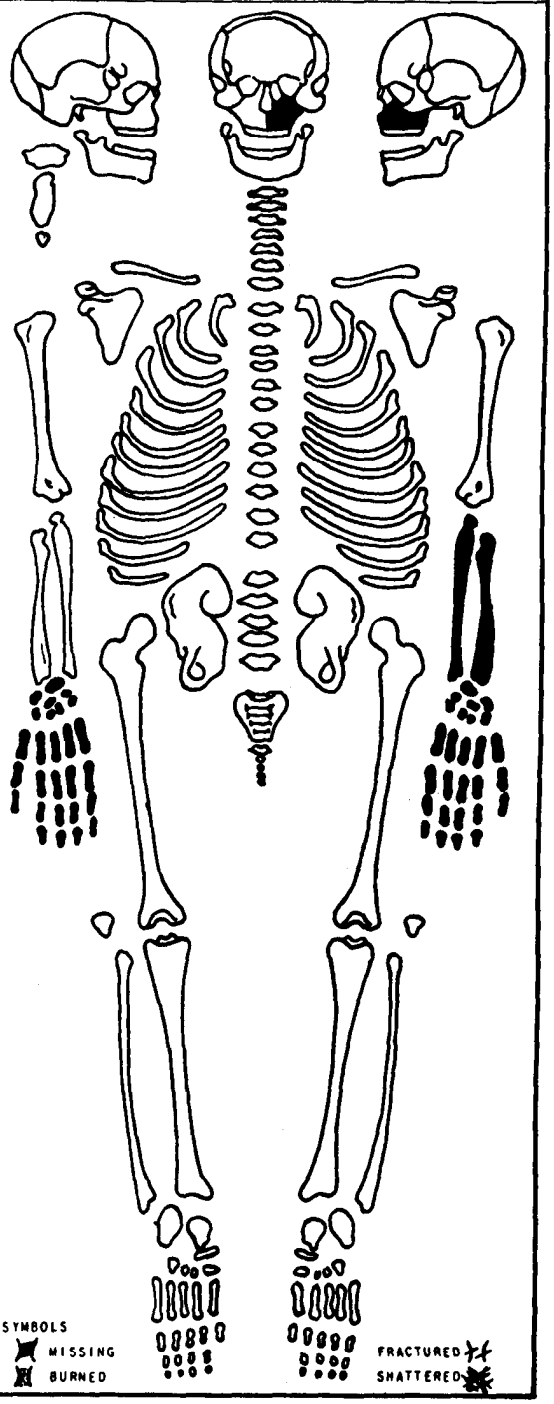
REMARKS OR STATEMENT OF ANTHROPOLOGIST *(Continue on reverse if more space is required)* These are the semiskeletal remains of an average-size man of average muscularity. The skull is medium in size and oval in shape, with moderate parietal bones and a rounded occiput. The forehead is of medium height and presents a slightly sloping profile. The median brow ridges are medium in size. The interorbital space is medium in width with medium size nasal bones. The nasal bridge is high. These remains were determined to be of the Caucasoid race. There is evidence of a penetrating wound of the face.

THE PARTS PRESENT AS INDICATED ON THIS SKELETAL CHART REPRESENTS ONE AND THE SAME INDIVIDUAL

PHYSICAL ANTHROPOLOGIST *(Name)*
Henry A. Harrison, DAC, Iden Spec

SIGNATURE
Henry A. Harrison

BLACK OUT PORTIONS NOT RECOVERED



DD FORM 1 FEB 86 892 REPLACES QMC FORM 1044, 18 MAR 47, WHICH IS OBSOLETE. GPO 906748

Figure E-29. DD Form 892 (Record of Identification Processing—Skeletal Chart) (unknown remains).

a. Name Block. Enter the name of the decedent in the order indicated. If the information is unknown, enter Unknown or Unk and the X-number.

b. Grade and Service Number (Social Security Number) Blocks. Make entries as directed. If the information is unknown, enter Unknown or Unk.

c. Name of Cemetery, Evacuation Number, or Search and Recovery Number Blocks. These blocks are for the unit preparing the form. Complete as indicated unless the form is prepared at a central identification laboratory (CIL). If it is prepared at a CIL, enter the name of the CIL and the case number of the remains.

d. Plot, Row, Grave Blocks. Unless the unit is a cemetery, enter NA.

e. Estimated Age Block. Enter age as determined by the anthropologist.

f. Estimated Height Block. Enter height as determined by the anthropologist or use the osteometric board and tables J-1 through J-6 for estimating long bone measurements in appendix J.

g. Skeletal Measurements Blocks. Enter in adjoining horizontal blocks the bones used to determine the measurement of the skeletal remains and the method used. Show whether right, left, or both bones were used by indicating their measurements in the next adjoining blocks.

h. Remarks or Statement of Anthropologist Block. Enter any comments that may assist in identifying the remains. If appropriate, refer to other identification charts.

i. Skeletal Diagram. Indicate on the diagram those bones that are missing, burned, fractured, or shattered, as determined by the anthropologist. Use symbols shown at the bottom of chart. In recording skull fractures, note that three views of the skull are illustrated. Therefore, fractures affecting more than one view of the skull should be indicated to present a clear picture of the extent of damage.

j. Physical Anthropologist and Signature Blocks. Make entries as required.

APPENDIX F

DENTAL IDENTIFICATION

Section I.

INTRODUCTION

F-1. General

A dental chart is prepared for each remains. Identification personnel must be able to identify a decedent's teeth according to their anatomical order. Further, they must be able to recognize dental caries, abnormalities, and unusual conditions present. Because correct dental identification may at times be the only positive clue to a decedent's identity, its importance cannot be overemphasized.

F-2. Terminology

a. Deciduous Teeth. The first set of teeth are called deciduous teeth. These teeth are also called temporary, baby, or milk teeth. The 20 deciduous teeth, 10 in each jaw, erupt between the ages of 6 months and 2 years and are lost between the ages of 7 and 14 years.

b. Permanent Teeth. Thirty-two permanent teeth replace the temporary teeth, 16 in each jaw or dental arch. The permanent teeth begin to erupt at age 6 to 7 years and cease with the eruption of the third molars ("wisdom teeth") between the ages of 17 and 21 years. Each tooth is assigned a number to simplify its designation. Under the system used by the armed services, the numbering begins with the upper right third molar and continues around the upper or maxillary arch from 1 to 16 (fig, F-1). The numbering on the lower or mandibular arch begins with the lower left third molar as 17 and continues to 32 (fig, F-2). The terms left and right refer to those of the decedent.

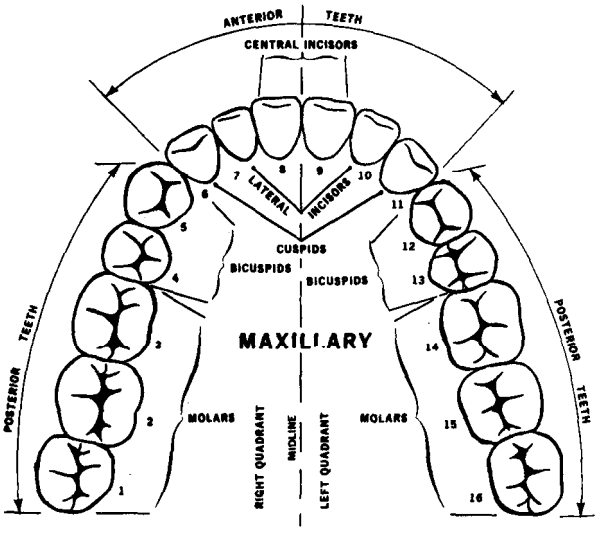


Figure F-1. Maxillary arch.

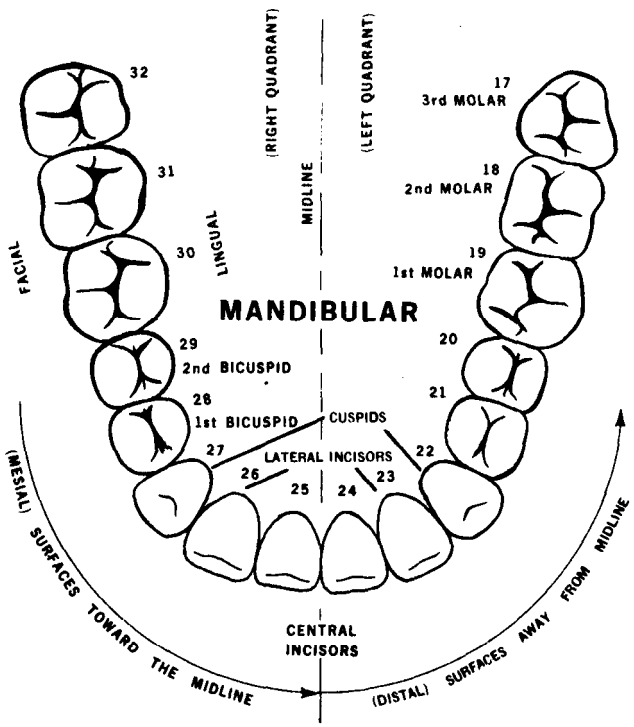


Figure F-2. Mandibular arch.

c. Crown and Root. Anatomically, each tooth is divided into two main parts. They are the crown, which is covered by enamel; and the root, or roots, which are covered by cementum and mostly embedded in the bony structure of the jaw.

d. Neck. The portion of the tooth where the crown and the root join is commonly referred to as the neck of the tooth; it is about the equivalent of the gum line.

e. Cusp. A cusp is a conical or cone-shaped elevation on the occlusal surface of bicuspids and molars and on the incisal edge of cuspids. A cusp may develop from one or more lobes.

f. Lobe. The lobe of a tooth is a developmental segment of the tooth. The crowns of teeth develop from either four or five lobes.

g. Surfaces of Teeth. The surfaces of teeth are named to indicate the direction each surface faces (fig, F-2). When describing adjoining surfaces of a tooth, combination forms of some of the terms are used. Some examples are: mesiodistal, mesiofacial, mesiolingual, distolingual, and distofacial.

(1) *Mesial.* The mesial surface is the surface of a tooth nearest the midline of the dental arch. On a central incisor, it is the surface which normally contacts the central incisor of the opposite side of the arch.

(2) *Distal.* The distal surface is that surface of a tooth which is farthest away from the middle of the arch. In deciduous second molars and permanent third molars, it is the surface which faces to the back of the arch.

(3) *Lingual.* This is the surface which faces toward the tongue.

(4) *Facial.* The surface of a posterior tooth which faces toward the cheek or the surface of an anterior tooth which faces toward the lips is called the facial surface. The facial surface of anterior teeth may also be called the labial surface; and the facial surface of posterior teeth may also be called the buccal surface.

(5) *Occlusal.* The occlusal surface is the surface of a posterior tooth which faces toward and contacts the teeth of the opposite jaw. It is the chewing surface of a tooth.

(6) *Incisal (incisal edge).* The surface of an anterior tooth which faces toward and contacts the teeth of the opposite jaw is called the incisal surface. It is the biting or tearing surface.

(7) *Axial.* Any surface which is parallel to the long axis of the tooth is an axial surface. The facial, lingual, mesial, and distal are all axial surfaces.

(8) *Proximal.* The proximal surface is that surface which lies next to another tooth. Most mesial and distal surfaces are proximal surfaces.

h. Anterior Teeth. The anterior teeth include the central and lateral incisors and the cuspids. As a group, anterior teeth have single roots and incisal edges or single-cusped crowns ending in narrow edges designed to incise or bite off relatively large amounts of food. They are located in the anterior part of the jaw and are generally alined to form a smooth curving arch from the distal of the cuspid on one side of the arch to the distal of the cuspid on the opposite side.

i. Posterior Teeth. The posterior teeth include the bicuspids and molars. Posterior teeth differ from anterior teeth in that they may have more than one root, they may have multiple cusps forming occlusal surfaces designed to crush and grind food to small parts, and the part of the dental arch which they form has little or no lateral curvature.

(1) *Bicuspids.* Most bicuspids have single roots but may have roots which are partly or completely bifurcated (forked). About one-half of all upper first bicuspids have such bifurcations. As their name implies, most bicuspids have two cusps. The lower second bicuspid may have either two or three cusps; the three-cusped bicuspid has two lingual cusps and one facial or labial cusp.

(2) *Molars.* Molars have four or more cusps, and all are multirooted. The upper molars have

three roots, and the lower molars have two roots. Third molars usually resemble second molars but are largely unpredictable as to form, size, and number of roots.

Section II.

MAXILLARY TEETH

F-3. General

The maxillary teeth are in the upper jaw or arch. They are numbered from 1 to 16, beginning with the upper right third molar (fig. F-1). The descriptions of the maxillary teeth in this section apply equally to both left and right teeth: however, only the right teeth are illustrated.

F-4. Maxillary Central Incisor

The maxillary central incisor (fig. F-3) is located adjacent to the midline on the anterior portion of the maxillary dental arch. Its mesial surface contacts the mesial surface of the maxillary central incisor of the opposite side.

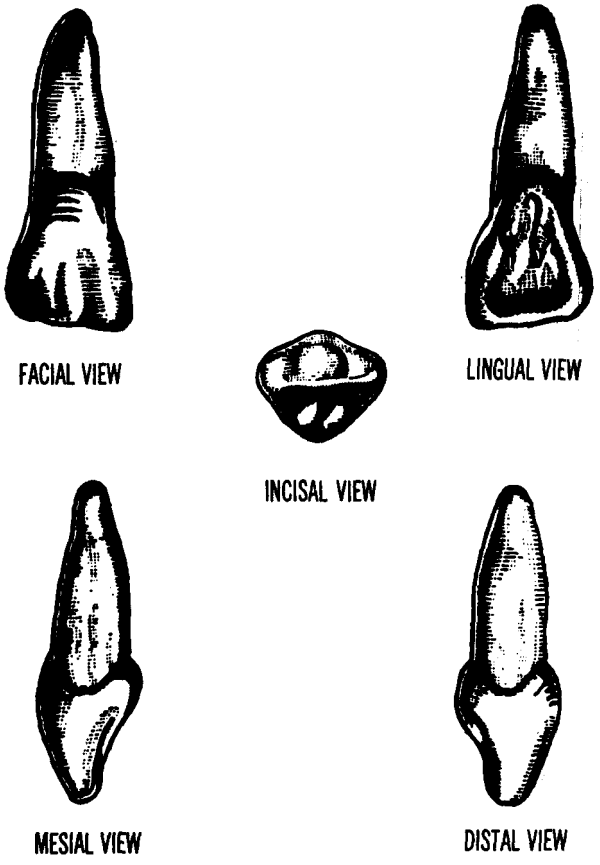


Figure F-3. Right maxillary central incisor.

a. Facial Surface. The facial surface is broad, resembling a thumbnail in outline. Its incisal two-thirds is relatively flat and broad; the gingival (gum line) one-third is more convex.

b. Lingual Surface. The lingual surface is scoop- or shovel-like in appearance and bounded by prominent mesial and distal marginal ridges. The lingual surface is narrower than the facial surface because both proximal surfaces converge toward the lingual.

c. Mesial Surface. The mesial surface is somewhat triangular in shape with the apex of the triangle toward the incisal.

d. Distal Surface. The distal surface is smaller in area but similar in outline to the mesial surface. Its contours are more convex than those of the mesial surface.

e. Incisal Edge. The incisal edge is fairly straight, ending in curved mesio-incisal and disto-incisal angles. The incisal edge is usually worn so that it presents a distinct narrow surface which usually slopes toward the lingual surface.

f. Root. The single root averages about 1¼ times the length of the crown. It tapers gradually from about its midsection and ends in a rounded apex.

F-5. Maxillary Lateral Incisor

The maxillary lateral incisor (fig, F-4) is smaller in size and has a more convex crown portion than does the central incisor; however, it has the same general appearance and compares with the central incisor as follows:

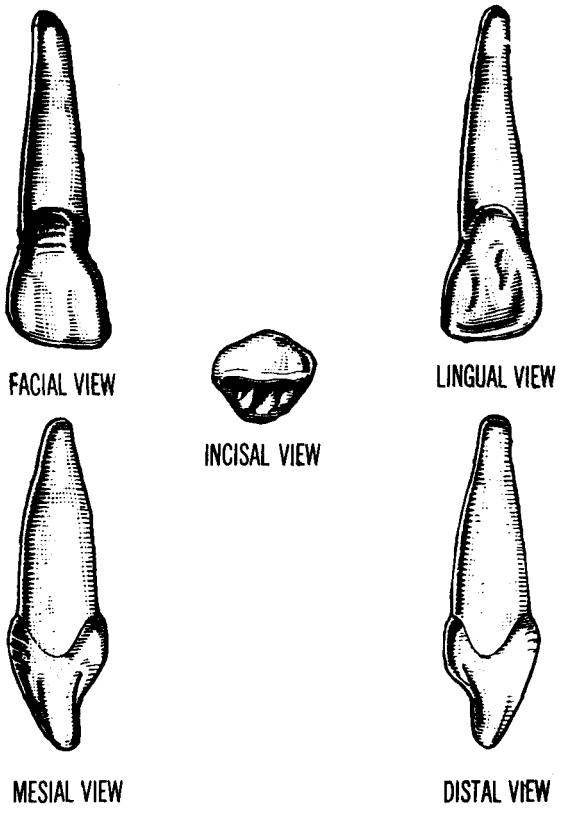


Figure F-4. Right maxillary lateral incisor.

a. Facial Surface. The facial surfaces of the lateral incisor and central incisor are similar, but the lateral incisor facial surface is more convex or rounded in form than that of the central incisor.

b. Lingual Surface. The lingual surfaces of the lateral incisor and central incisor are similar. The lingual pit (pointed depression) of the lateral incisor is often small. deep, and irregular in shape.

c. Mesial Surface. The mesial surface of the lateral incisor is similar to that of the central incisor.

d. Distal Surface. The distal surface of the lateral incisor is convex in all directions.

e. Incisal Edge. The incisal edges of the lateral incisor and the central incisor are similar. However, the outline of the incisal edge of the lateral incisor has generally greater convexity than does that of the central incisor.

f. Root. The single root of the lateral incisor averages about 1½ times the length of the crown. It is smaller than that of the central incisor, but it has a greater relative length in comparison to the length of the crown. Its tip inclines distally.

F-6. Maxillary Cuspid

The maxillary cuspid (fig F-5) is the third tooth from the midline. It is the longest and the only single-cusp tooth in the arch. Located at the angle between the anterior and the posterior portions of the dental arch, it plays an important role in determining facial features of the individual and in controlling mandibular movements. It is used for tearing food. It is sometimes called the canine or eye tooth.

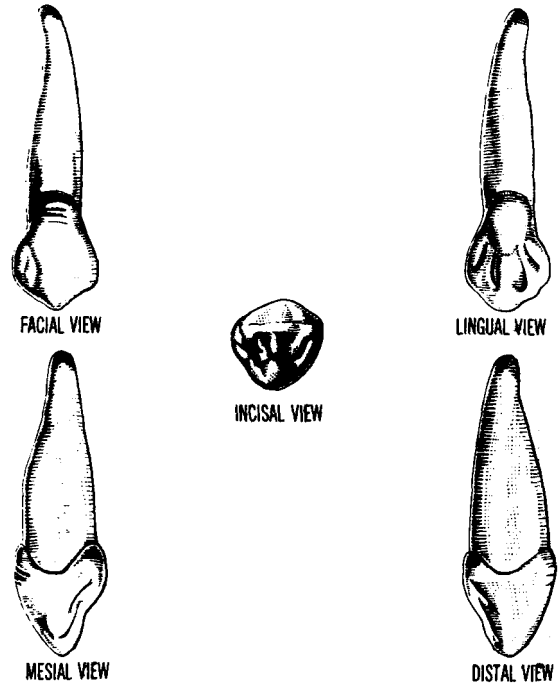


Figure F-5. Right maxillary cuspid.

a. Facial Surface. The facial surface is markedly convex in all directions. It has two longitudinal grooves. The middle lobes are developed into a prominent ridge running lengthwise from the cusp area to the bottom third of this surface.

b. Lingual Surface. The lingual surface resembles the facial surface in outline but is slightly smaller in area. It has the largest cingulum (bulge of enamel) of all anterior teeth.

c. Mesial Surface. The mesial surface is triangular in shape, the apex of which is represented by the incisal edge.

d. Distal Surface. The distal surface resembles the mesial surface but is more convex. The distal surface is slightly concave near the gum line (gingival portion).

e. Incisal Edge. The incisal edge consists of two sloping narrow surfaces which form a curved angle at the tip of the cusp. The distal slope is longer than the mesial slope.

f. Root. The root, which is about twice the length of the crown, is the longest of all human teeth. The gradual tapering of the root from the crown toward the apex becomes more pronounced in the apical (bottom) third of the root.

F-7. Maxillary First Bicuspid

The maxillary first bicuspid (fig F-6) has the largest crown of the maxillary bicuspid teeth. It is formed from four developmental lobes—three lobes form the facial cusp, and the fourth forms a lingual cusp.

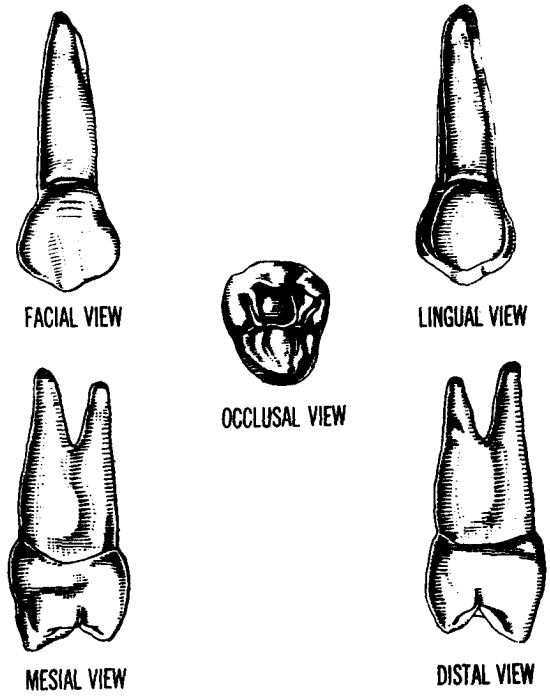


Figure F-6. Right maxillary first bicuspid.

a. Facial Surface. The facial surface resembles that of the cuspid but is not as long or as broad as that of the cuspid.

b. Lingual Surface. The lingual surface is oval in shape and convex in all directions. It is shorter and narrower than the facial surface.

c. Mesial Surface. The mesial surface is roughly rectangular in outline. It is convex in the occlusal two-thirds and concave in the third nearest the gum line.

d. Distal Surface. The distal surface resembles the mesial surface but is slightly more convex.

e. Occlusal Surface. The occlusal surface has two cusps–the facial and the lingual. The facial cusp is larger and more prominent than the lingual.

f. Roots. In about one-half of all maxillary first bicuspids, the root is bifurcated (forked) to form two roots about one-half to two-thirds of the way from the crown to the apex (bottom) of the root.

F-8. Maxillary Second Bicuspid

The maxillary second bicuspid (fig F-7) is similar to the first bicuspid. It differs from the first bicuspid in the following ways:

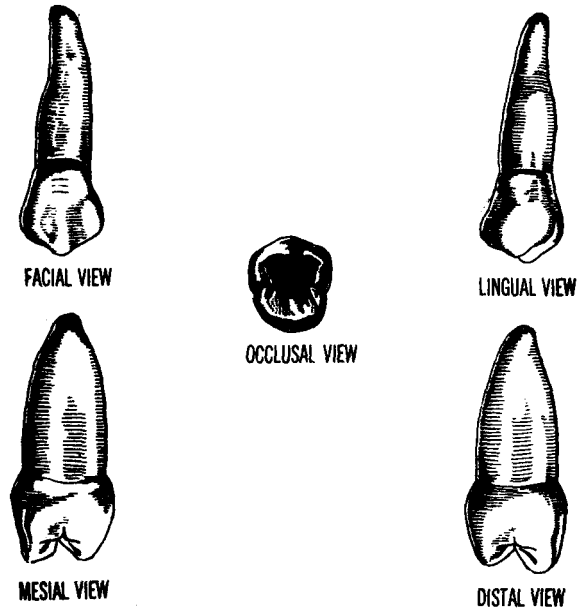


Figure F-7. Right maxillary second bicuspid.

a. It has smaller crown dimensions.

b. The cusps are more nearly the same height.

c. The marginal ridge of the second bicuspid is not divided by a prominent mesiolingual groove.

d. The second bicuspid has a single root which is slightly bulkier than that of the first bicuspid.

e. Contact areas are located slightly closer to the occlusal and facial surfaces than are those of the first bicuspid.

F-9. Maxillary First Molar

The maxillary first molar (fig F-8) is the largest tooth in the mouth. It develops from four lobes and is often called the “6-year molar” because it erupts when a person is 6 years of age.

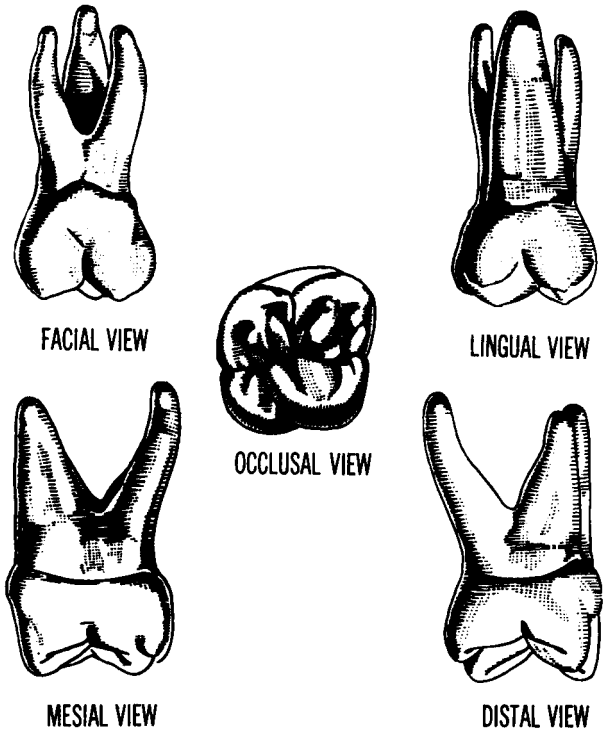


Figure F-8. Right maxillary first molar.

a. Facial Surface. The facial surface is convex in all directions. A groove passes vertically from the middle of the facial surface, between the two facial cusps, and onto the occlusal surface. The cusp on the mesial side is higher and wider than the cusp on the distal side.

b. Lingual Surface. The lingual surface is more convex and smaller in area than the facial surface. The mesiolingual cusp is larger than the distolingual cusp. An oblique groove passes from the lingual surface, between the two lingual cusps, and onto the occlusal surface. A fifth or rudimental cusp, which develops from the fifth lobe, may be present on the mesiolingual surface. It is called the cusp of carabelli.

c. Mesial Surface. The mesial surface is nearly flat in all directions.

d. Distal Surface. The distal surface resembles that of the mesial, but it is shorter and more convex.

e. Occlusal Surface. The occlusal surface has four cusps. each of which developed from a single lobe. Three pits are formed on this surface—the mesial. central, and distal.

f. Roots. The root divides into three in its cervical third. Each root is named according to its position on the tooth—mesiofacial, distofacial, and lingual. The lingual root is larger and longer than the facial roots, and the mesiofacial root is larger than the distofacial root.

F-10. Maxillary Second Molar

The maxillary second molar (fig F-9) closely resembles the maxillary first molar; however, all dimensions of the second molar are smaller, and the distolingual cusp is proportionally smaller. Also, on the second molar, the fifth cusp is seldom present, and the mesiofacial and distofacial roots are occasionally fused.

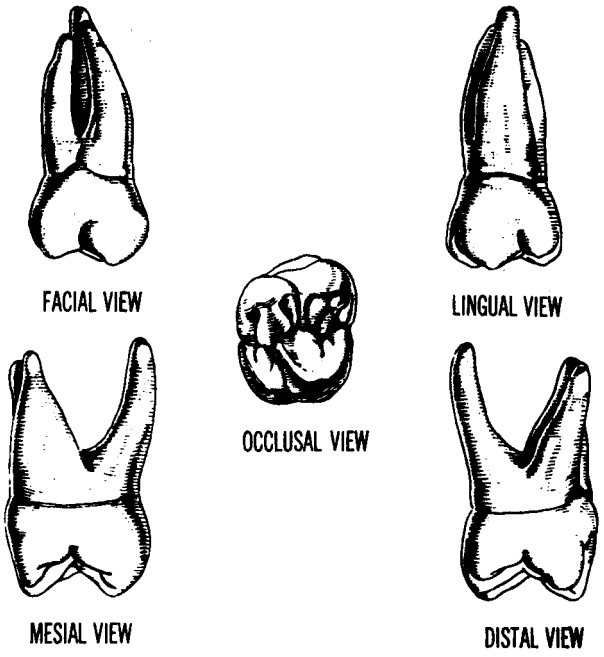


Figure F-9. Right maxillary second molar.

F-11. Maxillary Third Molar

The maxillary third molar (fig F-10) may appear in a variety of forms because the form, size, and number of its roots are unpredictable. In its most common form, it resembles the maxillary second molar, but it is smaller in all dimensions.

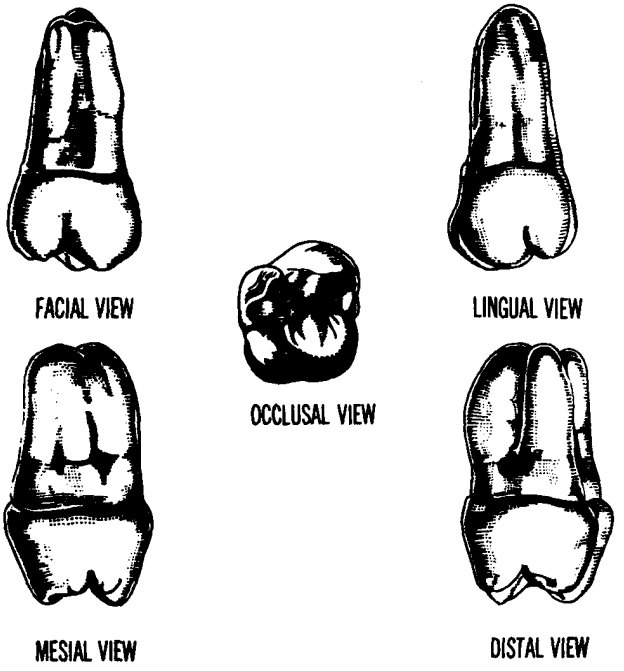


Figure F-10. Typical right maxillary third molar.

Section III.

MANDIBULAR TEETH

F-12. General

The mandibular teeth are in the lower jaw or arch. They are numbered from 17 to 32 beginning with the lower left third molar (fig F-2). The descriptions of the mandibular teeth in this section apply equally to both left and right teeth: however, only the right teeth are illustrated.

F-13. Mandibular Central Incisor

The mandibular central incisor (fig F-11) is located adjacent to the midline in the anterior portion of the mandibular arch. Its mesial surface contacts the mesial surface of the central incisor of the opposite side. It is the smallest and most symmetrical of all teeth.

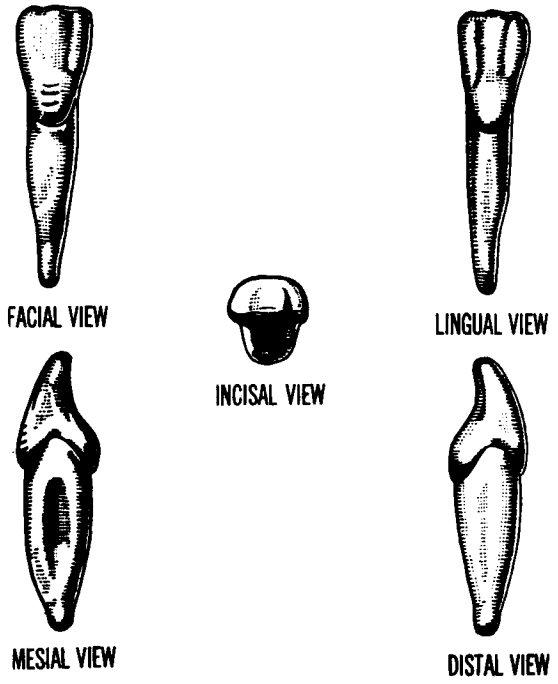


Figure F-11. Right mandibular central incisor.

a. Facial Surface. The facial surface is flat in the incisal two-thirds and convex in the bottom (cervical) third. It is widest near the incisal edge which forms a straight line at nearly right angles to the long side and forms slightly acute angles with the mesial and distal surfaces.

b. Lingual Surface. The lingual surface is narrower than the facial. The incisal two-thirds is concave and bounded by mesial and distal marginal ridges. In the bottom third or cingulum area, it is convex.

c. Mesial Surface. The mesial surface is triangular in shape and is almost flat for its entire length.

d. Distal Surface. Except for being slightly more convex, the distal surface closely resembles the mesial surface.

e. Incisal Edge. The incisal edge appears slightly curved from mesial to distal. Its thickness increases with wear.

f. Root. The single root is narrow mesiodistally but broad faciolingually. The apical portion (tip) may have a slight distal inclination.

F-14. Mandibular Lateral Incisor

The mandibular lateral incisor (fig F-12) resembles the mandibular central incisor; however, it is slightly larger in all dimensions and less symmetrical in outline than is the mandibular central incisor. The mandibular lateral incisor is also similar, in many respects, to the maxillary lateral incisor.

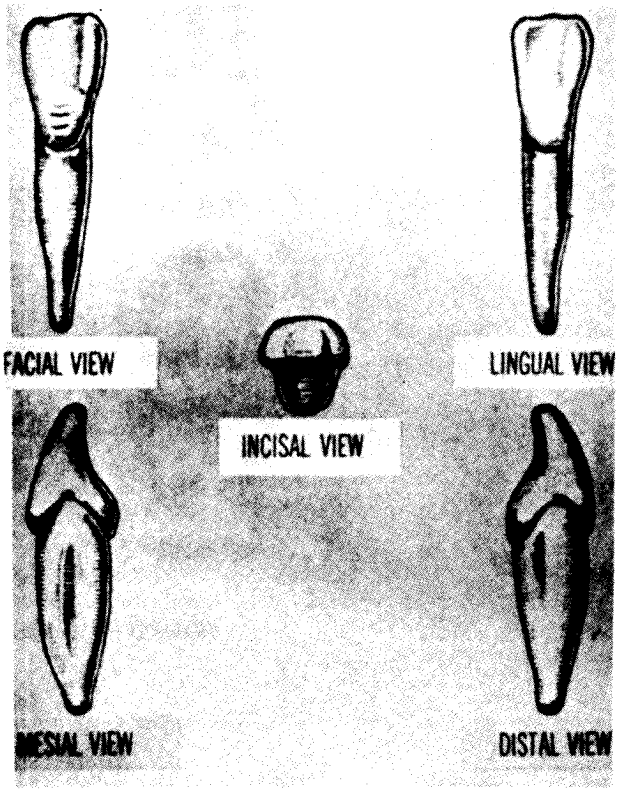


Figure F-12. Right mandibular lateral incisor.

a. Facial Surface. From the facial view, the incisal edge slope to the distal surface while that of the central incisor is straight. The mesio-incisal angle is more acute, and the disto-incisal angle is more obtuse and rounded than are those of the central incisor.

b. Lingual Surface. On the lingual surface, the marginal ridges and cingulum (bulge of enamel) are slightly more pronounced than are those of the central incisor.

c. Mesial and Distal Surfaces. The mesial and distal surfaces closely resemble those of the central incisor.

d. Incisal Edge. The incisal edge has more distal curvature than does that of the central incisor.

e. Root. The root is a little longer than that of the central incisor.

F-15. Mandibular Cuspid

The mandibular cuspid (fig F-13) is similar in many respects to the maxillary cuspid. Like the upper cuspid, it is long, is firmly anchored in the

alveolar bone (jawbone), and occupies a key position in the dental arch.

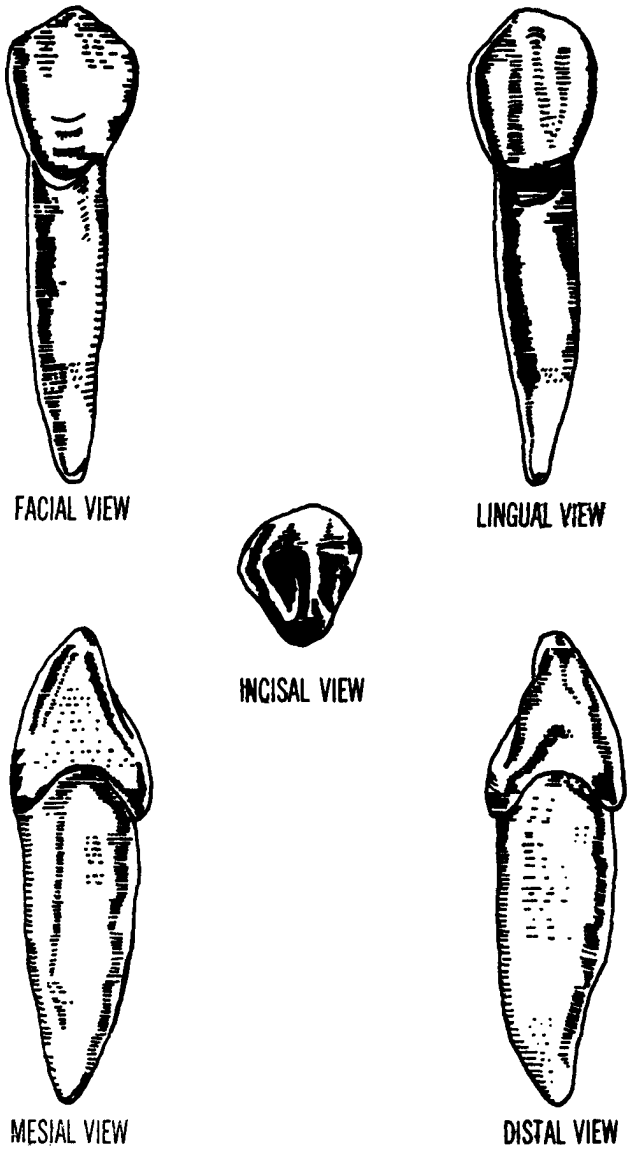


Figure F-13. Right mandibular cuspid.

a. Facial Surface. The facial surface of the mandibular cuspid is narrower than that of the maxillary cuspid, the distal slope of the incisal margin is almost twice the length of the mesial slope, and the mesial margin is almost parallel to the long axis of the tooth. Otherwise, the facial surface of the mandibular cuspid is much the same as that of the maxillary cuspid.

b. Lingual Surface. The lingual surface is narrower but similar in outline to the facial surface. The marginal ridges, the cingulum (enamel bulge), and the lingual axial ridge are not nearly so pronounced as they are on the maxillary cuspid.

c. Mesial Surface. The mesial surface of the crown is triangular in outline. It is flat, forming an almost continuous flat surface with the root.

d. Distal Surface. The distal surface is smaller in urea and much more convex than that of the mesial surface.

e. Incisal Edge. The incisal edge consists of two sloping narrow surfaces forming a curved angle at the tip of the cusp. The distal slope is about twice the length of the mesial slope. The tip of the cusp is located at the junction of the mesial third and the middle third of the crown.

f. Root. The root is shorter than that of the maxillary cuspid and its mesial and distal surfaces are flat. The apical (bottom) portion is usually inclined distally.

F-16. Mandibular First Bicuspid

The mandibular first bicuspid (fig F-14) is the smallest tooth in the bicuspid group. It possesses characteristics of all bicuspids, but it differs greatly in form, particularly when compared to upper bicuspids.

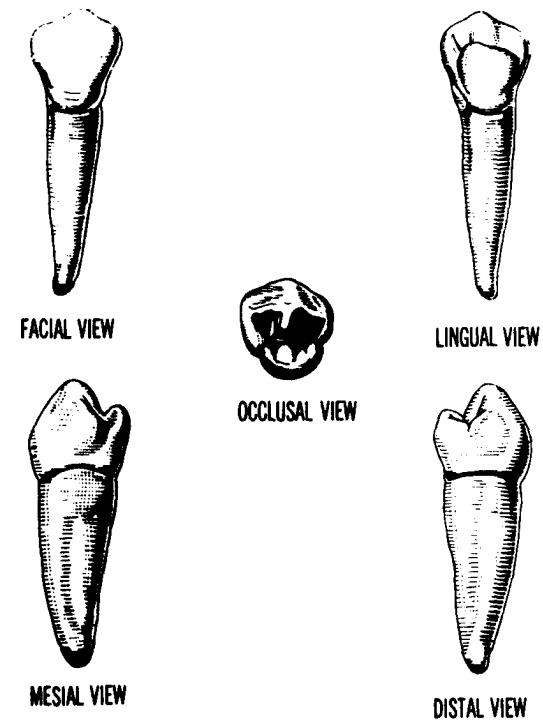


Figure F-14. Right mandibular first bicuspid.

a. Facial Surface. The facial surface is symmetrical in outline and is more convex in all directions than is the facial surface of the

maxillary bicuspid. The convexity gives the crown of the mandibular bicuspid the appearance of an inverted bell. The facial cusp is long and sharp.

b. Lingual Surface. The lingual surface is about half the size of the facial cusp because the lingual cusp is very short and because the mesial and distal surfaces have a marked lingual convergence.

c. Mesial Surface. The mesial surface is convex in all directions. In outline it resembles the mesial surface of a mandibular cuspid with an enlarged cingulum (bulge of enamel).

d. Distal Surface. The distal surface is more convex faciolingually than is the mesial surface.

e. Occlusal Surface. The occlusal surface is round to oval in outline. A well-developed transverse ridge runs from the tip of the facial cusp to the lingual cusp. The facial cusp occupies about four-fifths of the occlusal surface.

f. Root. The single root tapers gradually toward the apex. Near the crown, the root is narrower lingually than it is facially.

F-17. Mandibular Second Bicuspid

The mandibular second bicuspid (fig F-15) is slightly larger, stockier, and less rounded than the mandibular first bicuspid. It is, however, more rounded or oval than the maxillary bicuspids. It may have two or three cusps, the three-cusp form having one facial and two lingual cusps.

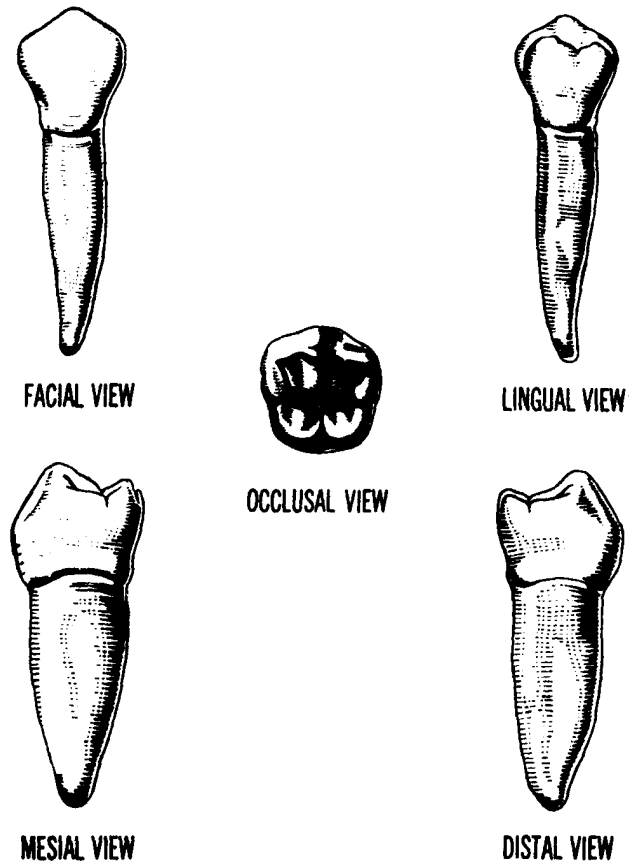


Figure F-15. Right mandibular second bicuspid.

a. Facial Surface. The facial surface resembles that of the first bicuspid.

b. Lingual Surface. The lingual surface, which is similar in outline to the facial surface, varies somewhat with the number and arrangement of lingual cusps. It is markedly larger than the lingual surface of the mandibular first bicuspid, and the cusp (or cusps) is much larger. When two lingual cusps are present, they are divided by a lingual groove passing from the occlusal onto the lingual surface.

c. Mesial Surface. The mesial surface has the form of a lingually inclined parallelogram. The surface is convex with a shallow concavity sometimes present in the cervical area.

d. Distal Surface. The distal surface resembles the mesial surface but is slightly more convex.

e. Occlusal Surface. The outline form varies with the number of lingual cusps. With a single lingual cusp, the outline form is similar to that of the first bicuspid. With two lingual cusps, the outline form is broader and more nearly rectangular toward the lingual. With a two-cusp tooth, the occlusal surface resembles that of a maxillary bicuspid. With a three-cusp tooth, a prominent lingual groove passes from the occlusal surface, between the lingual cusps, and onto the lingual surface.

f. Root. The single root is longer and larger than that of the first bicuspid. Most of the taper is confined to the apical (bottom) third.

F-18. Mandibular First Molar

The mandibular first molar (fig F-16) is the largest tooth in the mandible. It has five functional cusps, each of which develops from a separate lobe. The maxillary and mandibular first molars are often called "6-year molars" because they erupt when a person is 6 years of age.

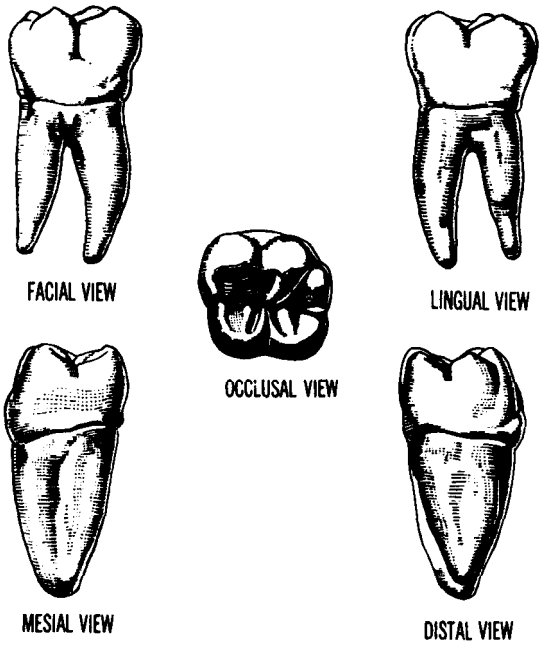


Figure F-16. Right mandibular first molar.

a. Facial Surface. The facial surface is convex in all directions. A facial groove and a distofacial groove are continuations of grooves from the occlusal surface which end on the facial surface. Its occlusal margin is made up of six slopes, two for each of three facial cusps.

b. Lingual Surface. The lingual surface is smaller than the facial surface. Its occlusal margin is formed by the four slopes of the two lingual cusps. A distinct lingual groove, which is continuous from the occlusal surface, ends in the middle third of the surface.

c. Mesial Surface. The mesial surface has the form of a lingually inclined parallelogram. It is flat in appearance with its greatest convexity in the occlusal third.

d. Distal Surface. The distal surface is similar in all directions. It is smaller in area than the mesial surface.

e. Occlusal Surface. The occlusal surface is characterized by the presence of a fifth cusp, the distal cusp, which is smaller than the other cusps and forms part of the masticating surface of the tooth. Three grooves, the facial, distofacial, and lingual, are mentioned in the descriptions of the facial, distofacial, and lingual, are mentioned in the descriptions of the facial and lingual surfaces (a and b above). Other grooves are a central groove and mesial and distal developmental grooves. The mesial groove runs from the central fossa (pit) over the mesial marginal ridge. The distal groove runs from the central fossa over the distal marginal ridge.

f. Root. The root is divided into mesial and distal roots with the bifurcation located nearer the crown than is the bifurcation of any of the other teeth. Both roots are wide faciolingually and narrow mesiodistally. The mesial root is larger than the distal and commonly has a distal inclination near its tip. The distal root may have a similar curvature but usually is straight.

F-19. Mandibular Second Molar

The mandibular second molar (fig F-17) is smaller than the lower first molar but is similar in general appearance. The second molar usually has four cusps, but occasionally there are five arranged similarly to those of the lower mandibular first molar. The second molar is sometimes called the 12-year molar.

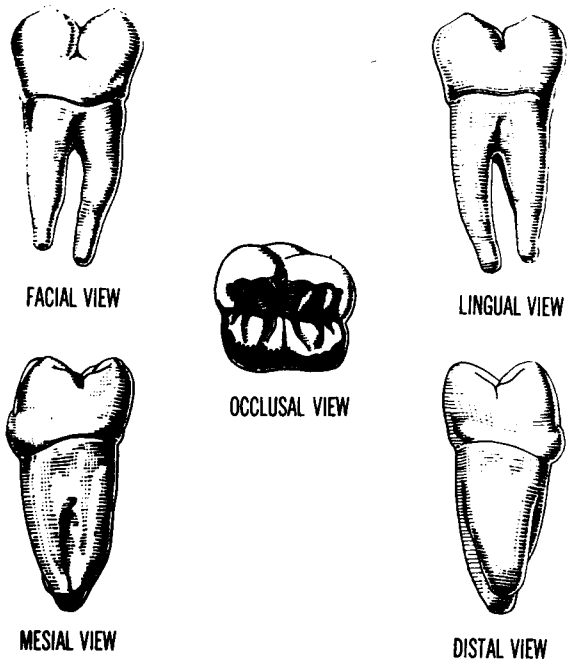


Figure F-17. Right mandibular second molar.

a. Facial Surface. The facial surface is rectangular in shape and convex in form. Its occlusal margin consists of the slopes of two similarly shaped cusps separated by a facial groove, which is a continuation of a groove from the occlusal surface. The groove ends at the middle of the facial surface. The mesial cusp is slightly larger than the distal cusp.

b. Lingual Surface. The lingual surface

resembles that of the mandibular first molar. The lingual groove, which is a continuation of the lingual groove of the occlusal surface, ends at the middle of this surface.

c. Mesial Surface. The mesial surface is similar in outline to that of the mandibular first molar but is more convex in all directions.

d. Distal Surface. The distal surface is similar to the mesial surface but is smaller in area and more convex.

e. Roots. The tooth has two roots which resemble but are less divergent than those of the mandibular first molar. Both roots present a distal inclination.

F-20. Mandibular Third Molar

The mandibular third molar (fig F-18) is commonly known as the wisdom tooth. It may appear in any of a wide range of forms, sizes, and shapes. Typically, it resembles either the first or second mandibular molar (more often the latter) but is smaller in its overall size.

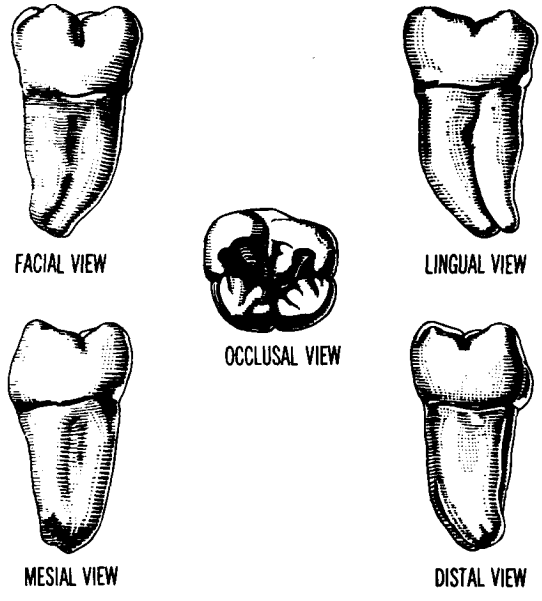


Figure F-18. Right mandibular third molar.

Section IV.

CARIES AND ABNORMALITIES

F-21. General

Identifying dental caries (cavities) and abnormalities is an important phase in the final identification of deceased personnel. Both caries and abnormalities must be charted accurately to compare them with the decedent's dental chart (SF 603 (Health Record–Dental)). The dental examining mirror provided with the fingerprint identification kit should prove helpful.

F-22. Caries

Dental caries, or dental decay, is a disease which, if untreated, involves progressive destruction of the tooth enamel and opens the way for bacteria to enter and infect other tissues of the teeth. Although caries may be found on any part or surface of a tooth, they occur mainly on hard-to-brush areas. The first visible sign of a caries is a slightly whitened area in the enamel. The area is easily overlooked when the enamel is wet but will stand out when it is dry. The caries develops from the whitened area and varies in size from that of a pinhole to a hole that covers a large percentage of the tooth area. When a caries is no longer decaying, it is yellowish brown or black.

F-23. Abnormalities

The dental abnormalities described in this paragraph are those that have been caused by nature or neglect. Excluded are the caries described in paragraph F-22 and the appliances and restorations described in paragraphs F-24 through F-27. Other abnormalities that may appear in or about a decedent's mouth, such as cankers and sores on gums and lips and diseases of the mouth, are not described.

a. Erosion. Erosion is the chemical wearing away of the tooth structure. It appears on the external surface at the neck (gum line) of the tooth. Where erosion is present, the enamel is usually hard and shiny. In some cases, the crown may almost be severed from the root.

b. Abrasion. Abrasion is the wearing away of tooth structure through mastication (chewing of food), sharp particles, incorrect toothbrushing, or friction of clasps holding a partial denture.

c. Mottled Enamel. When the tooth enamel is spotted with white flecks or blotches because of excess fluorine, it is said to be mottled.

d. Enamel Hypoplasia. Enamel hypoplasia is a

defect in the enamel which varies from shallow depressions or grooves to deep grooves or pits running in horizontal rows across the crown. A birth defect, scarlet fever, or measles may be the cause of the defect.

e. Fracture of Tooth. Where the enamel, dentin, and pulp are chipped away or broken, the condition is referred to as a fracture of a tooth. Such a condition does not have to include all surfaces but primarily includes the facial, lingual, incisal, occlusal, and either the mesial or distal surfaces.

f. Fracture of Enamel. The condition of a tooth in which only part of the enamel is chipped away, not the entire tooth area (dentin and pulp), is referred to as a fracture of enamel.

g. Rotation. A rotated tooth is one that is twisted in such a way that one or more of its surfaces are not in their proper location. For example, the distal surface faces the distal rather than the mesial surface of its neighboring tooth.

h. Malocclusion. Malocclusion is the improper interlocking of the upper and lower teeth.

i. Abnormal Interdental Spaces. Where an unusually large gap occurs between two teeth, it is referred to as an abnormal interdental space. A missing or a rotated tooth or the natural spacing between the teeth occuring in a particular jaw can be the reason for abnormal interdental spaces.

j. Irregularity of Alinement. Irregularity of alinement is the condition in which one or more teeth protrude either facially or lingually because they have grown in improperly.

Section V.

RESTORATIONS

F-24. General

Dental restorations are broken down into three categories: temporary restorations, permanent restorations, and prosthetic appliances.

F-25. Temporary Restorations

Temporary restorative materials are used on deciduous (baby) teeth and for emergency and temporary work on permanent teeth. The following materials are used to Fill cavities, cement crowns, and cap teeth:

a. Gutta-Percha. Gutta-percha is a widely used pink or gray rubberlike substance used as a temporary filling and as a root-canal sealer. It is easy to manipulate and does not dissolve in oral fluids.

b. Temporary Stopping. Temporary stopping is used primarily in filling deciduous teeth. It does not wear as well as gutta-percha and will dissolve in oral fluids.

c. Zinc Phosphate. Zinc phosphate is used to cement crowns and to restore nonstress-bearing parts. It is seldom used in areas subject to masticating stresses and abrasion. The color of the material can be made to match the color of the repair tooth.

d. Copper Phosphate. Copper phosphate can be either red or black and is used primarily on posterior deciduous teeth.

e. Zinc Oxide. Zinc oxide is used primarily for emergency filling of advanced caries and fractured enamel and for temporarily cementing crowns and some appliances. Zinc oxide is low in strength and has poor resistance to abrasion.

f. Aluminum Crown. An aluminum crown may be either a dull or shiny gray temporary cap used on a tooth prepared for a permanent full crown.

F-26. Permanent Restorations

Permanent restorative materials are those substances that will last as long as the natural tooth, if not longer, if proper dental hygiene procedures are followed.

a. Amalgam. Amalgam is a very durable alloy of silver, tin, and mercury. About 80 percent of all permanent restorations are made of amalgam. This gray filling material is used on the posterior teeth, primarily on the occlusal surface. However, it is also used on anterior teeth on all surfaces except the facial.

b. Silicate Cement. Silicate cement is the least permanent of the permanent restorative materials as it will dissolve in oral fluids. It is used on nonstress-bearing parts of anterior teeth or on other teeth where appearance is important. Silicate cement is translucent and can be made to match the tooth being restored.

c. Procelain. Porcelain is a very durable translucent material used for jacket crowns, inlays, and denture bases. Porcelain can be made to match the color of the tooth being repaired.

d. Gold. Because of its softness, gold by itself is a poor restorative material. However, as an alloy, it becomes a very durable material. Because of its high cost, gold is an unusual restorative. Five forms of gold are used in restoring teeth.

(1) *Casting gold.* Casting gold is used to fabricate various restorations in three consistencies: soft, for nonstress-bearing parts; medium, for ordinary inlay work; and hard, for

crowns and abutments. Casting gold can be whitened by adding palladium, platinum, or silver.

(2) *Gold alloy solder.* Gold alloy solder is used for joinging the parts of fixed bridges, building up or forming restorations, and other repairs.

(3) *Wrought gold.* Wrought gold is used to construct clasps and other appliances.

(4) *Gold foil.* Gold foil is used to restore tooth structures, particularly on facial and occlusal surfaces.

(5) *Gold plate.* Gold plate is seldom used but may be used in a crown or for reparing a hole in a crown.

F-27. Prosthetic Appliances

Complete and partial artificial dentures make up the great bulk of dental prosthetic appliances. A complete denture replaces the entire complement of teeth in an arch. A partial denture usually refers to a removable appliance which replaces less than the full complement of teeth in one arch. On the other hand, a bridge refers to a freed partial denture that replaces one or more teeth and which cannot be removed by the bridge wearer.

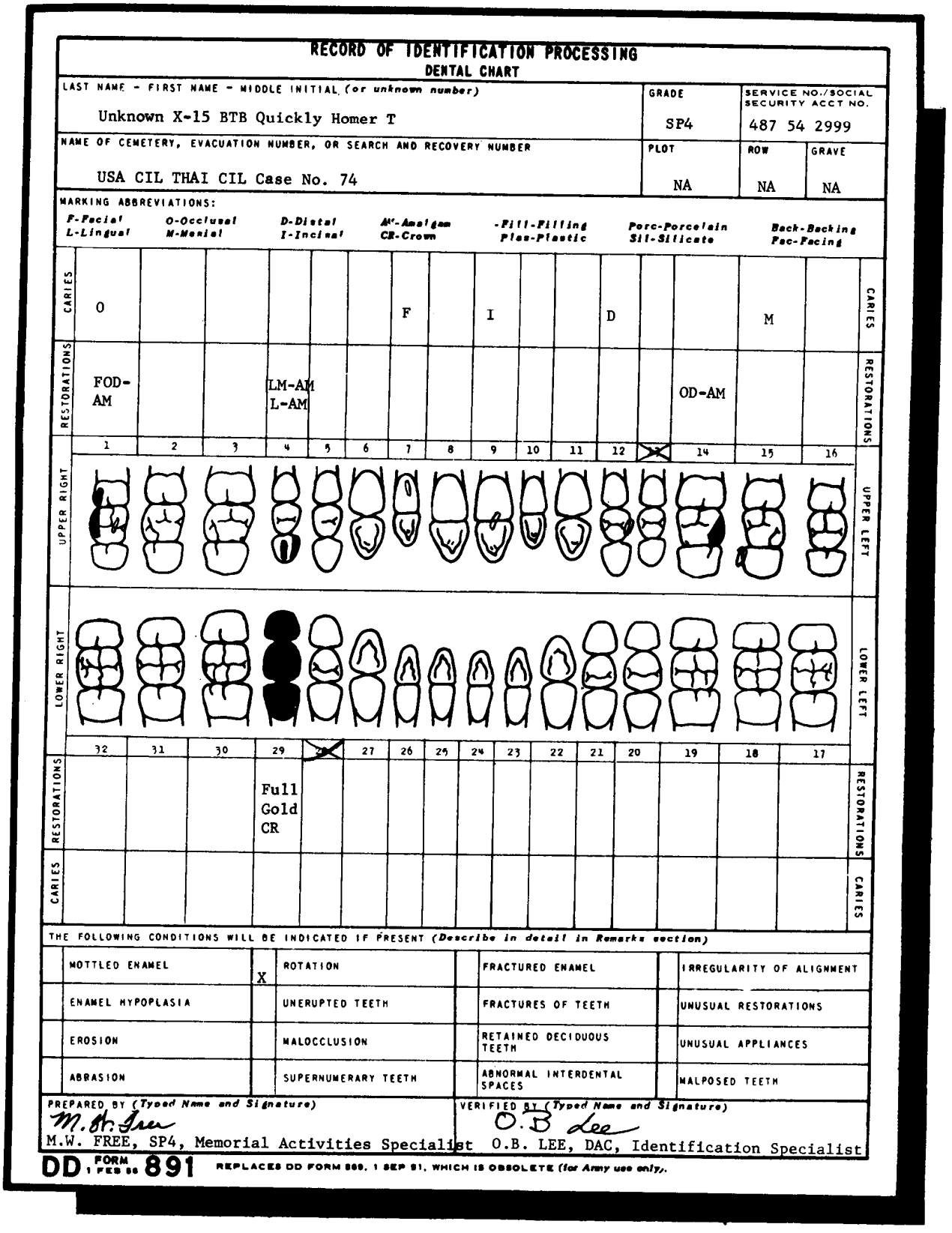
Section VI.

DD FORM 891 (RECORD OF INDENTIFICATION—DENTAL CHART)

F-28. Preparation of DD Form 891

Completing DD Form 891 is relatively simple but completing it to show an exact picture of a decedent's dentition is a painstaking task. At times, the DD Form 891 is refereed to as the "tooth chart" to keep it from being confused with SF 603. When the DD Form 891 is completed, it is compared with the decedent's SF 603 if it is available.

a. Last Name-First Name-Middle Initial (or Unknown Number). Fill our this block first as you begin to make the dental identification to insure that the form is being used with the correct remains. The sample in figure F-19 shown the unknown number as well as the BTB (believed-to-be) designation.



RECORD OF IDENTIFICATION PROCESSING
DENTAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL (or unknown number)	GRADE	SERVICE NO./SOCIAL SECURITY ACCT NO.
Unknown X-15 BTB Quickly Homer T	SP4	487 54 2999

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
USA CIL THAI CIL Case No. 74	NA	NA	NA

MARKING ABBREVIATIONS:
F-Facial L-Lingual O-Occlusal M-Mesial D-Distal I-Incisal Am-Amalgam CR-Crown -Fill-Filling Plas-Plastic Porc-Porcelain Sil-Silicate Back-Backing Fac-Facing

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CARIES	O						F		I			D			M	
RESTORATIONS	FOD-AM			LM-AM L-AM										OD-AM		

UPPER RIGHT / UPPER LEFT

LOWER RIGHT / LOWER LEFT

	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
RESTORATIONS				Full Gold CR												
CARIES																

THE FOLLOWING CONDITIONS WILL BE INDICATED IF PRESENT (Describe in detail in Remarks section)

	MOTTLED ENAMEL	X	ROTATION		FRACTURED ENAMEL		IRREGULARITY OF ALIGNMENT
	ENAMEL HYPOPLASIA		UNERUPTED TEETH		FRACTURES OF TEETH		UNUSUAL RESTORATIONS
	EROSION		MALOCCLUSION		RETAINED DECIDUOUS TEETH		UNUSUAL APPLIANCES
	ABRASION		SUPERNUMERARY TEETH		ABNORMAL INTERDENTAL SPACES		MALPOSED TEETH

PREPARED BY (Typed Name and Signature)	VERIFIED BY (Typed Name and Signature)
M. W. Free	O. B. Lee
M.W. FREE, SP4, Memorial Activities Specialist	O.B. LEE, DAC, Identification Specialist

DD FORM 1 FEB 86 891 REPLACES DD FORM 888, 1 SEP 81, WHICH IS OBSOLETE (for Army use only).

Figure F-19. DD Form 891 (Record of Identification—Dental Chart) (front).

b. Grade. If known, fill in the grade of the deceased. If not known, write in Unknown or Unk.

c. Service No. /Social Security Account No. If known, fill in the social security number of the deceased. If not known, enter Unknown or Unk.

d. Name of Cemetery, Evacuation Number, or Search and Recovery Number. In this block, enter the name of the unit that is processing the remains. If the unit is a CIL, enter the CIL case number.

e. Plot, Row, and Grave. Complete the Plot, Row, and Grave blocks only if the remains has been or is going to be interred in a temporary military cemetery. If not, enter NA in each block.

f. Marking Abbreviations. Printed in the DD Form 891 are the marking abbreviations that are used on the form. Three others are temp (temporary), alum (aluminum), and cem (cement). If other materials are used in the decedent's teeth that are not covered in the list of abbreviations, note them in the Caries and Restorations blocks on the chart and under Remarks on the reverse of the form.

g. Caries. In the Caries block for the proper tooth, enter the abbreviation for the surface or surfaces which have caries. For example, tooth No. 7 in figure F-19 shows a caries on the facial surface while No. 12 has one on the distal surface.

h. Restorations. In the Restorations block for the proper tooth, enter the abbreviation for the surface or surfaces involved in the restoration and the material used. For example, tooth No. 1 in figure F-19 shows an amalgam filling on the facial, occlusal, and distal surfaces; tooth No. 4 has two amalgam fillings on the lingual surface. Do not record dentures in the Restorations block.

i. Abnormalities. Under the heading "The following conditions will be indicated if present" note any abnormality (para F-23) by placing an X in front of the item. Describe each abnormality under Remarks on the reverse of the form.

j. Prepared By and Verified By Blocks. The Prepared By and Verified By Blocks at the bottom of the form are self-explanatory.

k. Dentures. In the Dentures block on the reverse of the form (fig, F-20), enter None if the decedent has no dentures. If the decedent has dentures, describe them to include the number designations of natural teeth replaced and those which have retaining clasps. Also, include any numbers or letters that appear on the dentures. Typical entries are given in the Dentures block (fig, F-20).

DENTURES (*Plates*): DESCRIBE DENTURES INCLUDING NATURAL TEETH REPLACED AND TEETH WHICH HAVE RETAINING CLASPS. (*For example: Lower Acrylic Partial Denture with Lingual Bar, replacing Teeth nos. 17, 18, 19, 30, 31, 32. Clasps on natural teeth nos. 20 and 29*) SHOW ANY NUMBERS OR LETTERS APPEARING ON DENTURE.

Full upper denture with palatal plate replaces teeth Nos. 1-16.

Fourteen false teeth made of porcelain held in place by acrylic palatal plate.

Bridge replaces tooth No. 31; held in place by 3/4 gold crown on natural teeth Nos. 30 and 32. Artificial tooth made of porcelain and gold.

Removable partial denture replaces teeth Nos. 20, 23, 24, 25, and 26; with artificial teeth made of porcelain and acrylic; held in place by a lingual bar attached by hooks or clasps on natural teeth Nos. 19 and 28. A saddle rests on the occlusal surface on No. 19.

REMARKS (*If no abnormalities are found make notation to that effect*)

Unusual appliance: bridge held in place by 3/4 gold crowns; replaces tooth No. 31.

Tooth No. 23 fractured.

Retained deciduous tooth No. 4.

Tooth No. 5 rotated.

Tooth No. 7 unerupted.

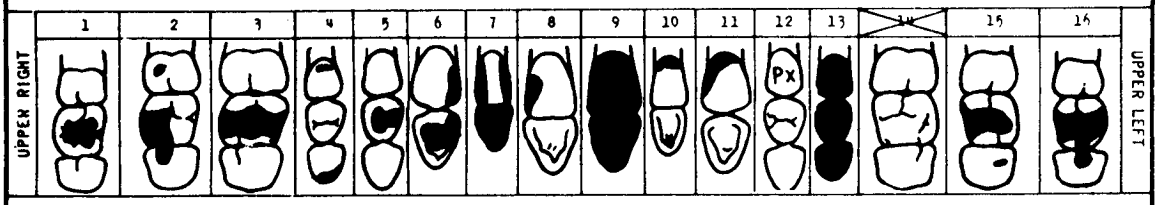
Supernumerary tooth above No. 10.

Teeth Nos. 18-22 irregularly alined.

Tooth No. 29 has gold filling.

Mottled enamel on teeth Nos. 22, 23, and 30.

EXAMPLE METHOD OF PREPARATION



1. O-AM
2. DOL-AM; F-AM
3. MOD GOLD FILL
4. F-GOLD FILL; ML-AM
5. MO-AM
6. ML-GOLD FILL
7. 3/4 GOLD CR
8. O-PORC FILL
9. PORC-CR
10. F-PORC FILL; L-AM
11. MF-PORC FILL
12. PX-POSTHUMOUSLY MISSING
13. GOLD-CR
14. MISSING
15. MO-AM; L-AM
16. MODL-AM

GPO 822337

Figure F-20. DD Form 891 (Record of Identification—Dental Chart) (reverse).
(Figure F-20 is not a continuation of the chart shown in F-19 because

l. Remarks. Under Remarks (fig, F-20), enter None if no abnormalities are present. Otherwise, describe abnormal conditions and note any gold fillings found. If any indication of a disease if found in the decedent's mouth, it should be noted and a medical officer should be called on to identify it.

m. Example Method of Preparation. The block at the bottom on the reverse of the form shown how the caries and restorations diagrams are blacked out and the appropriate abbreviations for them are entered. The three surfaces of each tooth shown are the facial (nearest the tooth number), the occlusal, and the lingual.

APPENDIX G

FINGERPRINTING

G-1. General

Fingerprinting consists of making ink impressions of the papillary ridges on the fingertips for identification purposes. The science of fingerprinting, technically known as dactyloscopy, provides an infallible, scientific means of personal identification. Fingerprints establish a positive and conclusive identification because no two sets of prints are identical, and they never change throughout life from the time they first appear 3 to 4 months before birth. However, it is true that fingerprint characteristics may be altered temporarily. Certain occupations requiring the handling of rough objects or corrosives or keeping the hands wet continually may impair the ridges on the fingers. Also, temporary disfigurement may result from warts, cuts, infections, burns, and diseases, but the ridges assume their original characteristics when the blemish heals, if the lower layer of tissue is not damaged. In addition, a public offender may purposely mutilate one or more fingers to prevent recognition; however, the scars created by this tissue disruption is visible and become a more definite means for his future identification. The legible fingerprints of a deceased person may be the only clue to his correct identity. In a combat area, there may be only one opportunity to fingerprint a decedent because of the tactical situation or decomposition. Clear, complete finger impressions are required to enable the FBI to match the prints with those they have on record. The prints should be black and sharp in appearance and have easily traced lines.

G-2. Finger Bulb

A finger impression or fingerprint is made of the bulb or first joint of a finger. Figure G-1 illustrates an overall cross-section view of a finger bulb with its various parts labeled; the remaining illustrations in the paragraph are detailed drawings of the parts. The papillary ridges on the surface of the bulb give a better sense of touch. Sweat glands inside the fingers discharge a fatty substance through the sweat pores onto the ridges. This substance constantly coating the ridges provides a person with a better grip and forms the latent prints left on objects he touches. The epidermis consists of two main layers— the stratum corneum, or outer layer, which covers the surface, and the stratum mucosum, or lower layer, which is just beneath the covering surface.

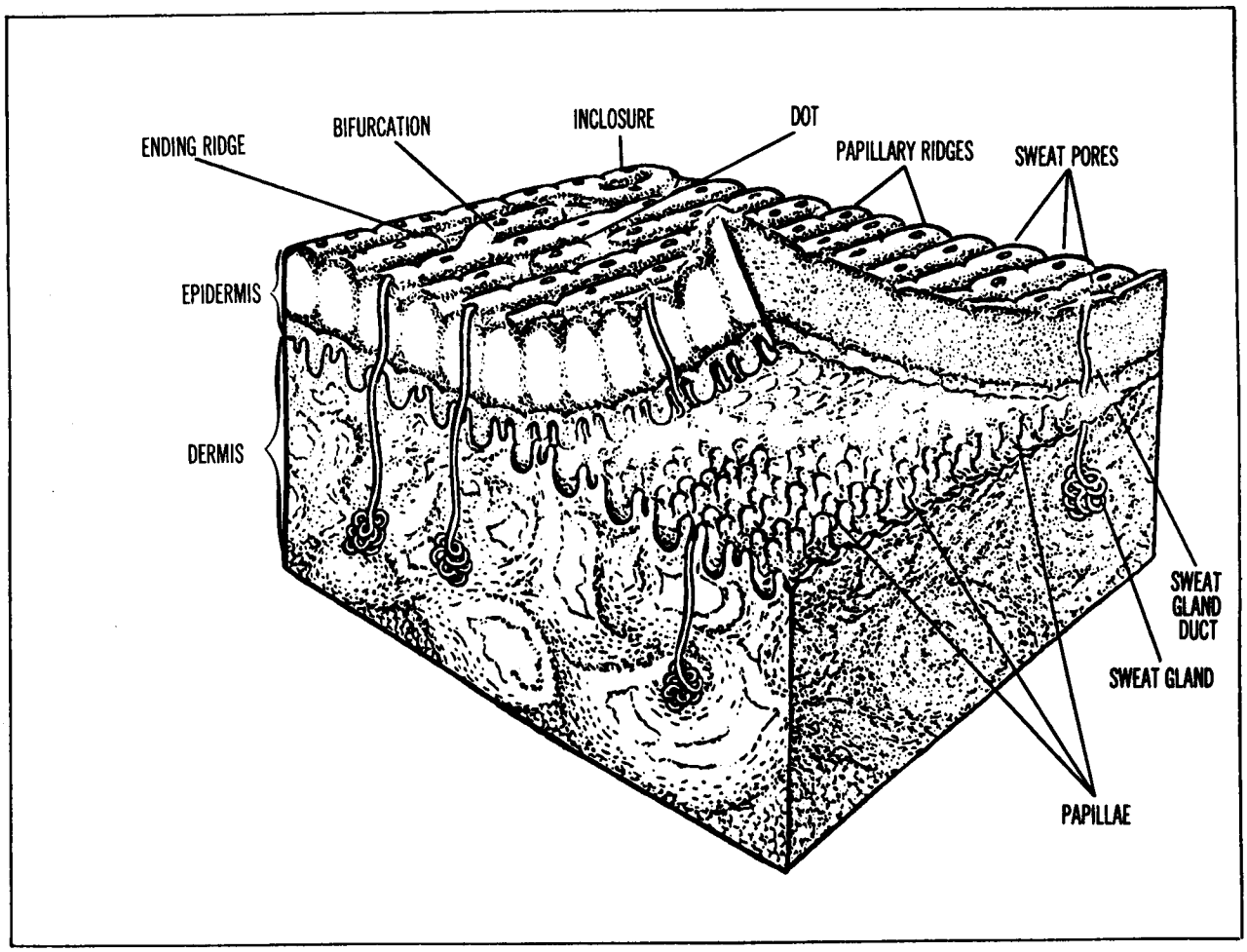
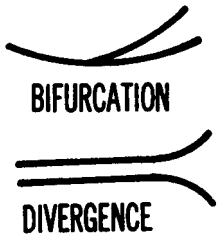


Figure G-1. Cross section of finger bulb.

a. Ridge. The papillary ridges (fig, G-1) on the finger bulb tend to run in parallels and meander around the finger bulb in much the same way as a river winds across a countryside. The combination of the ridges running in parallels and their meandering forms the characteristics that make up individual fingerprint patterns. The ridges have individual characteristics which must be clearly visible when the fingerprints are recorded. The operator must be sure that the fingerprints he takes show characteristics clearly and completely.

(1) *Dot.* A dot (fig G-1) is that portion of a ridge that surrounds one sweat pore.

(2) *Bifurcation.* A bifurcation is the forking or dividing of one line into two or more branches. Figure G-2 illustrates a bifurcation (A) and a divergence (B).



A. Bifurcation
B. Divergence

Figure G-2. Bifurcation and divergence.

(3) *Divergence.* A divergence (B. fig G-2) is the spreading apart of two ridges which have been running parallel or nearly parallel.

(4) *Enclosure.* An enclosure (fig G-3) is a ridge that separates and rejoins. An enclosure may also be referred to as an island.



Figure G-3. Enclosure.

(5) *Bridge.* A bridge (fig G-4) is a fragmentary ridge that joins two parallel ridges diagonally.

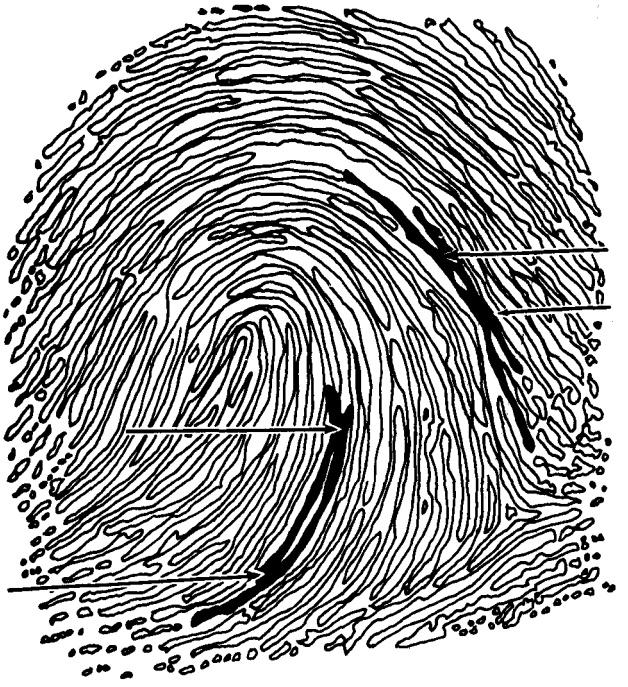


Figure G-4. Bridge.

(6) *Ending ridge.* An ending ridge (fig G-5) is one that runs for either a short or long distance and then discontinues.



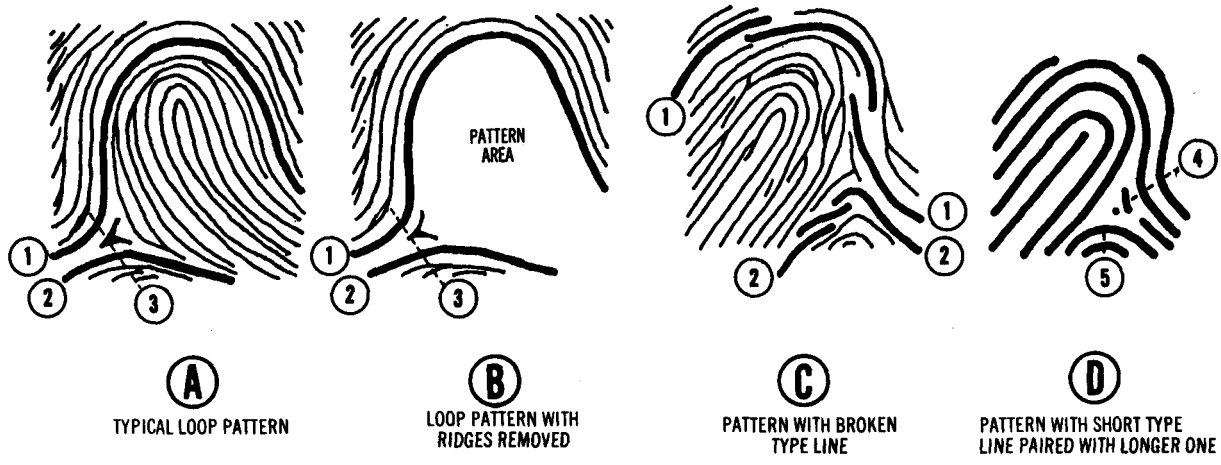
Figure G-5. Ending ridge.

(7) *Hook or spur.* A hook or spur (fig G-6) is a short curved ridge attached to another ridge.



Figure G-6. Hook or spur.

b. Pattern Area and Type Lines. The pattern area and the type lines (fig G-7) are closely related. The pattern area is the only part of the finger impression with which the fingerprint classifier is concerned. All fingerprint patterns have a pattern area, but in many plain and tented arches it is impossible to define. However, for classification purposes, the loop and the whorls are the only patterns for which the pattern areas need to be defined. In the pattern areas of the loops and whorls appear the cores, deltas, and ridges used in classifying prints. The pattern areas of the loops and whorls are included by type lines. These are the two innermost ridges which start parallel, then diverge, and surround or tend to surround the pattern area. In the typical loop shown in A of figure G-7, points 1 and 2 indicate the beginning of the type lines. They start parallel, diverge at point 3, and surround the pattern area. In B, all the ridges in the pattern area are eliminated to give the reader a clear-cut outline of the pattern area. Type lines are not always two continuous ridges; they are more often broken, Where there is a definite break in a type line, the ridge immediately outside of it is considered as the continuation of the type line, as the emphasized ridges in C show. Sometimes type lines may be very short, and care must be exercised in locating them. In D, a very short type line, 4, is paired with a longer one, 5. A distinction must be made between a divergence and a bifurcation.



A. Typical loop pattern
B. Loop pattern with ridges removed
C. Pattern with broken type line
D. Pattern with short type line paired with longer one

Figure G-7. Pattern area and type lines.

c. Focal Points. The focal points—Delta and core, as shown in figure G-8, are within the pattern areas of the loops and whorls.

(1) *Delta.* The delta is that point on a ridge at or in front of and nearest the center of the divergence of the type lines; that is, the delta is the first obstruction at the point of divergence. It may be a bifurcation, an abrupt ending ridge, a dot, a short ridge, a meeting of two ridges, or a point of the first recurving ridge located nearest to the center and in front of the divergence of the type lines. Perhaps the idea of the delta can be made clearer if Webster's definition is used: "Delta is the name of the fourth letter of the Greek alphabet. . . The Greeks called the alluvial deposit at the mouth of the Nile, from its shape, the Delta of the Nile." The greek letter "delta" is triangular (Δ); and an alluvial deposit is composed of the clay, sand, silt, gravel, and similar materials that wash up from running water to form a shoal. There is a similarity between the use of the word "delta" in physical geography and in fingerprints. The island formed in front of the diverging sides of the banks where the stream empties at its mouth corresponds to the delta in fingerprints. The delta of physical geography is illustrated in A of figure G-8. In B, the dot marked "delta" is considered the delta of the fingerprint because it is the first ridge or part of a ridge nearest the point of divergence of the two type lines. If the dot were not present, point B on ridge C would be considered the delta. This would be equally true whether the ridge were connected with one of the type lines, both type lines, or disconnected altogether. With the dot as the delta, the ridge count starts with ridge C. If the dot were not present, point B on ridge C would be considered the delta and the first ridge counted would be D. The lines X – X and Y – Y are the type lines, not X–A and Y–Z.

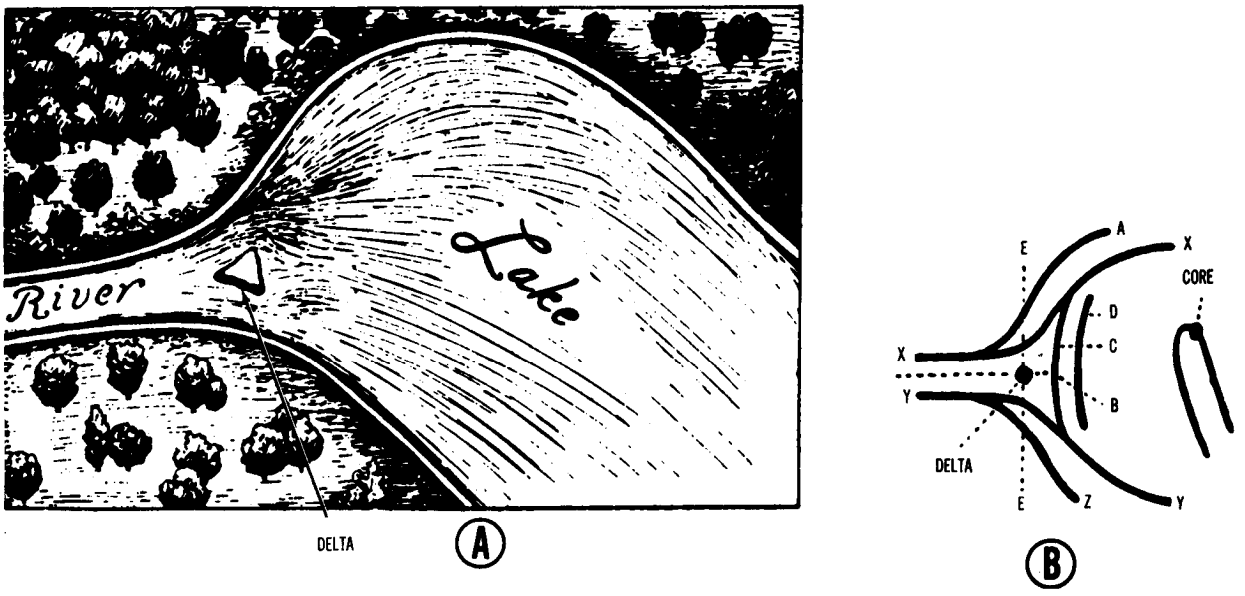


Figure G-8. Focal points: delta and core.

(2) *Core.* The core is the approximate center of the finger impression. It is located within the innermost looping ridge in the pattern area. Usually, the core is an ending ridge; however, when there is no ending ridge, the next ridge in the center *away* from the delta becomes the core. Diagrams of finger impressions with delta and core indicated are illustrated in figure G-9.

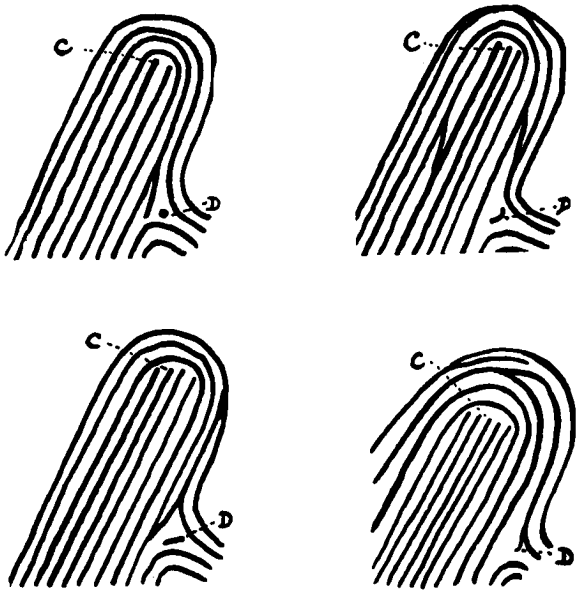


Figure G-9. Diagrams of finger impressions with delta (D) and core (C) indicated.

d. Ridge Count. The number of ridges intervening between the delta and the core is known as the ridge count. Each ridge which crosses or touches an imaginary line drawn from the delta to the core is counted; however, neither delta nor core is counted. In the event there is a bifurcation of a ridge exactly at the point where the imaginary line would be drawn, two ridges are counted. Where the line crosses an island, both sides are counted. Fragments and dots are counted as ridges only if they appear to be as thick and heavy as the other ridges in the immediate pattern. Variations in inking and pressure most be taken into consideration. Figure G-10 shows 12 examples of finger impressions with their ridge counts. Figure G-11 shows the type of ridges encountered in counting loop patterns.

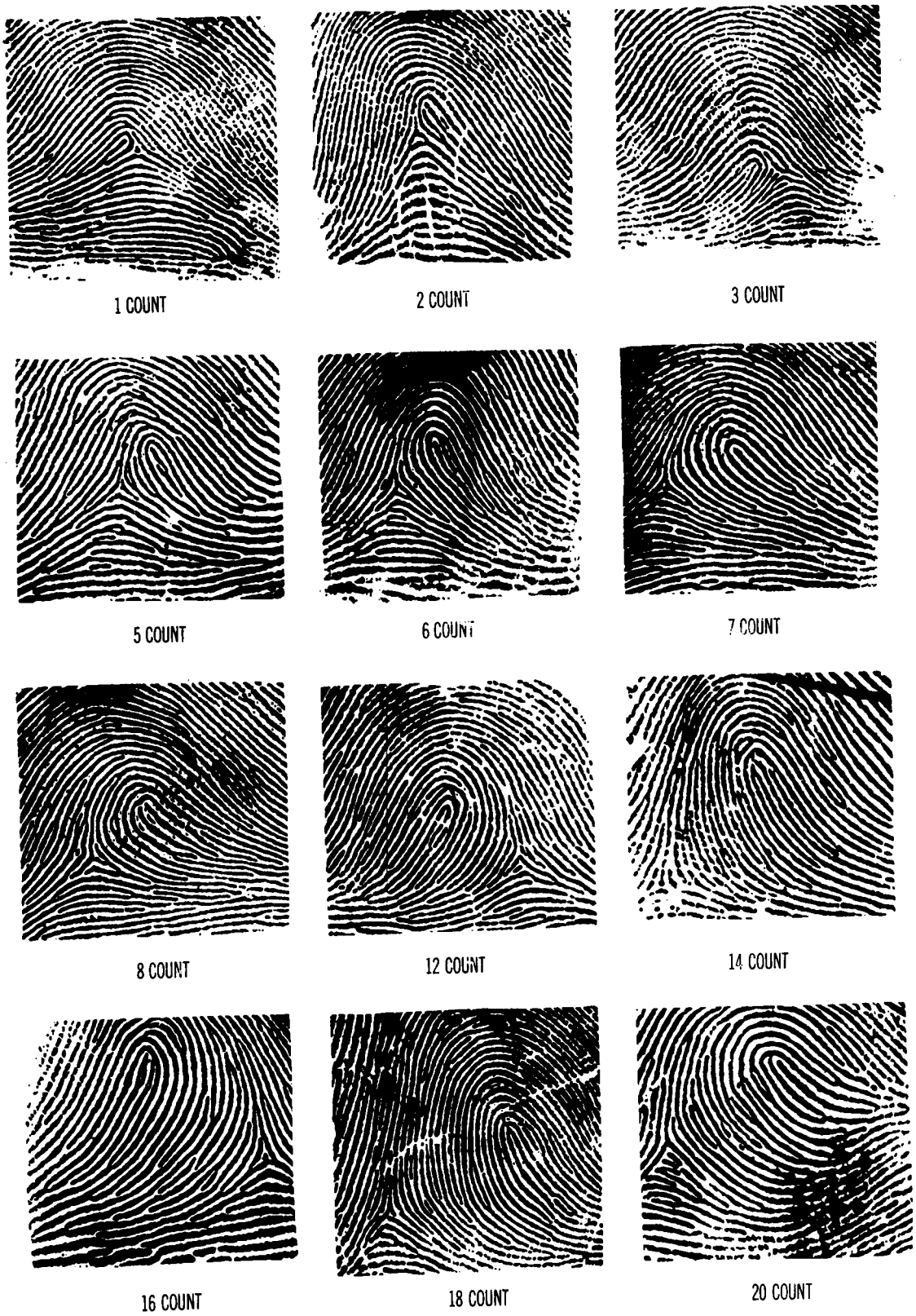


Figure G-10. Finger impressions with their ridge counts.

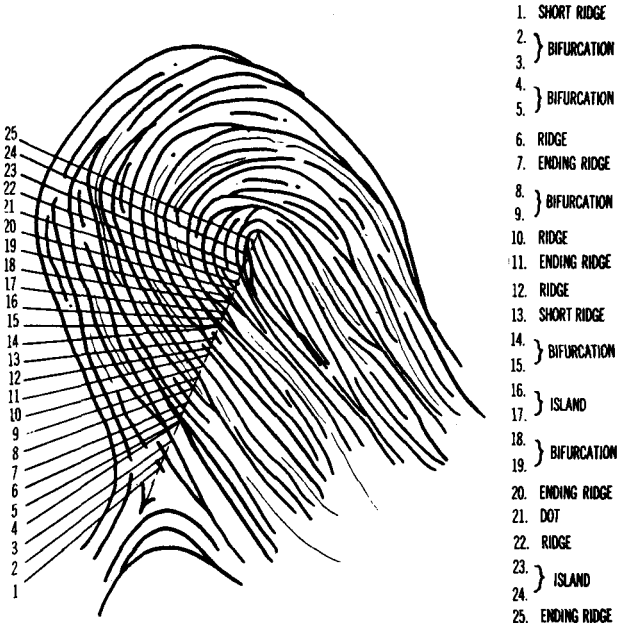


Figure G-11. Types of ridges encountered in counting loop patterns.

G-3. Fingerprint Patterns

Fingerprint identification is based on two established facts: the ridge arrangement on every finger of every person is different, and the ridge arrangement remains constant throughout a person's life. In 1900, Sir Edward Richard Henry introduced a sample, comprehensive method for filing and classifying prints. It is still used today in nearly all English-speaking countries. According to the modified Henry system used in the United States all inked finger impressions are divided into three large general groups of patterns which have eight subdivisions: *arch* —plain and tented: *loop* – radial and ulnar: and *whorl* – plain, central pocket loop, double loop, and accidental.

Classification and identification are two distinct concepts which have only a casual connection with one another. Classification provides a means for filing and searching large files of fingerprint records. Identification is based upon individual ridge characteristics and their relationship one to another. Accordingly positive identification may be established with partial of fragmentary impressions lacking pattern type essentials required for classification.

The descriptions that follow are provided to give sufficient familiarity with the fingerprint patterns and a working knowledge of the classification procedures so that the reader will be able to tell the difference between the basic patterns.

a. Plain Arch. In the plain arch pattern (fig G-12), the ridges enter from one side of the pattern area, rise noticeably in the center of the pattern area, drop back down, and exit the opposite side of the pattern area. This pattern is the simplest of all the fingerprint patterns and the easiest to identify. In the plain arch pattern shown in figure G-12, it may be noted that there may be various ridge formations, such as ending ridges, bifurcations, dots, and islands involved in this pattern, but all formations tend to follow the general ridge countour.



Figure G-12. Plain arch pattern.

b. Tented Arch. The tented arch pattern is characterized by ridges entering from one side of the pattern area, thrusting upward in the center, dropping down, and then exiting the other side. The thrusted ridges appear as though they are arranged around a spine or axis. In the tented arch pattern, there may be a core and a delta but no ridge count can be made. Tented arch patterns are divided into three distinct types:

(1) The type in which ridges at the center from a definite angle of 90° or less (fig G-13).



Figure G-13. Tented arch patterns, type with an angle.

(2) The type in which one or more ridges at the center form an upthrust (fig G-14). An upthrust is an ending ridge of any length rising at a sufficient degree from the horizontal plane, that is, 45^0 or more.



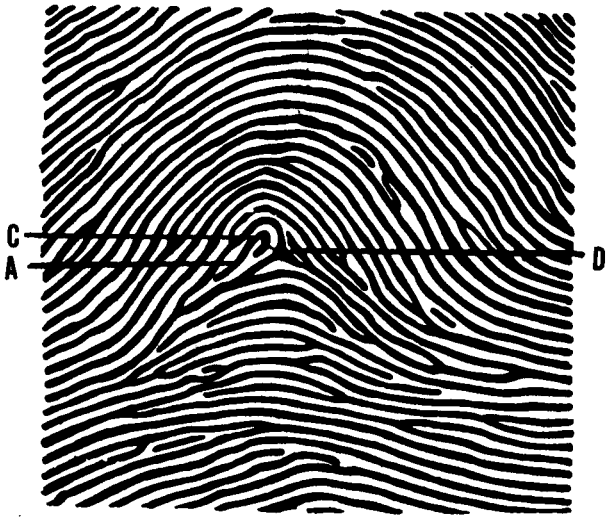
Figure G-14. Tented arch patterns, type with an upthrust.

(3) The type which resembles the loop pattern (fig G-15). This type has two of the basic or essential characteristics of the loop but lacks the third.



Figure G-15. Tented arch patterns, type resembling the loop.

c. Loop. The loop pattern is the most numerous of all; about 65 percent of all prints have loop patterns. In the loop pattern, one or more of the ridges enter from one side of the pattern area at the bottom, run toward the top of the pattern area, recurve, drop down, and exit the same side of the pattern area that they entered. Two examples of the loop pattern are shown in figure G-16 on which the delta (D) and the core (C) are indicated; other examples are shown in figure G-10. In a fingerprint, as well as in the usual use of the word "loop," there cannot be a loop unless there is a recurve of one or more of the ridges. A recurring ridge is labeled A in figure G-16. However, a fingerprint pattern must have three essentials before it can be properly classified as a loop: a delta, a ridge count across a loop ridge, and a sufficient recurve. The latter is defined as that part of a recurving ridge between the shoulders of a loop. The loop must be free of any appendages that are at right angles to the outside of the recurve. Figure G-17 shows appendages as they sometimes appear with the recurve totally destroyed. The two subdivisions of the loop pattern are ulnar and radial. The terms are derived from the radius and ulna bones of the forearm. A loop which flows in the direction of the ulna bone (toward the little finger) is called an ulnar loop, and one which flows in the direction of the radius bone is called a radial loop. The direction of the loop is judged by the way it flows on the hand.



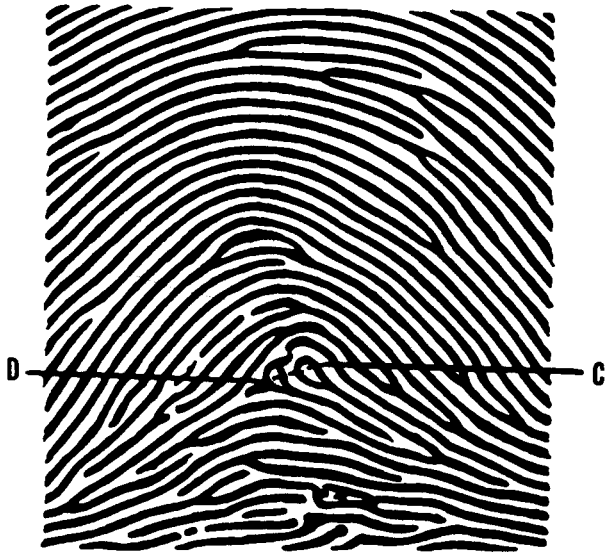


Figure G-16. Loop patterns.

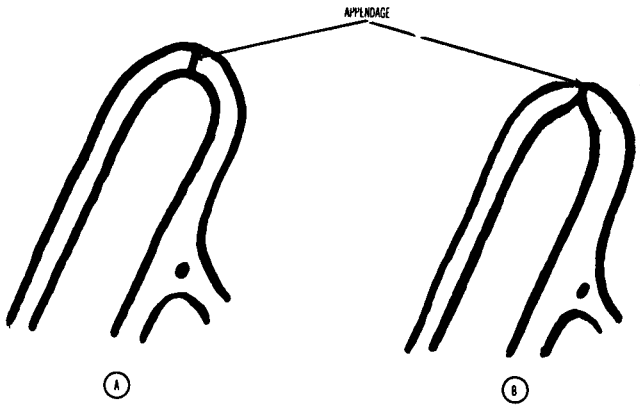


Figure G-17. Appendages.

d. Plain Whorl. The plain whorl (fig G-18) has two deltas and at least one ridge making a complete circuit. The circuit may be spiral, oval, circular, or any variant of a circle. In the plain whorl pattern, an imaginary line drawn between the two deltas must touch or cross at least one of the recurving ridges within the inner pattern area. However, a recurving ridge that has an appendage connected with it in the line of flow cannot be considered a circuit. Such an appendage spoils the recurve on that side.



Figure G-18. Plain whorl.

e. Central Pocket Loop Whorl. The central pocket loop whorl has two deltas and at least one ridge, making a complete circuit. The circuit may be spiral, oval, circular, or any variant of a circle (fig G-19). An imaginary line drawn between the two deltas must not touch or cross any recurving ridge within the inner pattern area. The inner line of flow is determined by drawing an imaginary line between the inner delta and the center of the innermost recurve or looping ridge.



Figure G-19. Central pocket loop whorl pattern.

f. Double Loop Whorl. The double loop whorl (fig G-20) consists of two loop formations, with two sets of shoulders and two deltas. The two loops may be connected by an appending ridge if it does not touch at right angles between the shoulders of the loop formation. An appendage which touches a loop at right angles between the shoulders is considered to spoil the loop; and appendage which flows off smoothly is considered to leave the recurve intact.

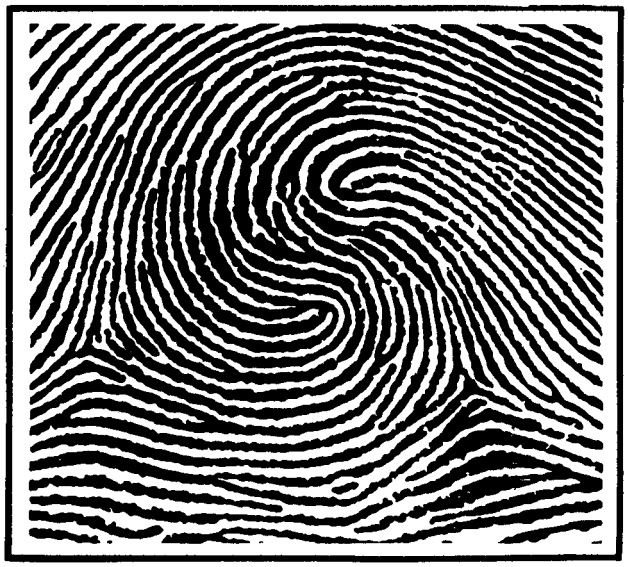


Figure G-20. Double loop whorl pattern.

g. Accidental Whorl. The accidental whorl pattern (fig G-21) may be a combination of two different types of patterns, with the exception of the plain arch, with two or more deltas: it may be a pattern which has some of the requirements for two or more different types; or it may be a pattern which conforms to none of the pattern definitions.



Figure G-21. Accidental whorl pattern.

G-4. Fingerprinting Procedures

a. General. Necrodactylography, a scientific study of identifying remains through fingerprints, includes the restoration of the fingers of a remains by using physical or chemical techniques to get identifiable prints. Prints taken soon after death give the best results. If they cannot be taken within a reasonable time after death or before the remains arrive at the final processing point, each finger should be injected with embalming fluid to retard decomposition so that impressions may be taken later. Fingerprints of all digits of each hand must be taken at the cemetery regardless of other identifying media, including any previously recorded fingerprints.

b. Fingerprint Kit. In fingerprinting deceased persons, the fingerprint identification kit: taking directly from fingers (fig G-22), is used, and the prints are recorded on DD Form 894 (Record of Identification Processing– Fingerprint Chart). The fingerprint kit contains a carrying case, a cleaning fluid container, black printer's ink, a spoon-or shovel-type cardholder, a tabletop cardholder, an inking slab or plate, and an inking roller. Also included is a dental examining mirror used to examine teeth for charting.

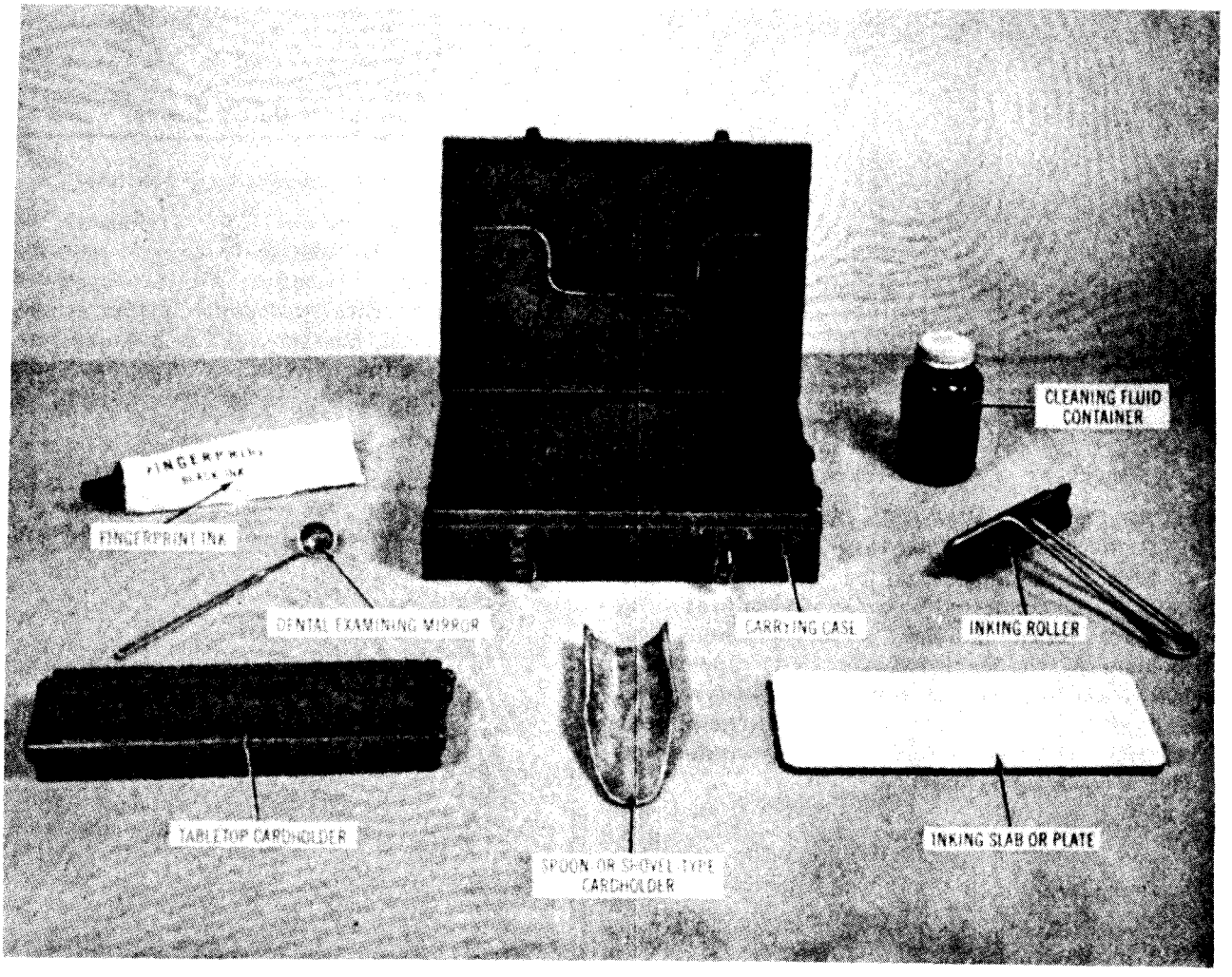


Figure G-22. Fingerprint identification kit: taking directly from fingers.

c. Fingerprinting the Newly Dead. When the fingers are flexible, it is often possible to obtain finger impressions of a newly deceased person by using the regular inking process. Successful prints can be obtained with the decedent lying on his back with hands turned palm down by his sides. If it is difficult to get fingerprints by the tabletop cardholder method described in (1) through (5) below, the 10 squares numbered for rolled impressions may be cut from DD Form 894 and used,

After the finger is inked, the square is rolled around the finger without letting it slip. Extreme caution should be exercised to be sure that each square bears the correct finger impression. After all fingers are recorded, the 10 squares bearing the impressions are pasted or stapled to the DD Form 894 in their proper positions. In some cases, a broad-bladed putty knife or a spatuala may be used as an inking instrument. The ink is rolled evenly and thinly on the tool and applied to the finger by passing the tool around it. The tool replaces the inking slab or plate which may be extremely difficult or awkward to use when printing a deceased person. Other procedures to be used are as follows:

(1) Check the decedent's hands to make sure they are clean and printable and to make note of scars and other marks.

(2) Check the fingerprinting equipment to make sure that it is usable and clean.

(3) Prepare fingerprint chart (DD Form 894). Fill in information in heading as explained in paragraph G6. Fold and place fingerprint chart in tabletop cardholder (fig G-23) as described in steps 1 and 2 below:

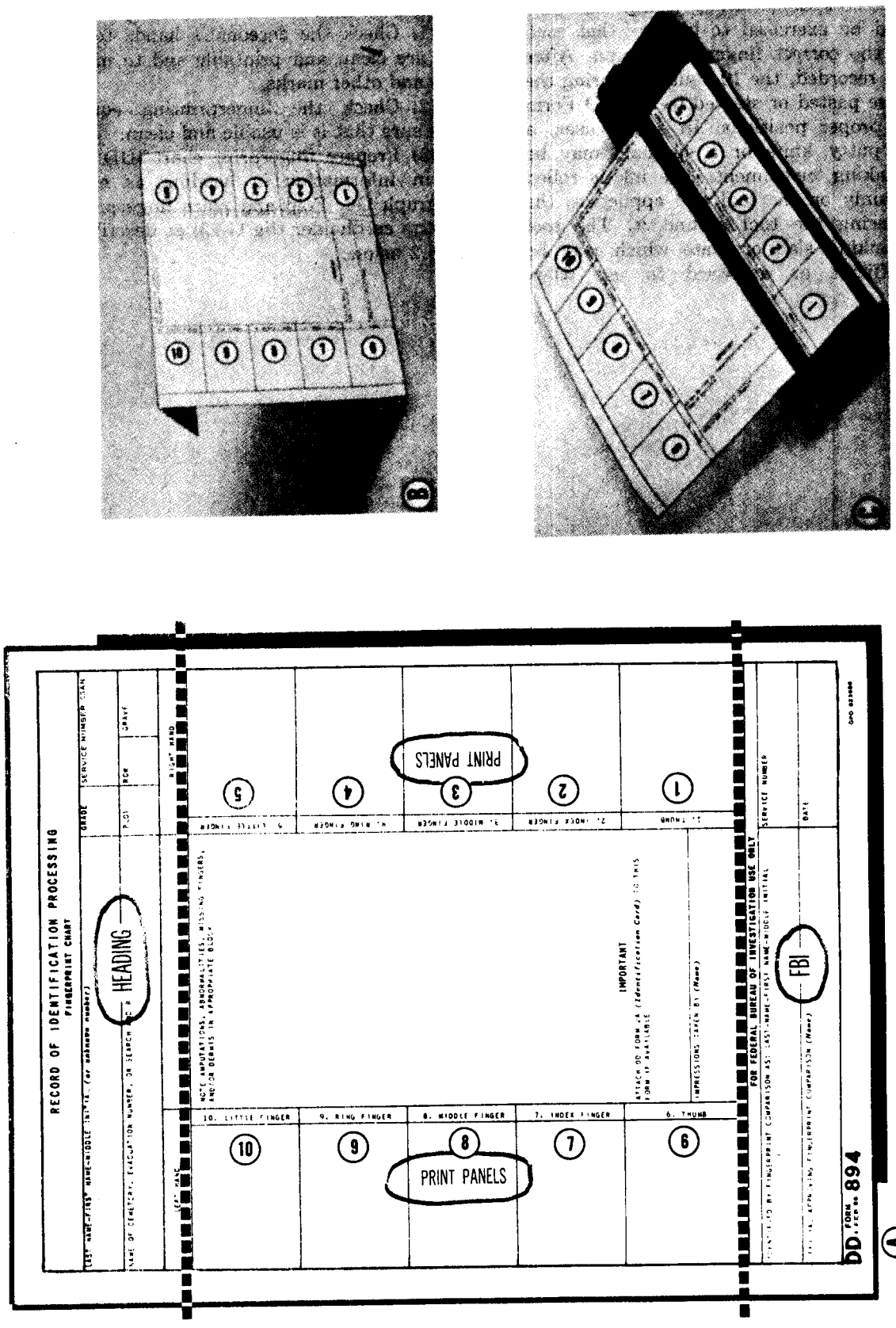


Figure G-23. Folding and placing fingerprint chart in tabletop cardholder.

(a) *Step 1.* Fold DD Form 894 horizontally below the Heading block and above the FBI block (A). All that should be showing are the print panels and the Information block in the center (B).

(b) *Step 2.* Lift the bar on the cardholder and slide the folded form forward under the bar until blocks 1 through 5 are positioned at the front of the cardholder (C). Press down on the bar until the form is secured in the holder. After the impressions have been made in blocks 1 through 5, remove the folded form and reverse the position of the card so that finger impressions can be recorded in blocks 6 through 10. Note that in the cardholder the order of the blocks, left to right, is 10 through 6.

(4) Apply a dab of ink to the inking plate and spread thoroughly with the roller until a very thin, even layer covers the entire surface.

(a) Too much ink. If there is too much ink on the plate, a wave effect is noticeable and the ink has a high gloss. Use the roller to remove excess ink, rolling it off onto clean bond paper.

(b) *Too little ink.* If there is too little ink, the ink is irregularly distributed and light spots appear on the plate. If this occurs, clean off the plate and start over. If more ink is added before cleaning the plate, the prints come out with a two-tone effect and blurred ridges.

(5) Apply ink to the fingers (A, fig G-24), one at a time, from the inking plate. Place the side of one finger bulb on the inking plate and roll it to the other side away from your body until the finger faces the opposite direction. Make sure the bulb is inked evenly from the tip to below the first joint. Press the finger lightly on the card and roll in exactly the same manner in which it was inked (B). In inking and printing the thumb, roll it away from your body. Make finger impressions in the same order in which they are called for on the print panels, beginning with the thumb.

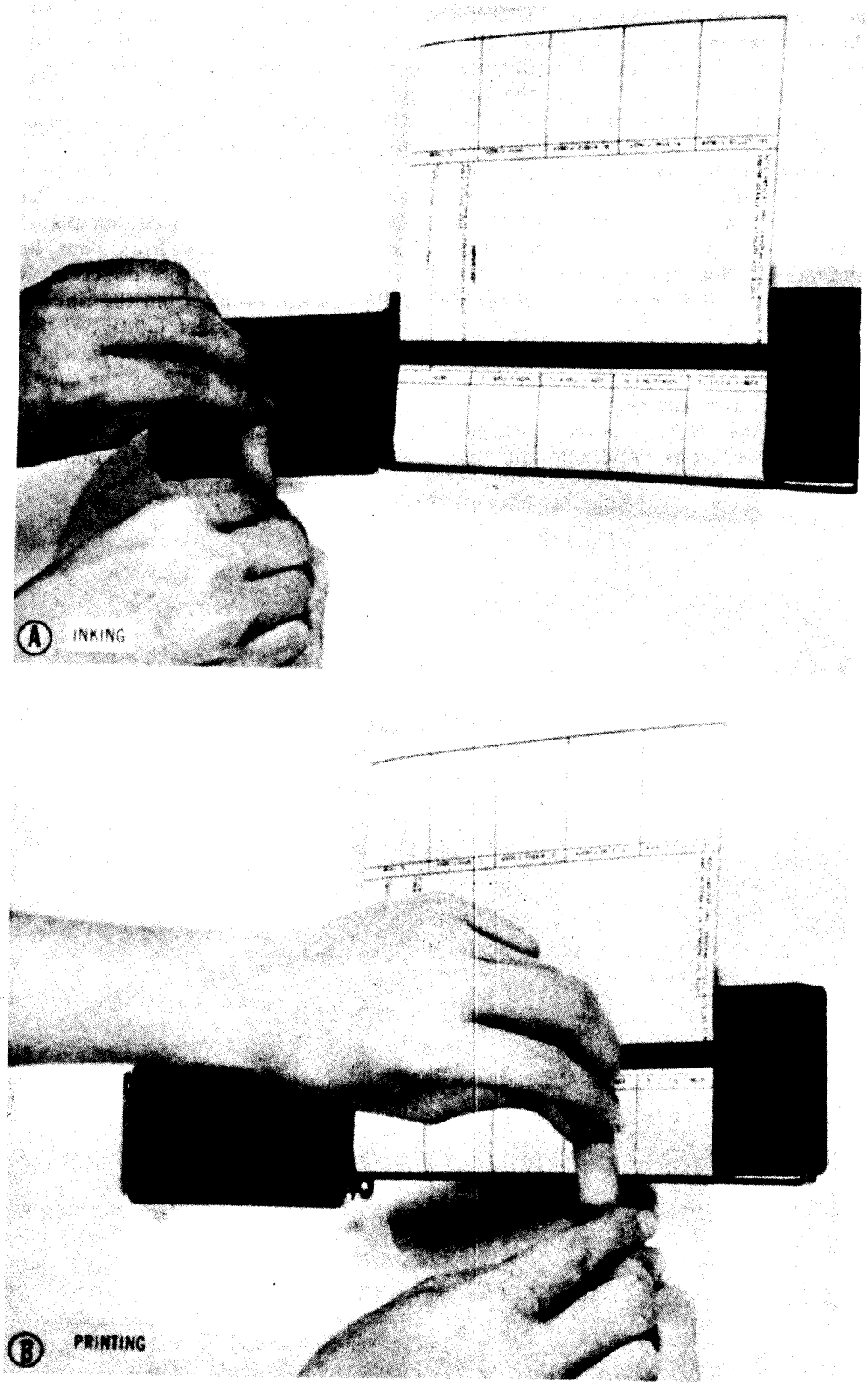


Figure G-24. Inking finger and printing rolled impression.

d. Fingerprinting Remains With Stiff Fingers and Signs of Early Decomposition. The second group of remains consists of those with the hands clenched, the fingertips wrinkled, or decomposition beginning. Also a combination of these conditions may be present. Such cases may necessitate cutting off the skin.

(1) *Stiffening muscles.* When the muscles have stiffened, that is, rigor mortis has set in and the fingers are tightly clenched, the fingers may be forcibly straightened by "breaking the rigor" (fig G-25). The operator firmly holds the hand of the deceased, grasps the stiffened finger to be straightened, places his thumb to serve as a lever on the knuckle of the stiffened finger, and forces it straight. Methods used to take fingerprints under these conditions are given below:

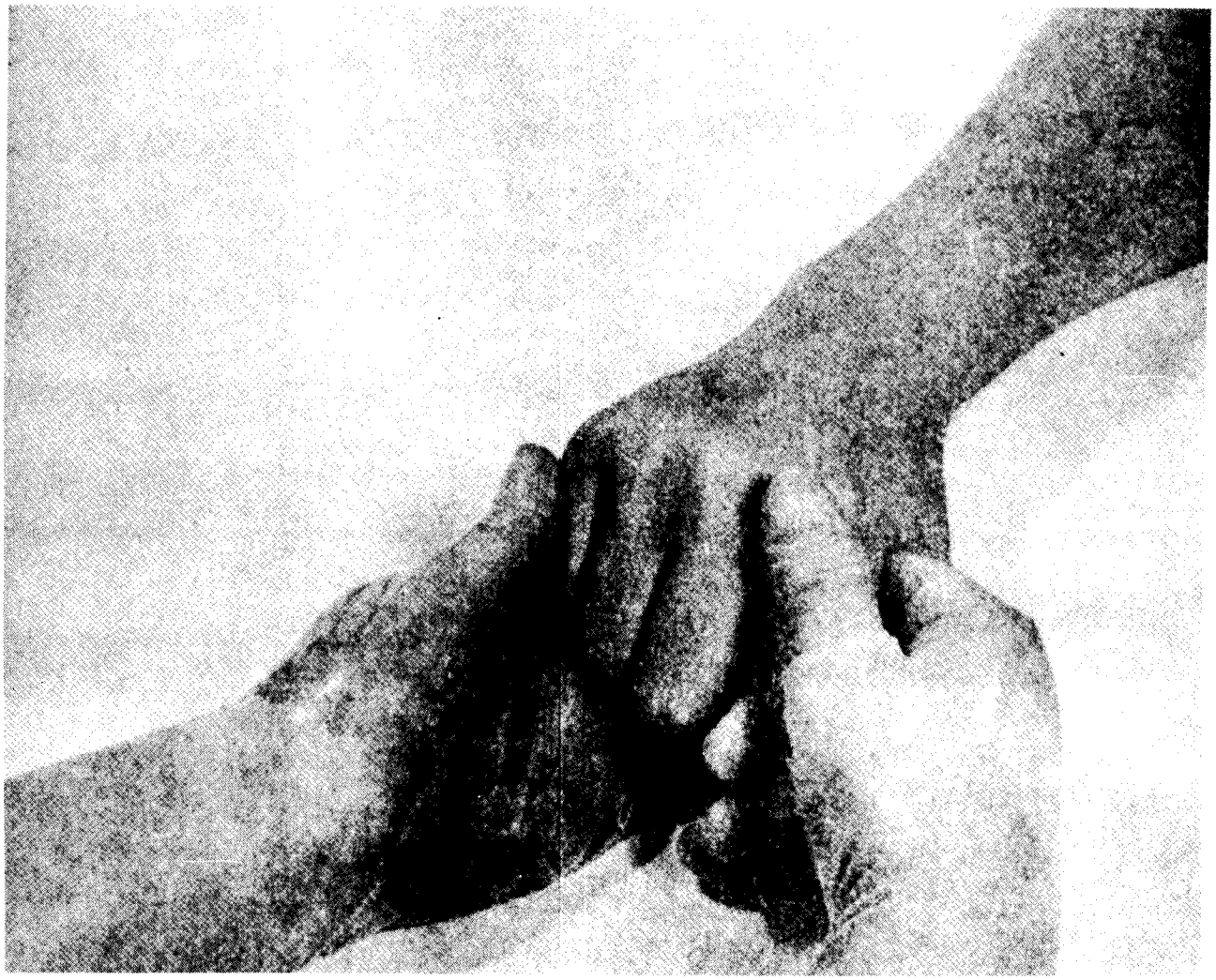


Figure G-25. Breaking the rigor.

(a) Spoon- or shovel-type cardholder. If the rigor cannot be completely overcome, the spoon- or shovel-type cardholder is used to make finger impressions (fig. G-26). The operator places in the cardholder a folded DD Form 894 or an individual square cut from the form. Use of the shovel eliminates having to roll the deceased's finger. The hollow in the cardholder and the gentle pressure applied to the inked finger when brought in contact with the square results in a rolled impression without actually rolling the finger. The fingerprint chart is folded and placed in the shovel-type cardholder as shown in figure G-27 and described below:

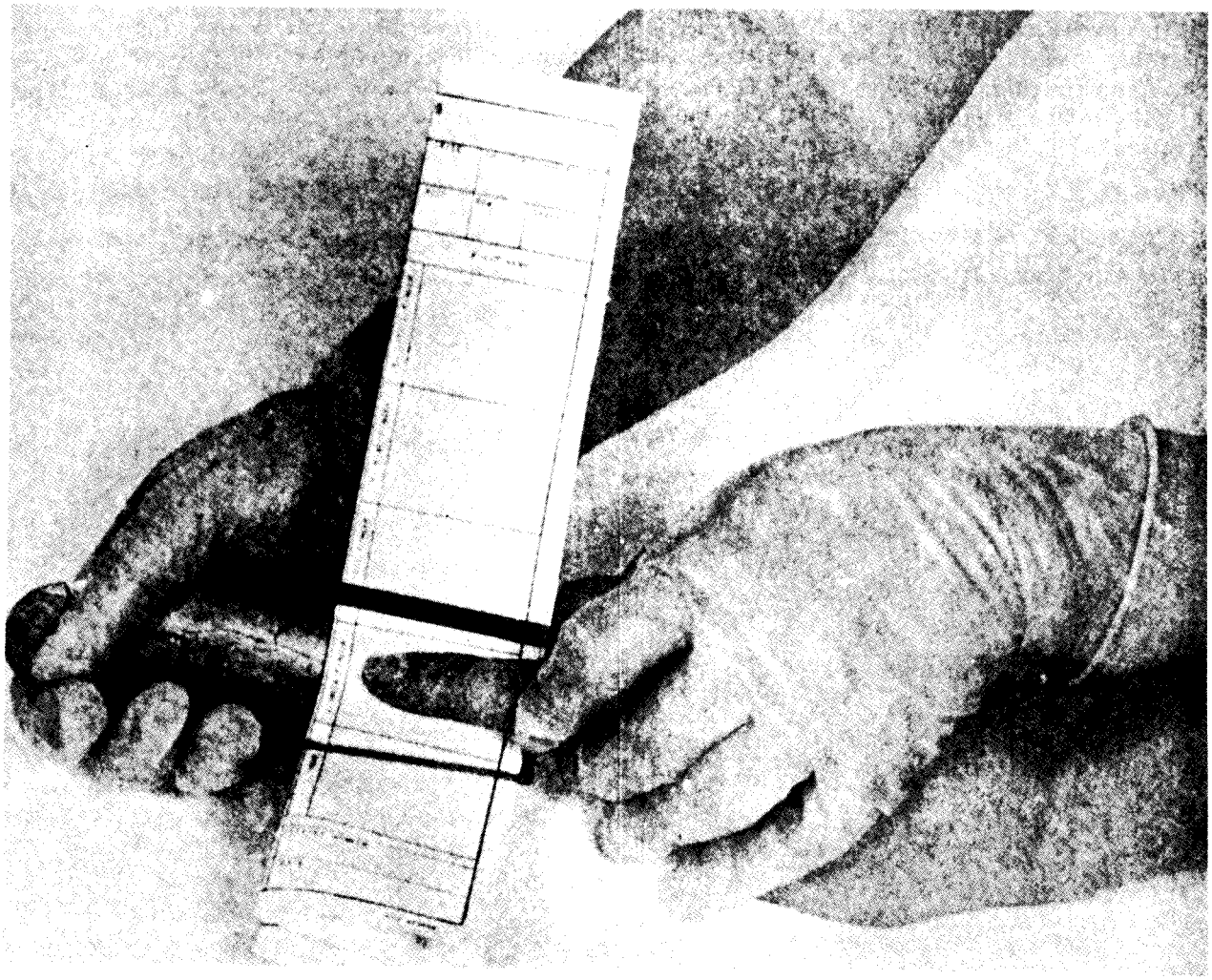


Figure G-26. Using the shovel-type cardholder.

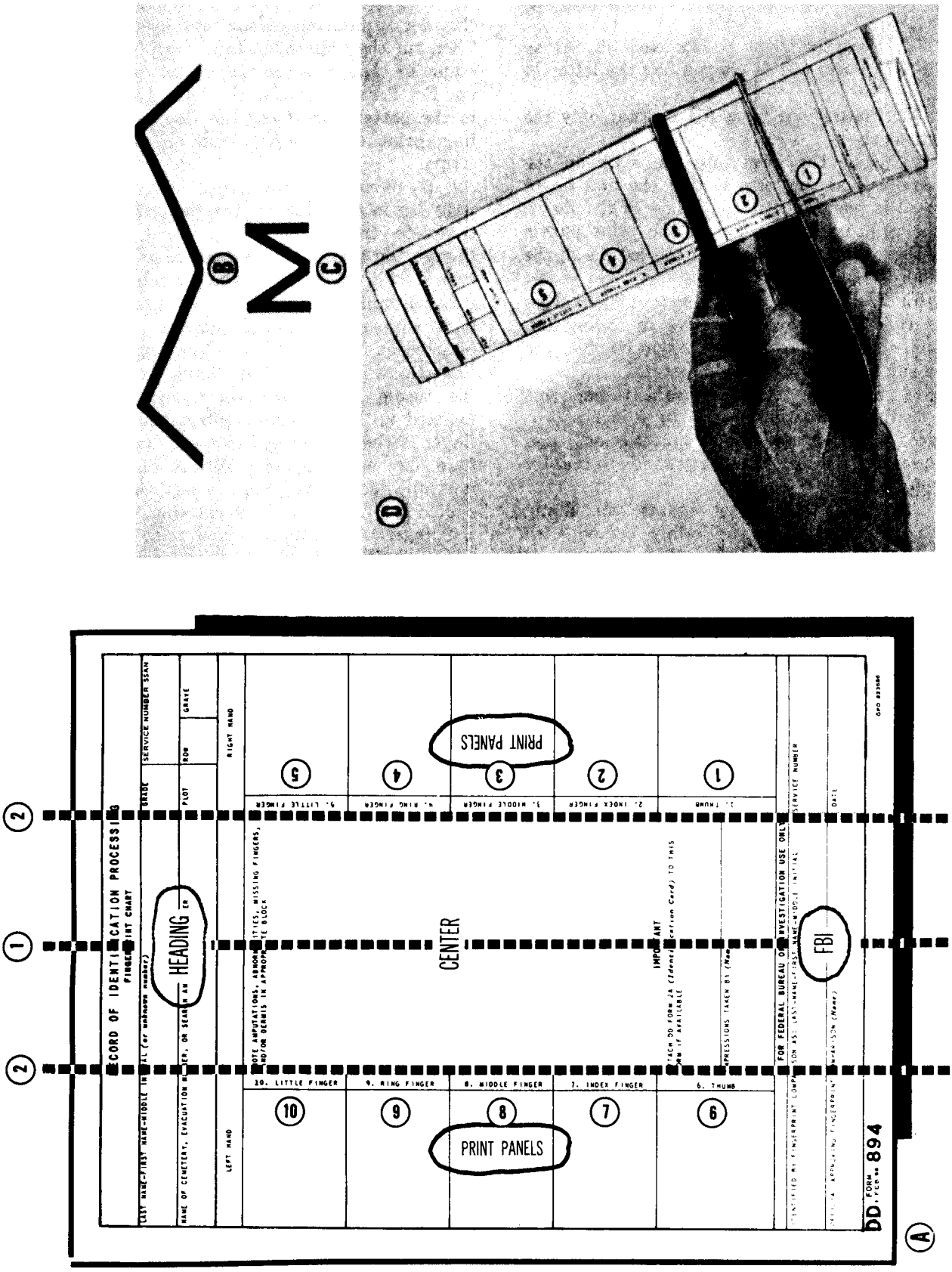


Figure G-27. Folding and placing fingerprint chart in shovel-type cardholder.

1. Fold DD Form 894 lengthwise in the center (1, A).

2. Fold the print panels back (2, A) so that the DD Form 894 is shaped like the letter M (B).

3. Flatten the form (C) so that only the print panels show.

4. Slide the form into the slots on the shovel and adjust the form so that the first finger block used is positioned in the hollow of the shovel with the printing at the top of the print panels toward the operator as he holds the handle of the cardholder (D).

(b) *Transparent plastic material.* Another method that has proved effective in taking impressions when rigor mortis has set in involves the use of a soft transparent plastic material.

1. Select a strip of soft transparent plastic that is approximately 1 ½ by 5 inches; free of bulges, wrinkles, and other imperfections; and of a quality similar to that used in candy packaging.

2. Press the plastic against an inking plate that is lightly but uniformly coated with fingerprint ink. Make sure that the center of the plastic strip is in contact with the inked area of the plate and that the ink is transferred evenly in the middle of the strip.

3. Grasp the plastic strip by both ends, slip it around the finger to be printed, and gently apply uniform pressure to both ends to distribute a light coating of ink over the entire pattern area. Call on an assistant if needed to help steady the hand as the impression is being taken.

4. Record the finger impression by slipping an uninked plastic strip around the finger. Then cut the impression from the plastic strip and staple or tape it to the fingerprint card, inked side up. For fingers with faintly defined ridge structure in the pattern area, roll the fingers directly on a fingerprint chart rather than on uninked plastic strips.

(2) *Wrinkled fingertips.* The presence of wrinkles in the skin on the fingertip can prevent complete impressions from being taken, even though the tips of the fingers are fairly pliable and intact. This condition can be corrected by injecting a tissue builder, glycerin, or water into the finger bulb with a hypodermic syringe. The needle is inserted at the first joint of the finger up into the fingertip (fig. G-28). Care must be used to keep the needle below the skin surface. The fluid is injected until the finger bulb is rounded out. The finger is then inked and printed. Occasionally, the fluid may not completely fill the finger bulb when it is injected at the joint. In such cases, the fluid should be injected at the extreme tip or sides of the finger until suitable results are obtained. The tissue builder hardens shortly after insertion whereas the glycerin or water may seep out when pressure is applied during printing. Seepage through the point where the fluid was injected may be prevented by tying a piece of string around the finger just above this point. When the tissue builder is used, care should be exercised to clean the syringe and needle thoroughly because the tissue builder will harden in the instruments.



Figure G-28. Injecting finger with embalming fluid.

(3) *Peeling skin.* Decomposition in its early stages is present when the outer layer of skin has begun to peel from the fingers. If the skin is in one piece, prints should be made if possible as though the skin were attached to the finger. It may be better, however, to peel the skin off in one piece, place it over the finger of the operator, and ink and print it as though it were his own finger. If the first layer of skin is missing, a print of the second layer should be made, using the same techniques described above. Since the ridge detail on the second layer is not as distinct, more attention and care is needed to get good impressions.

e. *Fingerprinting Badly Decomposed Remains.* Fingerprinting badly decomposed remains presents difficulties not encountered in fingerprinting remains where the flesh is fairly firm and the ridge detail intact. The technique of treating the fingers when they are in various states of decay depends upon the condition of the fingers with respect to decomposition, desiccation, or maceration. When a remains is badly decomposed, the hands should be examined initially to see if all the fingers are present. If some are missing, it should be determined whether they were amputated during the person's lifetime or whether they were destroyed by animal or marine life or combat. The results of the examination should be noted on the fingerprint card. Dirt, silt, grease, and other foreign matter on the fingers should be removed during this initial examination. Soap and water or xylene, a chemical, can be used as a cleaning agent. Xylene readily cleans grease and fatty matter from the fingers. A soft-bristled toothbrush may be used on fairly firm skin; a cotton swab should be used on less firm skin. After the fingers are cleaned, a further examination is made to determine their condition, based upon the circumstances in which the body was found. There are three general types of conditions: decomposition or putrefaction, prevalent in bodies found in brush or buried in earth; desiccation or mummification (dried out), noted in bodies found in the open (ridge detail of finger bulbs not in contact with the ground), those found in protected places, or bodies subjected to severe heat or burning; and maceration (water soaking), resulting ordinarily from bodies being

immersed in water. The degree of decomposition, desiccation, or maceration varies from a comparatively early to an extremely advanced stage. Each remains must be considered individually. The technique used to fingerprint one badly desiccated remains, for example, may not be the right technique for another. The techniques described here have been used successfully.

(1) *Preliminary problems.* When a body is found, the hands usually are tightly clenched. The first problem is to straighten the fingers to determine if there is any ridge detail. If desiccation of the hands precludes straightening of the fingers, the difficulty can be overcome by using a scalpel to make a cut at the second joint on the inner side of each of the four fingers (fig. G-29). They can then be straightened by applying force. The thumb, if it is cramped or bent, can generally be straightened by making a deep cut between the thumb and the index finger.



Figure G-29. Making deep cut at second joint to straighten finger.

(2) *Advanced decomposition.* When the remains is in an advanced state of decomposition, the operator is confronted with the problem of dealing with rotted or putrefied flesh which may be soft or flabby and very fragile. Procedures vary according to whether the outer skin is present and intact or whether better prints can be obtained from the underside of the skin or from the second layer of skin. At times, photographing the skin may give better results than fingerprinting.

(a) Fingerprinting outer skin. When the outer skin is present and intact and the ridge detail is

evident, the usual method of inking and printing may be possible. However, the skin may be too soft and fragile to ink and roll in the usual way. When this occurs, either the skin is removed from the finger or the finger is cut off at the second joint. The finger or the skin, whichever is used, is hardened in a 10- to 15-percent solution of formaldehyde for approximately an hour. Skin placed in this solution usually turns a grayish white and becomes firm and pliable. The skin may become brittle, however, and split if not handled carefully. The skin is kept in the solution until it hardens sufficiently for handling. When it is removed from the solution, it is carefully wiped dry with a piece of cloth. Then the skin, placed over the thumb or index finger of the operator and held in place by his other hand, is inked and rolled as though he were printing his own finger. While the finger is soaking in the formaldehyde, the skin may swell and come loose from the finger. Should this occur, the skin must be removed carefully and the procedure outlined above followed. If, however, the skin still adheres to the finger and is not too wrinkled, ink may be applied and prints made. Should the skin be intact but too wrinkled to obtain a satisfactory impression, tissue builder could be injected under the skin to stretch out the pattern area. If this is successful, the finger is inked and printed. When part of the skin has been destroyed to the extent that tissue builder cannot be injected effectively and the pattern area is present but wrinkled, the entire pattern area should be cut off from the first joint to the fingertip (fig. G-30). Care must be exercised to insure that the complete fingerprint pattern is removed, with the cut made deep enough to avoid injury to the skin. Then the flesh is carefully removed from the inside by scraping, cutting, and trimming until only the skin remains, or until the specimen is so thin that it can be flattened out to remove most of the wrinkles. If the skin is fairly pliable, the operator should attempt to place it over one of his own fingers and try several prints. If the prints obtained are not suitable, the piece of skin should be flattened out between two pieces of glass and photographed (fig. G-31). If a legible print is not obtained, the underside of the skin should then be examined.



Figure G-30. Removing pattern area from first joint.

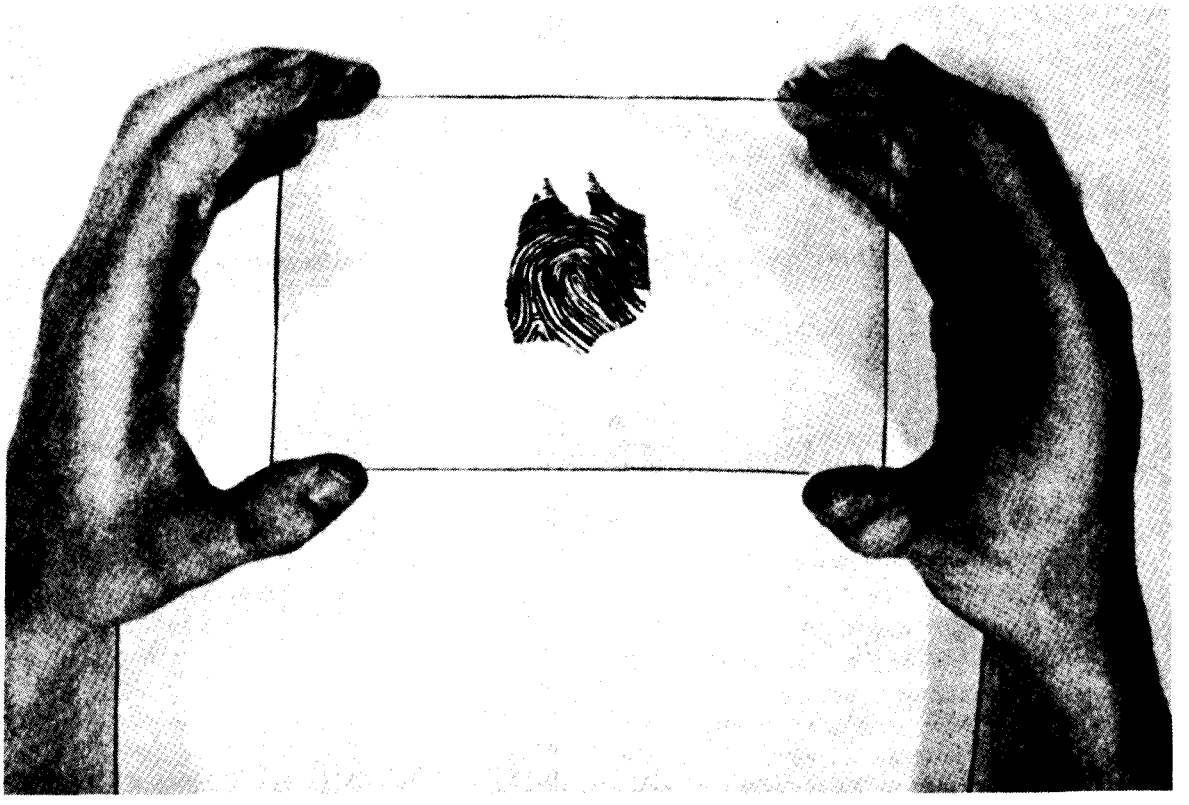


Figure G-31. Fingertip skin trimmed and flattened between two pieces of glass before being photographed.

(b) Fingerprinting underside of skin. In many instances when the ridge detail on the outer surface has been destroyed or cannot be seen, the ridge detail is clearly visible on the underside. If so, the skin is turned inside out carefully to prevent splitting or breaking and is then inked and printed in the usual way. It must be remembered, however, that when the underside of the skin is printed, the impression is in reverse color and position; that is, the ink is actually adhering to what would be the furrows of the pattern when viewed from the outer side. If it is thought that turning the skin inside out will damage it, a photograph of the inner ridge detail is made and the negative is printed to give an "as is" position photograph for proper classification and comparison purposes. A good photograph of the ridge detail may be obtained by trimming the skin, flattening it out between two pieces of glass, and photographing it in that position (fig. G-31).

(c) Fingerprinting lower layer of skin. The lower layer of skin has the same ridge detail, though finer and less pronounced, as the outer layer (fig. G-32). The lower layer is just as effective for identification purposes. These facts are particularly helpful to know when decomposition has destroyed the outer layer of skin, or it is in such a condition as to be of no value. If the outer layer of skin is missing and the second layer is intact, the finger should be cleansed, dried, inked, and printed in the usual way. Wrinkled finger bulbs can possibly be injected with tissue builder to round them out before they are inked and printed. If some of the outer skin remains attached, it should be removed by carefully picking or prying it off with a scalpel without destroying or injuring the lower layer. (Figure G-32 illustrates ridge detail visible after charred outer layer of skin is removed.) Then the finger should be cleansed, inked, and printed. If suitable results are not obtained, the ridge detail may be too fine to print even though there are few, if any, wrinkles in it. When this occurs, the finger should be cut off at the second joint and photographed. If the results are still unsatisfactory, the pattern area should be cut from the finger and the flesh cut and scraped out, and a photograph made of the skin flattened between two pieces of glass, as described in (b) above. Photographing the skin by using direct lighting may present a problem in that the skin may be seen plainly but the ridge detail may be poor. This problem can be overcome by scraping the skin to

transparency and then photographing it by transmitting light through the skin. Paragraph G-5 below describes photographic techniques.



Figure G-32. Ridge detail seen on dermis after charred epidermis removed.

(3) *Desiccation.* The main problem in treating desiccated or dried and shriveled fingers is that of stretching out and softening the skin. The outer layer of skin on desiccated fingers is usually intact and the ridge detail fairly clear. However, numerous wrinkles are present and as the drying process continues, the skin and flesh harden until the fingers become almost as hard as stone. The skin can be stretched and softened by soaking it in a hydroxide solution. If the results are unsuccessful, the pattern area can be removed and printed or photographed. Satisfactory prints can also be obtained by using modeling clay, plastic casting material, or liquid latex.

(a) Soaking hydroxide. By soaking the fingers in a 1- to 3-percent solution of sodium hydroxide or potassium hydroxide (caustic potash), the flesh can sometimes be swelled. However, it is best to try one finger at a time because even as the flesh is absorbing the solution and is swelling, it is being destroyed by the hydroxide. The finger to be soaked in the hydroxide is cut from the hand at the second joint. When it reaches its normal size by absorbing the hydroxide, it is inked and printed. There is no set time for this process— it may take from a few hours to as much as 10 days. A close watch is maintained, beginning 30 minutes after the finger is put in soak. If the skin peels, the loose skin is scraped off, and the finger is rinsed in water and returned to the solution. If the finger has not reached full size after several hours, it is placed in water for an hour or so to hasten the swelling. When removed from the water, the finger is coated with a film. Then it is scraped and replaced in the hydroxide for an hour or so. If the flesh becomes too soft, the finger is placed in a 1- to 3-percent solution of formaldehyde or alcohol for several minutes to harden it. This process of alternating from solution to water, scraping, and replacing in solution is continued until the desired result is obtained. Then the finger is inked and printed. However, the finger may become oversaturated and may not print properly. Then it is dipped in acetone for a few seconds, removed, and permitted to dry after which it is inked and printed. If satisfactory results are obtained with one finger, the rest of the fingers are given the same treatment.

(b) Removing the pattern area. If the reaction of the hydroxide solution on the first finger treated is not satisfactory and further soaking would not give satisfactory results, the treatment is discontinued. The finger is removed from the solution, washed carefully in water, and placed in formaldehyde to harden sufficiently for handling without damaging the ridges. Then the pattern area is cut off in such a way that sufficient surrounding surface permits the skin to be trimmed. On the cut side the skin is carefully scraped and cut to remove the excess flesh. During the cutting and scraping process, from time to time the skin is soaked in xylene and massaged to soften it and to remove wrinkles. When the skin is thin enough and sufficiently pliable, the operator places the skin on his own finger, inks, and prints it as usual. If the results are satisfactory, the same procedure is followed with the remaining fingers. If the prints are not suitable, the skin is scraped until it can be flattened between two pieces of glass and photographed (fig. G-31). If there is poor contrast between the ridges and the furrows when direct light is used, transmitted light should be used instead.

(c) Modeling clay. Modeling clay can be used to make satisfactory impressions of macerated, desiccated, and charred fingers, according to the following steps:

1 Step 1. Shape one end of a stick of ordinary modeling clay to resemble the head of a small mushroom. It should be large enough to cover the pattern area.

2 Step 2. Apply the mushroom end of the clay to the inking plate.

3 Step 3. Firmly press the inked clay against the pattern area several times to insure an even but not too heavy inking of the finger bulb.

4 Step 4. Press a ¼-inch layer of modeling clay into the concave section of the shovel-type cardholder. Then place over the clay a thin piece of plastic or paper on which to record the print.

5. Step 5. Press the inked finger against the paper or plastic which adapts itself to the con-

tours of the finger as the clay base yields. Rolling of the finger is unnecessary. (If the finger seeps an excessive amount of fluid, white plastic lifting tape may be substituted for the plastic or paper to prevent slippage and blurring.)

(d) Plastic casting material. Before plastic casting material is applied, the fingers must be thoroughly cleaned and dried. The plastic material is applied in small drops which are blown out to form a thin, even layer to cover, if possible, the whole papillary pattern of the finger bulb. When all the fingers have been treated in this way, they should remain at room temperature for about 30 to 60 minutes or until the casting material has dried, forming a transparent film. The casts are then carefully removed and each cast is placed between glass slides along with with the name of the finger. The casts may then be inked and rolled and the fingerprints photographed to produce positive prints.

(e) Liquid latex. Liquid latex may be used to make a cast according to the following steps:

1 Step 1. Dip each finger into the latex, remove it, and let it dry. Repeat several times until a cast approximately 1/32 of an inch thick is built up, to prevent its tearing upon removal from the finger and in later use.

2 Step 2. When the last coat is dry and the cast changes to flesh color, remove it by rolling it from the finger.

3 Step 3. Roll the cast onto the operator's finger, ink, and record it on the fingerprint chart. Note that the flow and color of the ridges in latex impressions are the reverse of prints made by the fingers themselves.

(4) *Charring.* Bodies which have been burned or subjected to severe heat are included in the desiccation cases, but the techniques for fingerprinting them differ from other desiccated cases. Often there are instances when the skin has become loose but is hard and crisp, or when the finger has been severely burned and is reduced almost to carbon, yet is firm. In such cases, the ridge detail usually has not been destroyed (fig. G-32). When a severely burned body is located, the problems of identification should be anticipated. Before the body is removed, the fingers should be carefully examined to determine if the removal would in any way cause damage to the fingers or ridge detail. If this type of damage could be incurred, consideration should be given to securing fingerprints at the scene or possibly to cutting off the hands or fingers to avoid destruction of the skin. An examination of the fingers may show that the outer skin is hardened and is partially loosened from the flesh. It is sometimes possible to remove this outer skin intact by twisting it back and forth. If this is done, the operator may place the skin on his own finger, ink it, and print it in the usual way. If the skin is intact on the finger and is unwrinkled, impressions are made in the usual way. Should wrinkles be present and the skin pliable, tissue builder is injected into the bulbs which are then inked and printed. If the wrinkles cannot be removed, then the pattern area is cut off and the procedure given in (b) above is followed. In some instances the fingers of burned bodies are charred. Such cases require very careful handling as the ridge detail can be destroyed or disturbed through mistreatment. In these instances, the procedure is determined by the degree of charring. In extreme cases, the only method of recording is by photographing, using side lighting to obtain the proper contrast of ridges and depressions. Obviously, no attempt should be made to ink and roll as the pressure necessary to secure the prints would cause the skin to crumble. When extreme charring has not occurred, the procedures previously given for treating the skin by cleaning, softening, inking, and printing or photographing should be followed.

(5) *Maceration.* Maceration, or the long immersion of the fingers in water, presents a problem in obtaining legible impressions. One important rule in making legible prints is that the fingers must be dry. In addition to drying the fingers, other difficulties must be overcome. Usually the skin on the fingers absorbs water, swells, and loosens from the flesh within a few hours after immersion. If the skin is water-soaked, wrinkled, and pliable, but intact, the skin is carefully cleaned as described earlier in this paragraph. Then the fingertip is wiped with alcohol, benzine, or acetone, and given a few seconds to dry. After the skin is dry, it is pulled or drawn tight across the pattern area so that a large wrinkle forms on the back of the finger. The bulb is then inked and printed. If the skin is broken and hanging loose but the pattern area is intact, the skin is removed from the finger and cleaned by placing it in alcohol or benzine (not acetone) for about a minute. Then it is stretched carefully over the operator's finger to remove any wrinkles before it is printed. Sometimes the skin is intact on the finger but is so wrinkled and hard that it is not possible to draw it tight for inking. If so, tissue builder may be injected to round out the bulb for inking and printing. Should this procedure fail, the ridge detail is photographed on the finger or the skin is cut off, flattened between two pieces of glass, and photographed. When the ridge detail does not show on the surface of the outer skin. the

underside should be examined to determine if the detail can be seen clearly. Should this be true, the underside is photographed. When the outer skin is gone and the finger is not saturated with water, it is possible to dry the surface sufficiently for inking and printing by rolling the finger on a blotter. If this fails, the finger is wiped off with a piece of cloth saturated with alcohol, benzine, or acetone; and it is inked and printed. When the outer skin is gone and the fingers are saturated with water, they may be dried out quickly by placing them in full strength acetone for approximately 30 minutes. The fingers are then placed in xylene for about an hour or until the xylene has overcome the reaction of the acetone. After the fingers are removed from the xylene, they are placed on a blotter to dry. When finger surfaces appear to be dry, they are ready to be inked and printed. When the fingers are removed from the acetone, they dry and harden in a matter of seconds. Xylene may be used to resoften them.

G-5. Photographic Techniques

Ridge detail should be photographed when linked impressions are unsuitable for classification purposes. Black and white photographs can be taken, or fingerprint impressions can be made directly on print paper.

a. Black and White Photographs. The cameras that the company still photographers use are readily adaptable for photographing ridge detail. Panchromatic and so-called soft films are suitable for this work. However, if high-contrast film is used, some of the ridge detail may be lost, especially if the skin is wrinkled. The ridge detail should be photographed at its natural size, that is, at 1 to 1, to allow comparisons with inked impressions at the same ratio. A yellow or light-red filter should be used when fingers or skin have a mottled, reddish-brown color caused by decomposition, nearness to severe heat, or diffusion with blood. Such a discoloration presents a problem in making a photograph because the ridges and depressions of the skin lack contrast. Discoloration from diffusion with blood may be removed by saturating and rinsing the specimen in a 10- to 20-percent solution of citric acid. Direct, side, transmitted, or reflected lighting may be used in photographing ridge detail. The type of lighting used depends upon the condition of the finger or skin.

(1) *Direct lighting.* Direct lighting is used when the ridge detail is fairly clear and no wrinkles, or only shallow ones, are present.

(2) *Side lighting.* Side lighting is used when there are no wrinkles of any consequence and the ridge detail is clear. If discoloration prevents ridges from being seen readily in the ground glass (viewer), the light should be placed at the side and directed across the skin or finger to highlight the ridges and depressions. Although two lights may be used, one light, such as a spotlight, may produce better results as the beam can be controlled.

(3) *Transmitted lighting.* Transmitted lighting is used when the skin has peeled off or when the dermis has been removed, cut, and scraped thin so that light will go through it. With the prepared skin flattened between two pieces of glass and the lights placed behind the skin and directed through it, the ridge detail can be brought into focus (fig G-33). However, if the contrast between the ridges and depressions is not sufficient when the skin is dry, better results may be gained by placing the skin in xylene for photographing. The skin is placed upright in a test tube or small bottle, with the ridges of the skin toward the camera. If the skin is thin enough, transmitted lighting is used; if not, direct lighting is used. If the skin produces a highlight which cannot be removed by rearranging the lights, reflected lighting is tried.



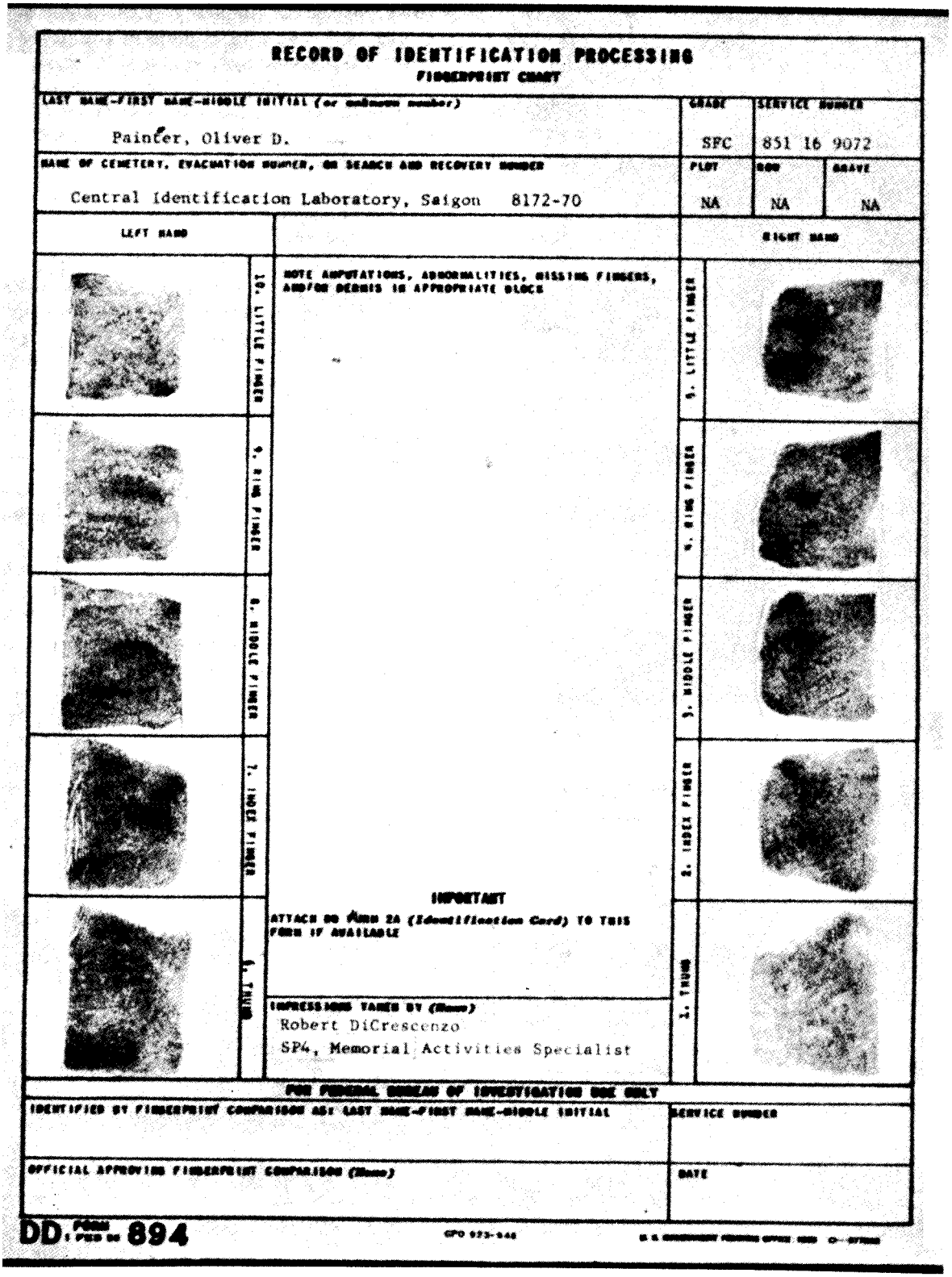
Figure G-33. Epidermis mounted on glass slide photographed with back lighting.

(4) *Reflected lighting.* The effect of reflected lighting is obtained by cutting a hole in the center of a large piece of paper or cardboard. The hole must be large enough for the camera lens to protrude through. The ends of the paper or cardboard are curved toward the skin or finger being photographed. The lamps are placed facing the curved paper or cardboard so that the light strikes the paper or cardboard and is reflected by the curved surface to the object. The lamps are placed close enough to give maximum light but not so close that they produce a fire hazard.

b. Photographic Print Impressions. When a comparison of fine structured details is needed, prints may be made with a photographic developer, using glossy photographic print paper. The developer is applied lightly to the fingertip and rolled lightly on the paper. Then it is placed in an acid-fixing bath for approximately 30 minutes and washed in the same way as the ordinary photograph. This process yields a highly detailed print.

G-6. Preparation of DD Form 894 (Record of Identification Processing—Fingerprint Chart)

All decedents are fingerprinted when possible, regardless of any other identifying media present. Fingerprints are recorded on DD Form 894 (fig G-34). If the decedent's identification card is available, it is attached to the form.



RECORD OF IDENTIFICATION PROCESSING
FINGERPRINT CHART

LAST NAME-FIRST NAME-MIDDLE INITIAL (or maiden number)	GRADE	SERVICE NUMBER
Painter, Oliver D.	SFC	851 16 9072

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	GRID	GRAVE
Central Identification Laboratory, Saigon 8172-70	NA	NA	NA

LEFT HAND

1a. LITTLE FINGER
4. RING FINGER
5. MIDDLE FINGER
2. INDEX FINGER
3. THUMB

NOTE AMPUTATIONS, ABNORMALITIES, MISSING FINGERS, AND/OR DEBRIS IN APPROPRIATE BLOCK

IMPORTANT
ATTACH DD Form 2A (Identification Card) TO THIS FORM IF AVAILABLE

IMPRESSIONS TAKEN BY (Name)
Robert DiCrescenzo
SP4, Memorial Activities Specialist

RIGHT HAND

1a. LITTLE FINGER
4. RING FINGER
5. MIDDLE FINGER
2. INDEX FINGER
3. THUMB

FOR FEDERAL BUREAU OF INVESTIGATION USE ONLY

IDENTIFIED BY FINGERPRINT COMPARISON AS: LAST NAME-FIRST NAME-MIDDLE INITIAL	SERVICE NUMBER
OFFICIAL APPROVING FINGERPRINT COMPARISON (Name)	DATE

DD FORM 1 FEB 66 894 GPO 925-948

Figure G-34. DD Form 894 (Record of Identification Processing—Fingerprint Chart).

a. Last Name-First Name-Middle Initial (or Unknown Number) Block. Enter in the order shown on the form the name associated with the person fingerprinted, or enter the unknow X-number assigned to the decedent.

b. Grade Block. If available, enter the grade of the decedent at the time of death.

c. *Service Number/SSAN Block.* If available, enter the social security number of the decedent.

d. Name of Cemetery, Evacuation Number, or Search and Recovery Number Block. Enter the name of the facility where the prints are taken and the number assigned to the case. If the decedent is to be interred in a temporary cemetery, enter the name and location of the cemetery.

e. Plot, Row, and Grave Blocks. If the decedent is to be interred in a temporary cemetery, enter the plot, row, and grave designations in the appropriate blocks.

f. Left Hand and Right Hand Columns. In the Left Hand and Right Hand columns, record the decedent's fingerprints in the proper spaces. Enter "missing" in the correct spaces when a particular finger has been amputated surgically or is otherwise lost.

g. Undesignated Center Block. If fingerprints are unobtainable, enter the reason in the undesignated center block. Also enter any abnormalities: scars, cuts, burns, and warts, for example.

h. Impressions Taken by (Name) Block. When the fingerprinting is completed and any applicable notations have been made, sign your name and enter your grade and position title in this block.

i. For Federal Bureau of Investigation Use Only Block. Make *no* entries in the blocks under this heading.

APPENDIX H

EXAMPLE OF A KNOWN REMAINS CASE

H-1. General

The case history of a known remains is never closed. The case history contains the records compiled when the field investigation was underway, but other records may be added if new evidence appears or results from review, analysis, or further research by the US Army Casualty and Memorial Affairs Directorate, TAGO.

H-2. Sequence of Material

Material given in this appendix as an example of a known remains case follows the sequence found in a case history folder. All cases in this category are not necessarily limited to the material shown in the example.

H-3. Field Investigation Records

a. DA Form 2773-R (Statement of Identification). DA Form 2773-R is prepared for each remains when there is any question of a decedent's identity (fig H-1).

STATEMENT OF IDENTIFICATION
(AR 638-40)

INSTRUCTIONS: 1. **Prepare in triplicate and distribute as follows:**
a. **Original to Director, Memorial Affairs Directorate, ATTN: DAAG-MED**
b. **Copy to Army Command**
c. **Copy retained at preparing installation**

2. **This statement will be supplemented by signed copies of appropriate Records of Identification Processing (DD Forms 890 through 894).**

NAME OF DECEASED (Last, First, Middle)	GRADE	SERVICE NUMBER
WRIGHT, Morris J.	PVT	164 90 2110

BRANCH OF SERVICE	ORGANIZATION AND BASE
Army	Co B, 66th Inf Bn, 15th Inf Div

DATE OF DEATH	PLACE OF DEATH
20 Sep 19 __	Jerseyville, Erewhon CT243146

CONDITION OF REMAINS (Describe Briefly in Remarks)

X	Recognizable		Evidence of Decomposition
	Not Recognizable		Mangled or Mutilated
	Commingled	X	Evidence of Burns

MEANS OF IDENTIFICATION (Check all Appropriate Boxes and Indicate Appropriate Inclosures. Specify Supporting Data in Remarks)

X	Identification Tags		INCLOSURES
X	Personal Effects	X	DD Form 890
X	Dental Comparison	X	DD Form 891 and SF 603
X	Skeletal & Anatomical Comparison	X	DD Form 892 and/or DD Form 893
	Fingerprints	X	DD Form 894
X	Visual Recognition		
	Other (Specify in Remarks)		

REMARKS (If additional space is required, continue on separate sheet)

Circumstances: Witness statements by SP4 Daniel Magnone and PVT Frank T. Jones of Co B, 66th Inf Bn, 15th Inf Div, show that PVT Wright received a direct hit in the chest while engaged with the enemy on 20 September 19__ in the vicinity of Jerseyville, Erewhon, when his vehicle received a direct hit and caught fire. PVT Wright was evacuated directly to the cemetery by a team from his unit.

Condition of Remains: Remains of PVT Wright was intact and recognizable with third degree burns on both hands. A bullet wound in the thorax appears to be the cause of death.

Basis for Identification: Identification of this remains as PVT Wright is based upon the following observations:

Race--Caucasian	(PVT Wright was Caucasian)
Estimated height 72"	(PVT Wright was 72" tall)
Hair--Dark brown	(PVT Wright had brown hair)

Fingerprints were unobtainable because both hands had 3rd degree burns. The tooth chart prepared for this remains agrees with the dental records of PVT Wright and contradicts the records of the associated casualty. ID tags--found around the neck. Clothing on the remains--Jacket, cotton, size 40R; Trousers, field, cotton OD; Belt, web, waist; Trousers, cotton, size 36/34; Socks, wool; Undershirt, cotton OD, with marking w2110; Drawers, cotton OD, size 36.

To the best of my knowledge & belief, the statements made herein are correct & true.

22 Sep __ (Date)	**TYPED NAME, GRADE, AND TITLE OF IDENTIFYING OFFICER** KEVIN HALL, 1LT, IDENTIFICATION OFFICER
	SIGNATURE OF IDENTIFYING OFFICER Kevin Hall

NAME AND ADDRESS OF INSTALLATION
ALLIED CEMETERY, EREWHON APO 96006

DA FORM 2773-R, 1 Mar 65 **Replaces DA Form 2773, 1 Feb 64, which may be used.**

Figure H-1. DA Form 2773-R (Statement of Identification).

FOR USE OF IDENTIFICATION SPECIALISTS ONLY

SUMMARY

Dental anatomy of the remains agrees favorably with recorded data for PVT Wright, as do the physical characteristics of race, height, hair, eyes, weight, and age. Two witnesses who knew PVT Wright saw him get hit, and he was later evacuated directly to this cemetery by a team from his unit.

REMARKS

There is no contradictory evidence to be considered in this case.

RECOMMENDATIONS

After considering all the evidence, it is recommended that the remains be declared officially identified as PVT Morris J. Wright, 164 90 2110, US Army.

RECOMMENDATIONS PRESENTED

22 Sep
(Date)

TYPED NAME AND TITLE OF IDENTIFICATION SPECIALIST
Kevin Hall
1LT Identification Officer

SIGNATURE OF IDENTIFICATION SPECIALIST
Kevin Hall

NAME AND ADDRESS OF INSTALLATION
ALLIED CEMETERY MORTUARY, EREWHON APO 96006

RECOMMENDATIONS ACCEPTED

22 Sep
(Date)

TYPED NAME, GRADE AND TITLE OF ACCEPTING OFFICER
William Walsh, CPT, QMC
Cemetery Officer

SIGNATURE OF ACCEPTING OFFICER
William Walsh

NAME AND ADDRESS OF INSTALLATION
ALLIED CEMETERY MORTUARY, EREWHON APO 96006

Figure H-1. —Continued

b. DD Form 898 (Record Data (Deceased and Missing Personnel)). Data on DD Form 898 and attached DA Form 1155 (Witness Statement on Individual) and SF 603 (Health Record–Dental) are used in the recovery of a remains, if necessary, or in the verification of the identity (fig H-2, H-3, and H-4).

RECORD DATA
(DECEASED AND MISSING PERSONNEL)

CHECK ONE: ☒ DEAD ☐ MISSING

DATE: 20 Sep 19__

STATUS

LAST NAME - FIRST NAME - MIDDLE INITIAL	GRADE	SERVICE NUMBER
WRIGHT, Morris J.	PVT	164 90 2110

ORGANIZATION	FORMER SERVICE NUMBERS
Co B, 66th Inf Bn, 15th Inf Div	None

DATE OF DEATH - MISSING STATUS	CAUSE OF DEATH	PLACE OF DEATH - OR LAST SEEN IF MISSING
20 Sep 19	KIA	Jerseyville, Erewhon CT151052
DATE OF BIRTH: 14 Jun 19__		

PHYSICAL CHARACTERISTICS

RACE	CREED	HEIGHT	WEIGHT
Caucasian	Lutheran	72 inches	172 lb

COLOR EYES	COLOR HAIR	SHOE SIZE	BLOOD TYPE
Brown	D. Brown	8 1/2 EE	O Neg

FRACTURES AND/OR BREAKS	TATTOOS AND SCARS
None of record	None of record

RECORD INCLOSURES

DENTAL DATA ☐ NONE OF RECORD ☒ INCLOSED *(Itemize by Form Number and Date of Record)*
SF 603 dated 12 Sep 19__

CASUALTY DATA ☒ CASUALTY REPORT ☒ STATEMENTS OF WITNESSES ☐ MISSING PERSONS SUPPLEMENTARY REPORT *(AF Form 484)*
☐ OTHER *(Specify)*

DA Form 1155 dated 20 Sep 19 __

ADDITIONAL DATA

Interred in Allied Cemetery, Erewhon.

DD FORM 1 FEB 66 898 REPLACES OQMG FORM 971, 24 JAN 51, WHICH IS OBSOLETE.

Figure H-2. DD Form 898 (Record Data (Deceased and Missing Personnel)).

WITNESS STATEMENT ON INDIVIDUAL
(AR 600-10)

CHECK APPLICABLE BOX
☐ MIS ☐ MIA ☐ CAP ☐ DET
☒ DEAD *(Remains not recovered)*

1. LAST NAME - FIRST NAME - MIDDLE NAME	2. SERVICE NO.
WRIGHT, Morris J	164 90 2110

3. GRADE	4. DATE OF DEATH OR WHEN LAST SEEN
Private	20 Sep __

5. ORGANIZATION	6. GEOGRAPHICAL LOCATION *(Include grid coordinates and nearby town)*
Co B, 66th Inf Bn, 15th Inf Div	Jerseyville CT 243146

7. IF ITEMS 1 AND 2 ARE UNKNOWN OR NOT POSITIVE, COMPLETE ITEMS LISTED BELOW:

AGE	WEIGHT	HEIGHT	HAIR	EYES	RACE
21	172 lb	6' 0''	D Brown	Brown	Cau

HOME TOWN	CIVILIAN OCCUPATION	NICKNAME
Green Bay, Wis	Musician	None

WAS HE MARRIED? *(If so, give wife's name if known)*	DID HE HAVE ANY CHILDREN? *(If so, give names if known)*
Not Known	Not Known

OTHER IDENTIFYING MARKS *(such as tattoos or birthmarks)*	OTHER PERSONS WHO MAY HAVE WITNESSED THIS INCIDENT OR HAVE FURTHER INFORMATION
Unknown	PVT Frank T. Jones, Co B, 66th Inf Bn, 15th Inf Div

DA FORM 1155, 1 Jun 66 REPLACES EDITION OF 1 JUN 61, WHICH WILL BE ISSUED AND USED UNTIL EXHAUSTED.

8. CIRCUMSTANCES SURROUNDING INCIDENT *(If known, include cause of death or condition when last seen, and how identified)*

Private Wright received a direct hit in the chest while engaged with the enemy on 20 September 19__ in vicinity of Jeresyville, Erewhon

9. NAME OF PERSON MAKING STATEMENT	10. SERVICE NO.	11. UNIT
Daniel Magnone	516 88 3219	Co B, 66th Inf Bn, 15th Inf Div

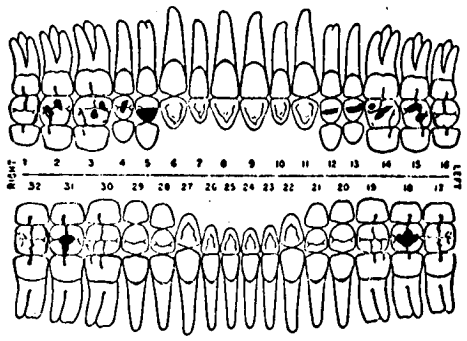
12. DATE	13. SIGNATURE
20 Sep __	Daniel Magnone

★ U.S. GOVERNMENT PRINTING OFFICE : 1966 O—222-626

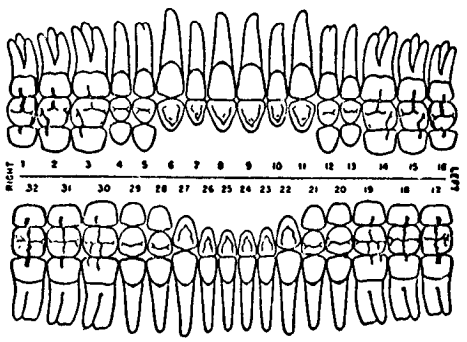
Figure H-3. DA Form 1155 (Witness Statement on Individual):

SECTION III. ATTENDANCE RECORD

15. RESTORATIONS AND TREATMENTS (*Completed during service*)



16. SUBSEQUENT DISEASES AND ABNORMALITIES



REMARKS

REMARKS

17. SERVICES RENDERED

DATE	DIAGNOSIS—TREATMENT	CLASS	OPERATOR AND DENTAL FACILITY	INITIALS
			Ft. Blank, California	
12 Sep	Type I examination	3	Robert B. Kester	
"	Car #2, O-Am, O-Am		Robert B. Kester	
"	Car #3, O-Am, O-Am		Robert B. Kester	
13 Sep	Car #4, O-Am		Robert B. Kester	
"	Car #5, MOD-Am		Robert B. Kester	
"	Car #7, FM-Sil		Robert B. Kester	
"	Car #12, O-Am	2	Robert B. Kester	
15 Sep	Car #13, O-Am		Robert B. Kester	
"	Car #14, O-Am, O-Am		Robert B. Kester	
22 Sep	Car #15, O-Am, O-Am		Orville R. Love	
"	Car #18, O-Am		Orville R. Love	
"	Car #31, O-Am	1	Orville R. Love	

PATIENT'S LAST NAME—FIRST NAME—MIDDLE NAME: WRIGHT, MORRIS J.

GPO : 1969—648—16—80366-1 332-644

Figure H-4. SF 603 (Health Record—Dental).

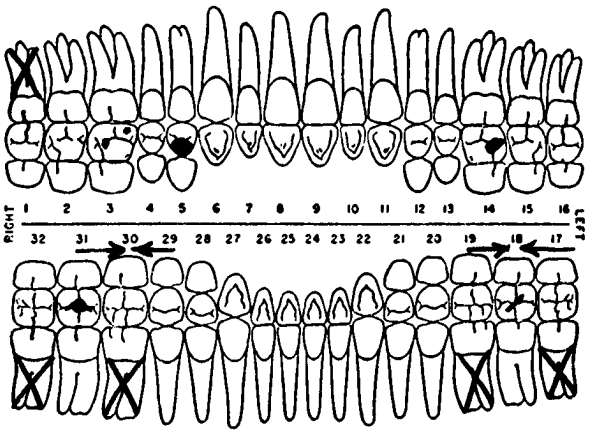
Standard Form 603
Rev. November 1953
Bureau of the Budget
Circular A-32 (Rev.)

HEALTH RECORD — **DENTAL**

SECTION I. DENTAL EXAMINATION

1. PURPOSE OF EXAMINATION						2. TYPE OF EXAM.					3. DENTAL CLASSIFICATION					
	INITIAL		SEPARATION		OTHER (*Specify*)	1	2 X	3	4		1	2 X	3	4		5

4. MISSING TEETH AND EXISTING RESTORATIONS

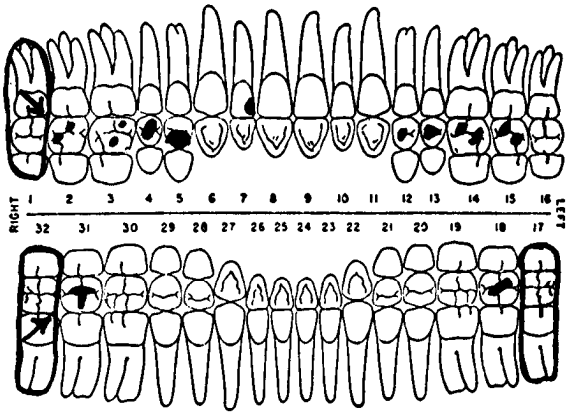


REMARKS

PLACE OF EXAMINATION	DATE
Ft. Blank, California	5 Sep

SIGNATURE OF DENTIST COMPLETING THIS SECTION: Robert B. Keating

5. DISEASES, ABNORMALITIES, AND X-RAYS



A. CALCULUS

	SLIGHT		MODERATE		HEAVY
X					

B. PERIODONTOCLASIA

	LOCAL		GENERAL

	INCIPIENT		MODERATE		SEVERE

C. STOMATITIS (*Specify*)

	GINGIVITIS		VINCENT'S

D. DENTURES NEEDED
(*Include dentures needed after indicated extractions*)

FULL		PARTIAL	
U	L	U	L

ABNORMALITIES OF OCCLUSION—REMARKS

E. INDICATE X-RAYS USED IN THIS EXAMINATION

	FULL MOUTH PERIAPICAL		POSTERIOR BITE-WINGS		OTHER (*Specify*)
X		X			

DATE	PLACE OF EXAMINATION	SIGNATURE OF DENTIST COMPLETING THIS SECTION
11 Sep	Ft. Blank, California	Orville R. Lone

SECTION II. PATIENT DATA

6. SEX	7. RACE	8. GRADE, RATING, OR POSITION	9. ORGANIZATION UNIT	10. COMPONENT OR BRANCH	11. SERVICE, DEPT., OR AGENCY
M	W	PVT	66th Inf Bn	Infantry	Army

12. PATIENT'S LAST NAME—FIRST NAME—MIDDLE NAME	13. DATE OF BIRTH (DAY-MONTH-YEAR)	14. IDENTIFICATION NO.
WRIGHT, MORRIS J.	14 Jun	164 90 2110

DENTAL
Standard Form 603
603-102

Figure H-4—Continued

*c. DD Form 551 (Record of Interment).*DD Form 551 is shown in figure H-5.

RECORD OF INTERMENT

DATE: 20 Sep __

TYPE OF RECORD: [X] INITIAL [ ] SUPPLEMENTAL (Reason)

IDENTIFICATION

IMPRINT OF IDENTIFICATION TAG: WRIGHT / MORRIS J / O- 164 90 2110 / PRESBYTERIAN

LAST NAME - FIRST NAME - MIDDLE INITIAL		SERVICE NUMBER
Wright, Morris J.		164 90 2110
GRADE: PVT	ORGANIZATION: Co B, 66th Inf Bn, 15th Inf Div	BRANCH OF SERVICE: Infantry
RACE: W	RELIGION: Presbyterian	COUNTRY (if not U.S.): Erewhon
DATE OF DEATH: 20 Sep 19__	CAUSE OF DEATH: Bullet wound in chest	PLACE OF DEATH: Jerseyville, Erewhon
		WHERE REMAINS WERE FOUND (Give Grid Coordinates): CT 243146

IDENTIFICATION TAGS FOUND ON REMAINS: [ ] ONE [X] TWO [ ] NONE

WERE SUBSTITUTE TAGS FURNISHED: [ ] YES [X] NO

MEANS OF IDENTIFICATION (other than Identification Tag): Comparison of dental structure, physical characteristics, and blood type.

PERSONAL EFFECTS FOUND ON REMAINS AND DISPOSITION OF SAME

1 Wallet	1 Ring	1 Bible
1 Watch	1 Cigarette Case	1 Goodluck Charm
Pictures	2 Address Books	3 Foreign Coins

INTERMENT (Prepare overlay and attach if other than established cemetery)

NAME, NUMBER, COORDINATES, AND LOCATION OF CEMETERY: Allied Cemetery, Erewhon CT151052

DATE OF INTERMENT	HOUR	INTERRED IN A SHROUD, BLANKET, OR OTHER (Specify)	TYPE OF GRAVE MARKER	PLOT	ROW	GRAVE
20 Sep __	1835	Shroud	Cross	D	12	575

IS THIS A REINTERMENT	NAME, NUMBER, COORDINATES AND LOCATION OF PREVIOUS CEMETERY IF A REINTERMENT	PLOT	ROW	GRAVE
[ ] YES [X] NO				

TYPE OF RELIGIOUS CEREMONY	PERSON CONDUCTING CEREMONY	IDENTIFICATION DATA AND TYPE OF CONTAINER PLACED WITH REMAINS IF IDENTIFICATION TAG NOT USED
Protestant	Anthony Meggs CPT, CH	NA

IDENTIFICATION TAG PLACED WITH REMAINS	IDENTIFICATION TAG ATTACHED TO GRAVE MARKER
[X] YES [ ] NO	[X] YES [ ] NO

REMAINS INTERRED IN GRAVE TO LEFT (When viewed from foot of grave) NAME-LAST-FIRST-MIDDLE INITIAL	GRADE	SERVICE NUMBER	ORGANIZATION	GRAVE NO.
Brown, Jay V.	PVT	554297759	66th Inf Bn	574
REMAINS INTERRED IN GRAVE TO RIGHT (Name)	GRADE	SERVICE NUMBER	ORGANIZATION	GRAVE NO.
Smith, Neal N.	SGT	876459008	66th Inf Bn	576

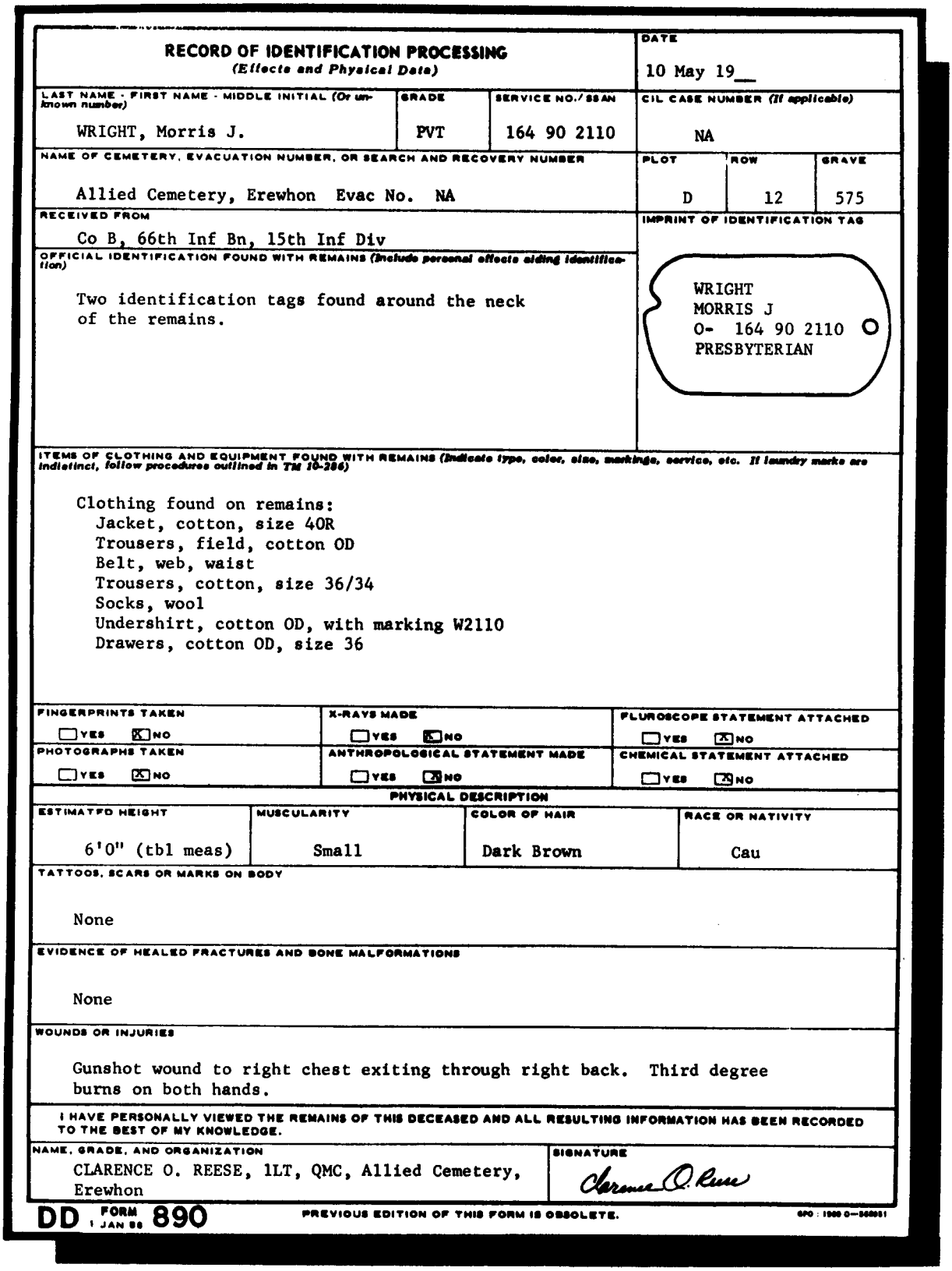
PREPARED BY (Typed Name and Signature): Harold G. Wells / HAROLD G. WELLS, SGT.

VERIFIED BY (Typed Name and Signature): Leonard R. Hanson / LEONARD R. HANSON, 1LT, QMC

DD FORM 1 FEB 55 551 EDITION OF 1 JUL 51 IS OBSOLETE. GPO 822364

Figure H-5. DD Form 551 (Record of Interment).

d. DD Forms 890, 891, 893, and 894 (Records of Identification Processing). Detailed identifying media found in processing the remains are shown in figures H-6 through H-9.



RECORD OF IDENTIFICATION PROCESSING
(Effects and Physical Data)

DATE: 10 May 19__

LAST NAME - FIRST NAME - MIDDLE INITIAL (Or unknown number)	GRADE	SERVICE NO./SSAN	CIL CASE NUMBER (If applicable)
WRIGHT, Morris J.	PVT	164 90 2110	NA

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
Allied Cemetery, Erewhon Evac No. NA	D	12	575

RECEIVED FROM: Co B, 66th Inf Bn, 15th Inf Div

OFFICIAL IDENTIFICATION FOUND WITH REMAINS (Include personal effects aiding identification):
Two identification tags found around the neck of the remains.

IMPRINT OF IDENTIFICATION TAG:
WRIGHT
MORRIS J
O- 164 90 2110 O
PRESBYTERIAN

ITEMS OF CLOTHING AND EQUIPMENT FOUND WITH REMAINS (Indicate type, color, size, markings, service, etc. If laundry marks are indistinct, follow procedures outlined in TM 10-286):

Clothing found on remains:
Jacket, cotton, size 40R
Trousers, field, cotton OD
Belt, web, waist
Trousers, cotton, size 36/34
Socks, wool
Undershirt, cotton OD, with marking W2110
Drawers, cotton OD, size 36

FINGERPRINTS TAKEN	X-RAYS MADE	FLUROSCOPE STATEMENT ATTACHED
☐ YES ☒ NO	☐ YES ☒ NO	☐ YES ☒ NO
PHOTOGRAPHS TAKEN	**ANTHROPOLOGICAL STATEMENT MADE**	**CHEMICAL STATEMENT ATTACHED**
☐ YES ☒ NO	☐ YES ☒ NO	☐ YES ☒ NO

PHYSICAL DESCRIPTION

ESTIMATED HEIGHT	MUSCULARITY	COLOR OF HAIR	RACE OR NATIVITY
6'0" (tbl meas)	Small	Dark Brown	Cau

TATTOOS, SCARS OR MARKS ON BODY:
None

EVIDENCE OF HEALED FRACTURES AND BONE MALFORMATIONS:
None

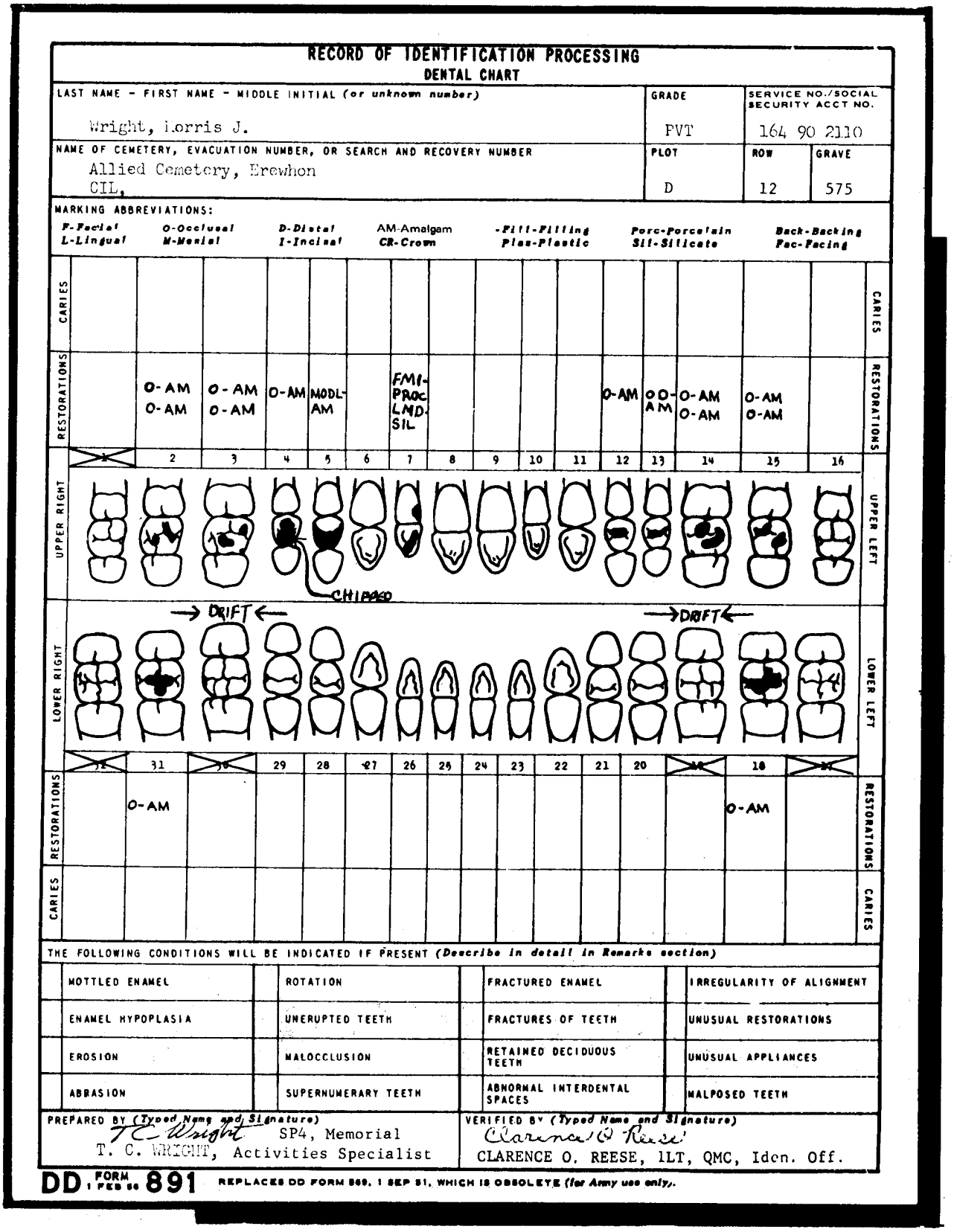
WOUNDS OR INJURIES:
Gunshot wound to right chest exiting through right back. Third degree burns on both hands.

I HAVE PERSONALLY VIEWED THE REMAINS OF THIS DECEASED AND ALL RESULTING INFORMATION HAS BEEN RECORDED TO THE BEST OF MY KNOWLEDGE.

NAME, GRADE, AND ORGANIZATION	SIGNATURE
CLARENCE O. REESE, 1LT, QMC, Allied Cemetery, Erewhon	Clarence O. Reese

DD FORM 1 JAN 86 890 — PREVIOUS EDITION OF THIS FORM IS OBSOLETE.

Figure H-6. DD Form 890 (Record of Identification Processing (Effects and Physical Data)).



RECORD OF IDENTIFICATION PROCESSING
DENTAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL (or unknown number)	GRADE	SERVICE NO./SOCIAL SECURITY ACCT NO.
Wright, Lorris J.	PVT	164 90 2110

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
Allied Cemetery, Erewhon CIL,	D	12	575

MARKING ABBREVIATIONS:
F-Facial L-Lingual O-Occlusal M-Mesial D-Distal I-Incisal AM-Amalgam CR-Crown -Fill-Filling Plas-Plastic Porc-Porcelain Sil-Silicate Back-Backing Fac-Facing

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RESTORATIONS	O-AM O-AM	O-AM O-AM	O-AM	MODL-AM		FMI-PROC LND. SIL					O-AM	O O-AM	O-AM O-AM	O-AM O-AM	
CARIES															

UPPER RIGHT / UPPER LEFT

CHIPPED

DRIFT DRIFT

LOWER RIGHT / LOWER LEFT

	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
RESTORATIONS	O-AM													O-AM	
CARIES															

THE FOLLOWING CONDITIONS WILL BE INDICATED IF PRESENT (Describe in detail in Remarks section)

	MOTTLED ENAMEL		ROTATION		FRACTURED ENAMEL		IRREGULARITY OF ALIGNMENT
	ENAMEL HYPOPLASIA		UNERUPTED TEETH		FRACTURES OF TEETH		UNUSUAL RESTORATIONS
	EROSION		MALOCCLUSION		RETAINED DECIDUOUS TEETH		UNUSUAL APPLIANCES
	ABRASION		SUPERNUMERARY TEETH		ABNORMAL INTERDENTAL SPACES		MALPOSED TEETH

PREPARED BY (Typed Name and Signature)
T C Wright SP4, Memorial
T. C. WRIGHT, Activities Specialist

VERIFIED BY (Typed Name and Signature)
Clarence O Reese
CLARENCE O. REESE, 1LT, QMC, Idcn. Off.

DD FORM 1 FEB 55 891 REPLACES DD FORM 869, 1 SEP 51, WHICH IS OBSOLETE (for Army use only).

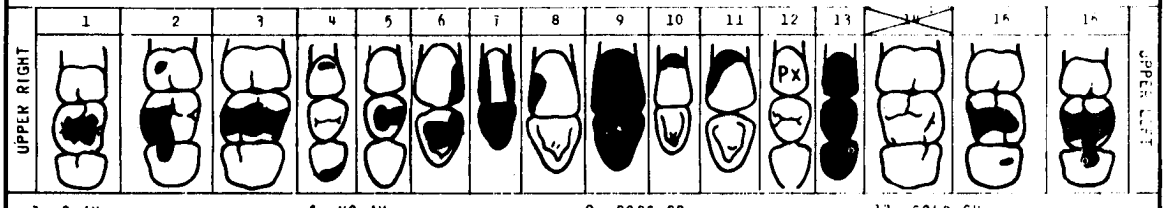
Figure H-7. DD Form 891 (Record of Identification Processing—Dental Chart).

DENTURES *(Plates)*: DESCRIBE DENTURES INCLUDING NATURAL TEETH REPLACED AND TEETH WHICH HAVE RETAINING CLASPS. *(For example: Lower Acrylic Partial Denture with Lingual Bar, replacing Teeth nos. 17, 18, 19, 30, 31, 32. Clasps on natural teeth nos. 20 and 29)* SHOW ANY NUMBERS OR LETTERS APPEARING ON DENTURE.

REMARKS *(If no abnormalities are found make notation to that effect)*

1. Teeth present found intact.
2. Teeth Nos. 12 and 13 rotated.
3. Maxilla fractured between Nos. 5 and 6 and between Nos. 11 and 12.
4. Mandible fractured in the area of No. 30.
5. Wear on the anteriors.

EXAMPLE METHOD OF PREPARATION



1. O-AM
2. DOL-AM; F-AM
3. MOD GOLD FILL
4. F-GOLD FILL; ML-AM
5. MO-AM
6. ML-GOLD FILL
7. 3/4 GOLD CR
8. O-PORC FILL
9. PORC-CR
10. F-PORC FILL; L-AM
11. MF-PORC FILL
12. PX-POSTHUMOUSLY MISSING
13. GOLD-CR
14. MISSING
15. MO-AM; L-AM
16. MODL-AM

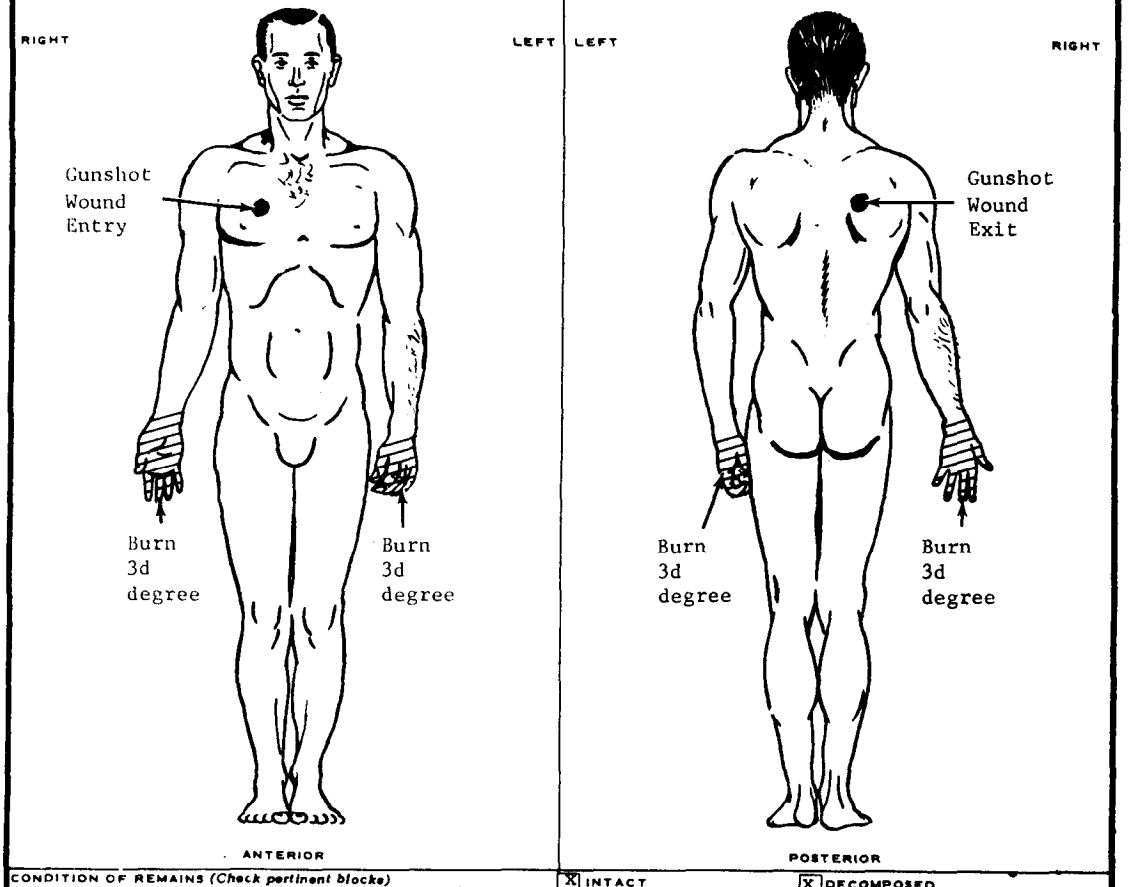
U. S. GOVERNMENT PRINTING OFFICE : 1956 O - 377899

Figure H-7—Continued

RECORD OF IDENTIFICATION PROCESSING
ANATOMICAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL (or unknown number)		GRADE		SERVICE NUMBER	
Wright, Morris J.		PVT		164 90 2110	
NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NO.	PLOT	ROW	GRAVE	ESTIMATED AGE (Yrs)	ESTIMATED HEIGHT
Allied Cemetery, Erewhon Evac No. NA	D	12	575	22	6'0"

BLACK OUT PORTIONS NOT RECOVERED



CONDITION OF REMAINS (Check pertinent blocks)
☐ SEMI-SKELETAL ☐ FLESH COVERED ☒ INTACT ☒ DECOMPOSED ☒ BURNED (Degree: ☐ 1st ☐ 2d ☒ 3d)

REMARKS (Continue on reverse if additional space is required)

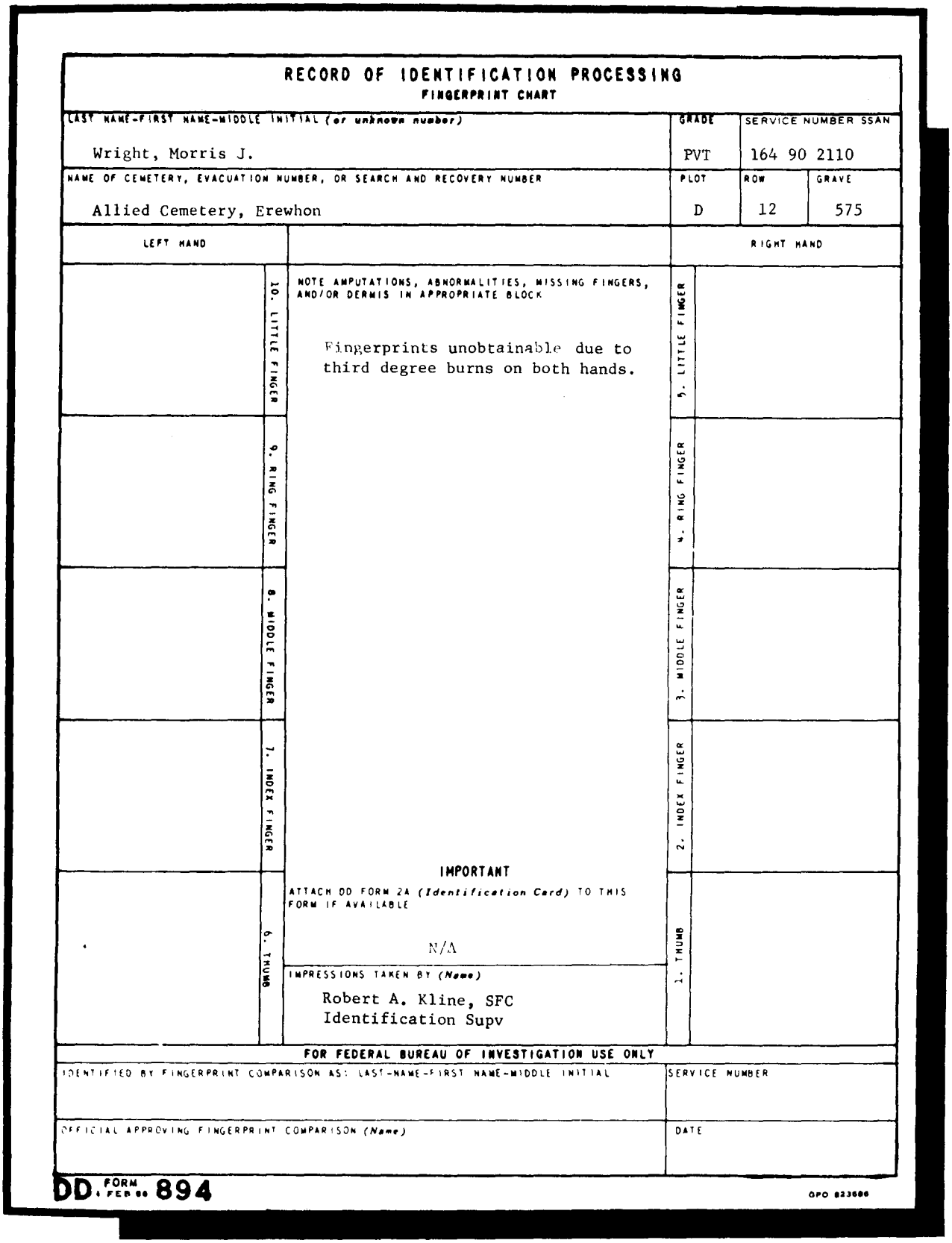
Current remains with 3d degree burns to both hands making fingerprints unobtainable. Gunshot wound to chest exiting through back. Height: 6'0". Hair: brown. Eyes: brown. Race: cau. No distinguishing marks.

NAME OF PREPARING OFFICIAL (Print or type)	SIGNATURE
ROBERT A. KLINE, SFC, Identification Supv	Robert A. Kline

DD FORM 1 FEB 56 893

U. S. GOVERNMENT PRINTING OFFICE : 1956 O - 371903

Figure H-8. DD Form 893 (Record of Identification Processing—Anatomical Chart).



RECORD OF IDENTIFICATION PROCESSING
FINGERPRINT CHART

LAST NAME-FIRST NAME-MIDDLE INITIAL (or unknown number)	GRADE	SERVICE NUMBER SSAN
Wright, Morris J.	PVT	164 90 2110

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
Allied Cemetery, Erewhon	D	12	575

LEFT HAND			RIGHT HAND	
	10. LITTLE FINGER	NOTE AMPUTATIONS, ABNORMALITIES, MISSING FINGERS, AND/OR DERMIS IN APPROPRIATE BLOCK Fingerprints unobtainable due to third degree burns on both hands.	5. LITTLE FINGER	
	9. RING FINGER		4. RING FINGER	
	8. MIDDLE FINGER		3. MIDDLE FINGER	
	7. INDEX FINGER		2. INDEX FINGER	
	6. THUMB	IMPORTANT ATTACH DD FORM 2A (*Identification Card*) TO THIS FORM IF AVAILABLE N/A IMPRESSIONS TAKEN BY (*Name*) Robert A. Kline, SFC Identification Supv	1. THUMB	

FOR FEDERAL BUREAU OF INVESTIGATION USE ONLY

IDENTIFIED BY FINGERPRINT COMPARISON AS: LAST-NAME-FIRST NAME-MIDDLE INITIAL	SERVICE NUMBER
OFFICIAL APPROVING FINGERPRINT COMPARISON (*Name*)	DATE

DD FORM 1 FEB 66 894

GPO 823686

Figure H-9. DD Form 894 (Record of Identification Processing—Fingerprint Chart).

e. DD Form 897 (Physical and Dental Comparison Charts). Physical and dental records for Private wright and those of a found remains are compared on DD Form 897 (fig H-10). The remains of Private Wright with those of Private Woolsey, an associated casualty, are compared on a second DD Form 897 (fig H-11).

PHYSICAL AND DENTAL COMPARISON CHART

REMAINS OF WRIGHT, Morris J. 164 90 2110		NAME WRIGHT, Morris J. 164 90 2110	
1	X	1	X
2	O-AM O-AM	2	O-A O-AM
3	O-AM O-AM	3	O-AM O-AM
4	O-AM Chipped	4	O-AM
5	MODL-AM	5	MOD-AM
6		6	
7	FML-Sil	7	ML-Sil
8		8	
9		9	
10		10	
11		11	
12	O-AM	12	O-AM
13	O-AM	13	O-AM
14	O-AM O-AM	14	O-AM O-AM
15	O-AM O-AM	15	O-AM O-AM
16		16	
17	X	17	X
18	O-AM	18	O-AM
19	X	19	X
20		20	
21		21	
22		22	
23		23	
24		24	
25		25	
26		26	
27		27	
28		28	
29		29	
30	X	30	X
31	O-AM	31	O-AM
32	X	32	X
ESTIMATED HEIGHT 5' 11 1/2"		HEIGHT 6' 0"	
ESTIMATED WEIGHT 170		WEIGHT 172 lb	
ESTIMATED AGE 22		AGE 21 yr 3 mo 6 days	
HAIR Dark Brown		HAIR Dark Brown	
REMARKS Blood Type: O Neg Eyes: Brown		Blood Type: O Neg Eyes: Brown	

DD Form 897, 1 Feb 56 Replaces OQMG Form 1961, 23 Feb 51, which is obsolete.

Figure H-10. DD Form 897 (Physical and Dental Comparison Chart) (Wright).

PHYSICAL AND DENTAL COMPARISON CHART

REMAINS OF WRIGHT, Morris J. 164 90 2110		NAME WOOLSEY, Harold D. 145 36 8840						
1	X	1		X			X	X
2	O-AM O-AM	2						
3	O-AM O-AM	3					O	DO-AM
4	O-AM Chipped	4						
5	MODI-AM	5						
6		6						
7	FML-S11	7						
8		8			O			
9		9			O			
10		10			O			
11		11						
12	O-AM	12						
13	O-AM	13						
14	O-AM O-AM	14		O	O			
15	O-AM O-AM	15						
16		16						
17	X	17			O			
18	O-AM	18						
19	X	19	X		O	X	X	X
20		20						
21		21						
22		22						
23		23						
24		24						
25		25						
26		26						
27		27						
28		28						
29		29						
30	X	30	X	X	X	X	X	X
31	O-AM	31					O	
32	X	32			O			
ESTIMATED HEIGHT		HEIGHT	Chart 2/49	Chart 10/41	Chart 9/45	Chart 10/45	Chart 11/49	Chart 1/50
ESTIMATED WEIGHT		WEIGHT						
ESTIMATED AGE		AGE						
HAIR		HAIR						
REMARKS								

DD Form 897, 1 Feb 56 Replaces OQMG Form 1961, 23 Feb 51, which is obsolete.

Figure H-11. DD Form 897 (Physical and Dental Comparison Chart) (Woolsey).

H-4. Action by US Army Casualty and Memorial Affairs Directorate, TAGO

The US Army Casualty and Memorial Affairs Directorate, TAGO, provides review and further research, as applicable, for adequancy of identification.

APPENDIX I

EXAMPLE OF AN UNKNOWN REMAINS CASE

I-1. General

The case history of a remains. received as unknown, is never closed even though identification is established. The case history includes the records compiled when the field investigation was underway, but other records are added to new evidence appears or results from review. analysis, or further research by the US Army Casualty and Memorial Affairs directorate, TACO.

I-2. Sequence of Material

Material given in this appendix as an example of an identified former unknown remains follows the sequence found in a case history file. All cases in this category are not necessarily limited to the material shown in the example.

I-3. Field Investigation Records

a. DA Form 2773-R. DA Form 2773-R is prepared in detail for each remains when there is any question of a decedent's identity (fig I-1).

STATEMENT OF IDENTIFICATION
(AR 638-40)

INSTRUCTIONS: 1. Prepare in triplicate and distribute as follows:
a. Original to Director, Memorial Affairs Directorate, ATTN: DAAG-MED
b. Copy to Army Command
c. Copy retained at preparing installation

2. This statement will be supplemented by signed copies of appropriate Records of Identification Processing (DD Forms 890 through 894).

NAME OF DECEASED (Last, First, Middle)	GRADE	SERVICE NUMBER
REED, Arthur D.	PVT	143 20 9860

BRANCH OF SERVICE	ORGANIZATION AND BASE
Army	Co A, 66th Inf Bn, 15th Inf Div

DATE OF DEATH	PLACE OF DEATH
11 Jul 19__	Jerseyville, Erewhon CT267336

CONDITION OF REMAINS (Describe Briefly in Remarks)

	Recognizable		Evidence of Decomposition
	Not Recognizable		Mangled or Mutilated
	Commingled		Evidence of Burns

MEANS OF IDENTIFICATION (Check all Appropriate Boxes and Indicate Appropriate Inclosures. Specify Supporting Data in Remarks)

	Identification Tags		INCLOSURES
X	Personal Effects	X	DD Form 890
X	Dental Comparison	X	DD Form 891 and SF 603
X	Skeletal & Anatomical Comparison	X	DD Form 892 and/or DD Form 893
	Fingerprints	X	DD Form 894
	Visual Recognition	X	SF 88
	Other (Specify in Remarks)		

REMARKS (If additional space is required, continue on separate sheet)

Circumstances: This remains was recovered by a search and recovery team from Co A, 2017th Fld Svc Co (GS) on 12 November 19__. The remains was in an unmarked shallow grave at a former infantry position near Jerseyville, Erewhon, at grid coordinates CT 267336. A search was made for the missing portions, but none were found.

Condition of Remains: This is an incomplete skeletal remains. The bones of both hands and wrists are missing, and there is evidence of a penetrating wound to the face.

Basis for Identification: Identification of this remains as PVT Reed is based on the following observations:

Race--Caucasian	(PVT Reed was Caucasian)
Estimated height--68.3"	(PVT Reed was 68" tall)
Hair--brown	(PVT Reed had brown hair)

Fingerprints were unobtainable because both hands were missing. The tooth chart prepared for this remains agrees with the dental records and x-rays for PVT Reed. An x-ray revealed a healed fracture of the right tibia which agrees with PVT Reed's medical history (broken tibia--age 6). ID tags--none received Clothing on remains: Pr. boots, combat, size 9D, marked PVT A. THURD REED; Trousers, cotton with marking S5573; Jacket, cotton, size 36R med, laundry mark B__,5__; web belt w/buckle, marked Arthur D. R__d; cotton drawers, T-shirt, 1 pr. socks, wool, unmarked.

To the best of my knowledge & belief, the statements made herein are correct & true.

	TYPED NAME, GRADE, AND TITLE OF IDENTIFYING OFFICER
14 Nov __ (Date)	HARVEY MUSSER, GS-13, IDENTIFICATION OFFICER
	SIGNATURE OF IDENTIFYING OFFICER Harvey Musser

NAME AND ADDRESS OF INSTALLATION
US ARMY MORTUARY, EREWHON APO 96006

DA FORM 2773-R, 1 Mar 65 **Replaces DA Form 2773, 1 Feb 64, which may be used.**

Figure I-1. DA Form 2773-R (Statement of Identification).

FOR USE OF IDENTIFICATION SPECIALISTS ONLY

SUMMARY

Dental anatomy of Evac Case No. 8919 agrees favorably with recorded data for PVT Reed as do the physical characteristics of race, height, hair, color, and old fracture of the right tibia. Additionally, the marks found on clothing on the remains is in agreement with the name and serial number for PVT Reed, and the witness statement places PVT Reed at the place of recovery the last time he was seen. The only conflicting information found was markings on items of uniform that are normally exchanged for clean clothing at field bath locations.

REMARKS

Clothing items which were marked but did not compare with the laundry mark for PVT Reed should not be considered as unfavorable to positive identification of Evac Case No. 8919 as being the remains of PVT Arthur D. Reed, 143 20 9860, US Army, because direct exchange of these items of clothing at field bath locations is standard Army procedure.

RECOMMENDATIONS

After considering all of the evidence, it is recommended that the remains of Evac Case No. 8919 be declared officially identified as PVT Arthur D. Reed, 143 20 9860, US Army.

RECOMMENDATIONS PRESENTED

TYPED NAME AND TITLE OF IDENTIFICATION SPECIALIST	NAME AND ADDRESS OF INSTALLATION
Harvey Musser, GS-13, Identification Officer	US Army Mortuary, Erewhon
DATE: 14 Nov __	SIGNATURE OF IDENTIFICATION SPECIALIST: Harvey Musser

RECOMMENDATIONS ACCEPTED

TYPED NAME, GRADE AND TITLE OF ACCEPTING OFFICER	NAME AND ADDRESS OF INSTALLATION
KENT ASHBY, CPT, QMC, MORTUARY SERVICES OFFICER	US Army Mortuary, Erewhon
DATE: 14 Nov __	SIGNATURE OF ACCEPTING OFFICER: Kent Ashby

Figure I-1—Continued

b. DD Form 567 (Record of Recovery of Remains). DD Form 567, together with the map overlay and gravesite sketch (fig I-2, I-3, and I-4), gives the basic facts of the recovery of the remains.

RECORD OF RECOVERY OF REMAINS
(FM 10-63 and TM 10-286)

DATE
12 November 19___

REMAINS		SPACE FOR USE OF UNIT MAKING FINAL DISPOSITION
Recovery Number 1362/2017	**Evacuation Number** 8919/2017	**Unit designation**
Date of recovery 12 Nov 19___		**Identified as (Last Name-First Name-Middle Initial)**
Estimated date of death Estimated 19___		**Grade** **Service Number**
Nationality (Check one) U. S. X Allied Enemy Unknown		**Means of Identification**

Place of Recovery (Indicate Map Sheet Number; Grid Coordinates; name of nearest village or town; name, description or number of roads, mountains or other landmarks; type of grave (shallow - deep - surface); type of position (infantry, field artillery, etc.). If recovered from a vehicle, tank or plane, give position therein.

Remains recovered from an unmarked shallow grave in a former infantry position near Jerseyville, Erewhon, Map Sheet 6628, Grid Coords: CT 267 336, nearest mountain: No. 234, nearest MSR: No. 45.

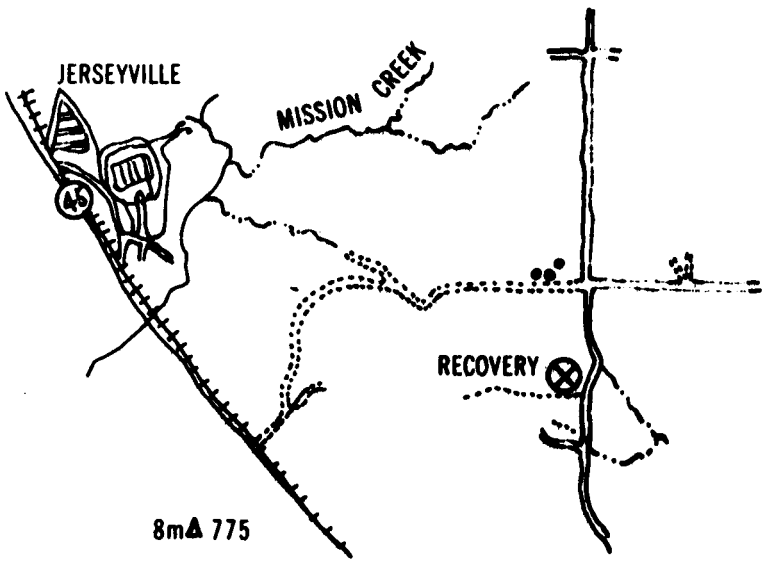
Identification media found in grave and surrounding area (Include serial numbers found on vehicles, tanks, aircraft and weapons) Two improvised paper tags with inscription BTB REED, Arthur D. 143 20 9860, 1 chain w/lock and 2 keys, found with remains. Remains clothed in 1 fld jacket; 1 white cotton T-shirt; white cotton shorts; 1 pr cam trousers; 1 web belt w/buckle; 1 pr combat boots size 9½D; 1 pr wool socks; 1 M-16 cartridge belt and first aid pouch. All area within a radius of 50 yards was thoroughly searched for additional missing portions and identifying media, with negative results.

RECOVERED WITH REMAINS (Use Reverse Side for Additional Space)		SPACE FOR USE OF UNIT MAKING FINAL DISPOSITION
		Unit designation
Recovery Number	**Evacuation Number**	**Identified as (Name, grade, service number)**
Recovered by (Name, grade, service number and organization) JOE E. JACKSON, CPL 452 04 1651,Co A,2017th Fld Svc Co (GS)		**Signature** Joe E. Jackson
Received at Collecting Point by (Name, grade, service number and organization) HARVEY T. RICE 1LT, QMC, Co A, 2017th Fld Svc Co (GS)		**Signature** Harvey T Rice
Officer-In-Charge (Name, grade and branch of service and organization)		**Signature**

DD Form 567, 1 Feb 56

Figure I-2. DD Form 567 (Record of Recovery of Remains).

MAP OVERLAY



35
72

31
68

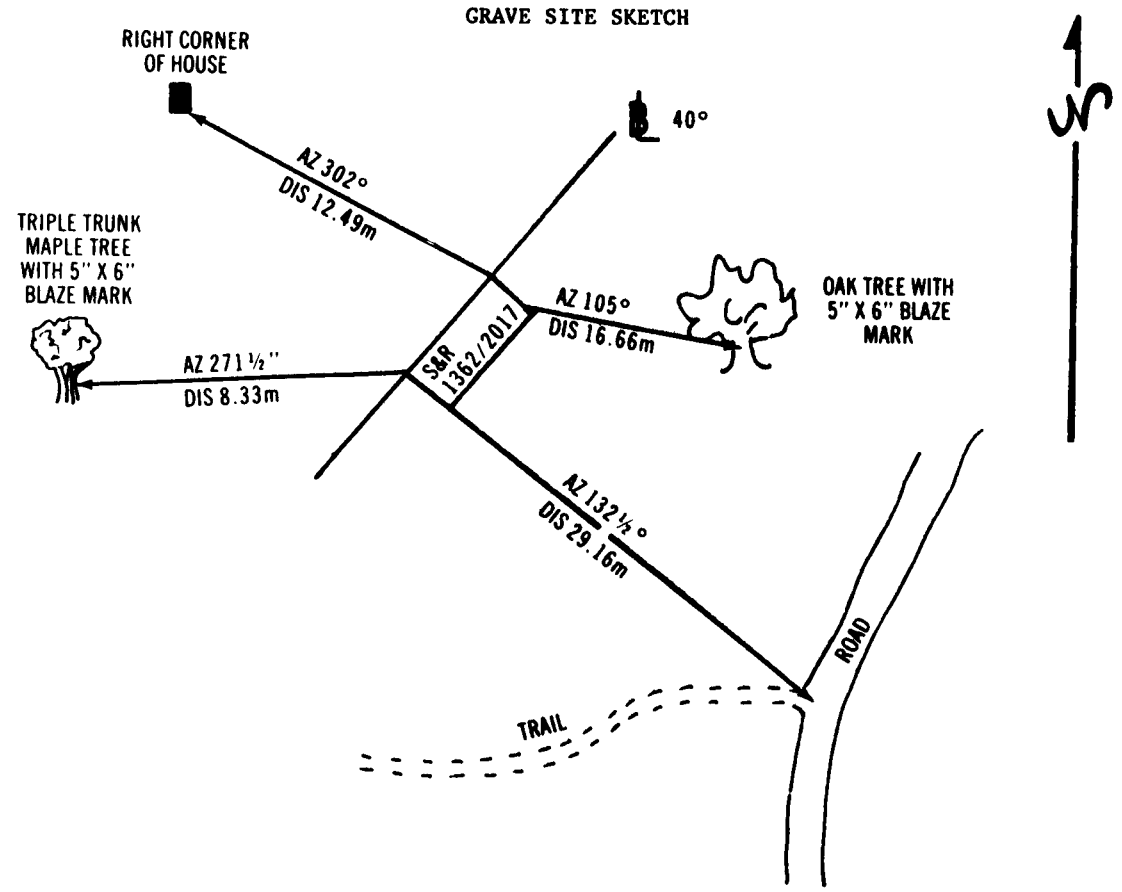
S&R No. 1362/2017

GRID COORDINATES
CT 267336

TITLE BOX

DATE TIME GROUP 121035 November 19____
MAP NAME AND SCALE Jerseyville, Erewhon 1:50,000
MAP SHEET NO. 6068 II
NAME OF MAKER Walter H. Edwards
ORGANIZATION OF MAKER Co A, 2017 Fld Svc Co (GS)

Figure I-3. Map overlay of recovery site.



INFORMATION BOX

TEAM NO: 2
GRID COORDINATES: CT 267336
PACE CONVERSION FIGURE: 120 paces per 100 meters
ALL AZIMUTHS ARE MAGNETIC
SKETCH NOT TO SCALE

TITLE BOX

DATE TIME GROUP 121035 November 19____
MAP NAME AND SCALE Jerseyville, Erewhon 1:50,000
MAP SHEET NUMBER 6068 II
NAME OF MAKER Walter H. Edwards
ORGANIZATION OF MAKER Co A, 2017 Fld Svc Co (GS)

Figure I-4. Gravesite sketch showing location of remains recovered.

c. Certification of Nonrecoverability of Missing Major Portions. A nonrecoverability certificate is shown in figure I-5.

HEADQUARTERS
COMPANY A, 2017th FLD SVC CO (GS)

S&R No. 1362/2017 12 November 19__

CERTIFICATION OF NONRECOVERABILITY
OF MISSING MAJOR PORTIONS

I, the undersigned, do certify that it was not possible to recover the complete remains. A thorough and systematic search was made of the surrounding area covering a radius of 50 yards, and no additional portions were found.

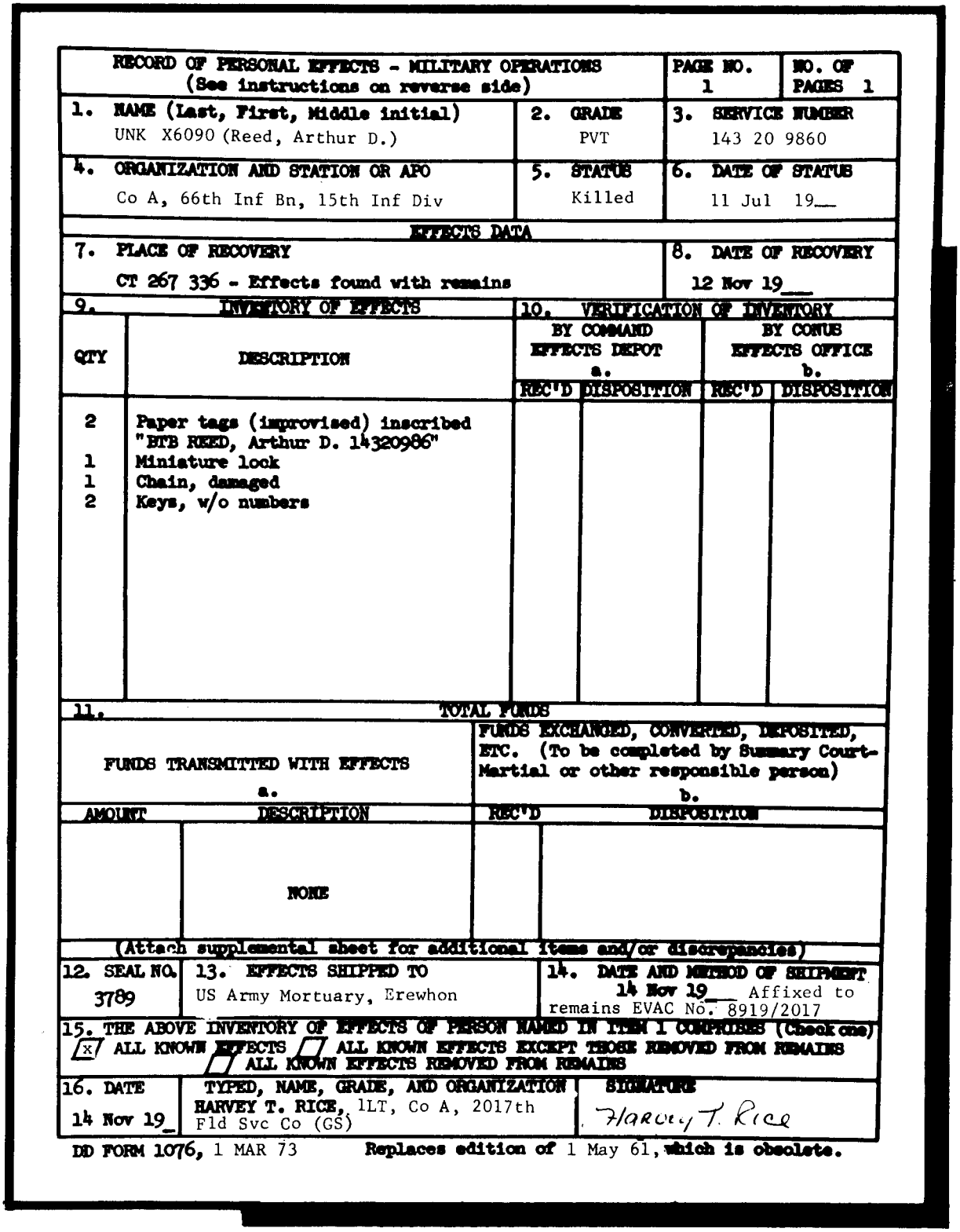
Recovery was made in the northern section of the Demilitarized Zone under supervision of enemy personnel who controlled the extent of area to be searched.

Joe E. Jackson
JOE E. JACKSON
CPL 452 04 1614
Co A, 2017th Fld Svc Co (GS)

VERIFIED:
Harvey T. Rice
HARVEY T. RICE
1LT QMC
OIC

Figure I-5. Certificate of nonrecoverability of missing major portions.

d. DD Form 1076 (Record of Personal Effects—Military Operations). DD Form 1076 is shown in figure I-6.



RECORD OF PERSONAL EFFECTS - MILITARY OPERATIONS (See instructions on reverse side)

PAGE NO. 1 | NO. OF PAGES 1

1. NAME (Last, First, Middle initial)	2. GRADE	3. SERVICE NUMBER
UNK X6090 (Reed, Arthur D.)	PVT	143 20 9860
4. ORGANIZATION AND STATION OR APO	**5. STATUS**	**6. DATE OF STATUS**
Co A, 66th Inf Bn, 15th Inf Div	Killed	11 Jul 19__

EFFECTS DATA

7. PLACE OF RECOVERY	8. DATE OF RECOVERY
CT 267 336 - Effects found with remains	12 Nov 19__

9. INVENTORY OF EFFECTS		10. VERIFICATION OF INVENTORY			
		BY COMMAND EFFECTS DEPOT a.		BY CONUS EFFECTS OFFICE b.	
QTY	DESCRIPTION	REC'D	DISPOSITION	REC'D	DISPOSITION
2	Paper tags (improvised) inscribed "BTB REED, Arthur D. 14320986"				
1	Miniature lock				
1	Chain, damaged				
2	Keys, w/o numbers				

11. TOTAL FUNDS

FUNDS TRANSMITTED WITH EFFECTS a.		FUNDS EXCHANGED, CONVERTED, DEPOSITED, ETC. (To be completed by Summary Court-Martial or other responsible person) b.	
AMOUNT	DESCRIPTION	REC'D	DISPOSITION
	NONE		

(Attach supplemental sheet for additional items and/or discrepancies)

12. SEAL NO.	13. EFFECTS SHIPPED TO	14. DATE AND METHOD OF SHIPMENT
3789	US Army Mortuary, Erewhon	14 Nov 19__ Affixed to remains EVAC No. 8919/2017

15. THE ABOVE INVENTORY OF EFFECTS OF PERSON NAMED IN ITEM 1 COMPRISES (Check one)
[x] ALL KNOWN EFFECTS [ ] ALL KNOWN EFFECTS EXCEPT THOSE REMOVED FROM REMAINS
[ ] ALL KNOWN EFFECTS REMOVED FROM REMAINS

16. DATE	TYPED, NAME, GRADE, AND ORGANIZATION	SIGNATURE
14 Nov 19_	HARVEY T. RICE, 1LT, Co A, 2017th Fld Svc Co (GS)	Harvey T. Rice

DD FORM 1076, 1 MAR 73 Replaces edition of 1 May 61, which is obsolete.

Figure 1-6. DD Form 1076 (Record of Personal Effects—Military Operations).

INSTRUCTIONS

1. This form will be prepared in at least four copies and as many additional copies as are required. The original and one copy will be forwarded with the personal effects. One copy will be mailed immediately to the appropriate Effects Office in CONUS, and the remaining copy will be retained by the preparing unit. In the case of Navy or Marine Corps personnel, a copy of this form will be forwarded to either the Chief of Naval Personnel (Pers-G23), or the Commandant, U.S. Marine Corps (DN), as appropriate.

2. For effects recovered from remains. A separate record (in quintuplicate) will be prepared for personal effects removed from remains. First four copies will be distributed as in paragraph 1 above; the extra copy will be forwarded to the Central Graves Registration Office.

ITEMS 1-4 Complete in full.

ITEMS 5 & 6 The status of owner and date of such status will be shown in all cases (killed, missing, POW, etc.).

ITEMS 7 & 8 The source of personal effects (i.e., found on remains, recovered from unit or warehouse storage) and date of recovery will be indicated in all cases. When personal effects are recovered from the remains, record the cemetery, plot, row and grave or evacuation number.

ITEM 9 Describe all articles completely (including serial numbers where applicable) especially items of high intrinsic value.

ITEM 10 The command effects depot and the appropriate Effects Office in CONUS will indicate opposite the effects listed in Item 9 the result of verification of the effects received by placing a checkmark (✓) next to items received. Discrepancies will be noted. When effects are prepared for shipment to the appropriate Effects Office in CONUS, the appropriate shipment number, date and mode of shipment will be entered in Disposition column, and actions dated and signed by processing officer.

ITEM 11 Furnish amounts and description of funds, and serial number, date, office of issue and payee for negotiable instruments such as money orders, checks, bonds, etc.

ITEMS 12-14 Specify seal number, and disposition of effects (unit, organization or applicable location to which the effects are being shipped and date and method of shipment).

ITEMS 15&16 The person first inventorying the effects will complete items 15 and 16.

CHANNELS OF EVACUATION - TRANSFER POINTS (To be completed on the duplicate copy and forwarded with effects)	
EFFECTS SHIPPED TO (List unit designation)	EFFECTS RECEIVED BY (Signature)
8204 Army Unit	Adam Strong, SFC

DD Form 1076 (Back)

Figure 1-6—Continued

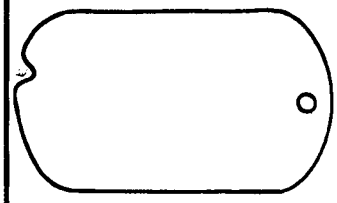
e. DD Form 551. DD Form 551 is shown in figure I-7.

RECORD OF INTERMENT

DATE: 14 Nov 19__

TYPE OF RECORD: ☒ INITIAL ☐ SUPPLEMENTAL (Reason)

IDENTIFICATION

IMPRINT OF IDENTIFICATION TAG	LAST NAME - FIRST NAME - MIDDLE INITIAL		SERVICE NUMBER
	Unknown X-6090		Unk
	GRADE: Unk	ORGANIZATION: Unk	BRANCH OF SERVICE: Army
	RACE: Cau	RELIGION: Unk	COUNTRY (if not U.S.)
DATE OF DEATH: Est 19__	CAUSE OF DEATH: Unk	PLACE OF DEATH: Jerseyville, Erewhon	WHERE REMAINS WERE FOUND (Give Grid Coordinates): CT 267 336
IDENTIFICATION TAGS FOUND ON REMAINS: ☐ ONE ☐ TWO ☒ NONE	MEANS OF IDENTIFICATION (other than Identification Tag)		
WERE SUBSTITUTE TAGS FURNISHED: ☒ YES ☐ NO			

PERSONAL EFFECTS FOUND ON REMAINS AND DISPOSITION OF SAME

For personal effects see DD Form 1076

INTERMENT (Prepare overlay and attach if other than established cemetery)

NAME, NUMBER, COORDINATES, AND LOCATION OF CEMETERY: EVAC No. 8919 — Remains presently stored in mausoleum, Zone Hq, 8204th AU, APO 93482

DATE OF INTERMENT	HOUR	INTERRED IN A SHROUD, BLANKET, OR OTHER (Specify)	TYPE OF GRAVE MARKER	PLOT	ROW	GRAVE
NA		NA	NA			

IS THIS A REINTERMENT	NAME, NUMBER, COORDINATES AND LOCATION OF PREVIOUS CEMETERY IF A REINTERMENT	PLOT	ROW	GRAVE
☐ YES ☒ NO				

TYPE OF RELIGIOUS CEREMONY	PERSON CONDUCTING CEREMONY	IDENTIFICATION DATA AND TYPE OF CONTAINER PLACED WITH REMAINS IF IDENTIFICATION TAG NOT USED
Memorial	George C. Goodman, MAJ, CH	

IDENTIFICATION TAG PLACED WITH REMAINS	IDENTIFICATION TAG ATTACHED TO GRAVE MARKER
☒ YES ☐ NO	☐ YES NA ☐ NO

REMAINS INTERRED IN GRAVE TO LEFT (When viewed from foot of grave) NAME-LAST-FIRST-MIDDLE INITIAL	GRADE	SERVICE NUMBER	ORGANIZATION	GRAVE NO.
NA				
REMAINS INTERRED IN GRAVE TO RIGHT (Name)	GRADE	SERVICE NUMBER	ORGANIZATION	GRAVE NO.
NA				

PREPARED BY (Typed Name and Signature)	VERIFIED BY (Typed Name and Signature)
William L. Grice WILLIAM L. GRICE, DAC, Iden Spec	Harold G. White HAROLD G. WHITE, CPT, QMC

DD FORM 1 FEB 55 551 EDITION OF 1 JUL 51 IS OBSOLETE. GPO 822364

Figure I-7. DD Form 551 (Record of Interment). (This form is given as an example and is not intended as a part of the case under discussion.

f. DD Forms 890, 891, 892, and 894 (Records of Identification Processing). Detailed identifying media found in processing the remains are shown in figures I-8 through I-11.

RECORD OF IDENTIFICATION PROCESSING
(Effects and Physical Data)

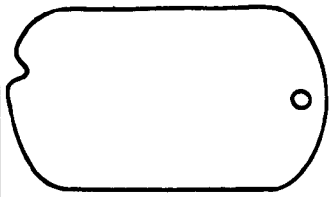
DATE: 17 Dec 19__

LAST NAME - FIRST NAME - MIDDLE INITIAL (Or unknown number)	GRADE	SERVICE NO./SSAN	CIL CASE NUMBER (If applicable)
Unknown X-6090 BTB REED, Arthur D. 143 20 9860	PVT	143 20 9860	26,364

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
EVAC No. 8919/2017 S&R No. 1362/2017			

RECEIVED FROM: Co A, 2017th Fld Svc Co (GS)

IMPRINT OF IDENTIFICATION TAG



OFFICIAL IDENTIFICATION FOUND WITH REMAINS (Include personal effects aiding identification)

Two improvised paper tags read BTB Reed, Arthur D, 143 20 9860

ITEMS OF CLOTHING AND EQUIPMENT FOUND WITH REMAINS (Indicate type, color, size, markings, service, etc. If laundry marks are indistinct, follow procedures outlined in TM 10-286)

Clothing found on and with remains:
Trousers, cotton
Jacket, cotton
Belt, web, w/buckle
Combat boots, 9 1/2D
Drawers, cotton
T-Shirt
Socks, wool

FINGERPRINTS TAKEN	X-RAYS MADE	FLUROSCOPE STATEMENT ATTACHED
☐ YES ☒ NO	☒ YES ☐ NO	☒ YES (Neg)
PHOTOGRAPHS TAKEN	**ANTHROPOLOGICAL STATEMENT MADE**	**CHEMICAL STATEMENT ATTACHED**
☐ YES ☒ NO	☒ YES ☐ NO	☒ YES ☐ NO

PHYSICAL DESCRIPTION

ESTIMATED HEIGHT	MUSCULARITY	COLOR OF HAIR	RACE OR NATIVITY
Fem + Fib=5' 8 1/3'' Fem + Tib=5' 8 1/2''	Average	Brown	Caucasoid

TATTOOS, SCARS OR MARKS ON BODY

None found

EVIDENCE OF HEALED FRACTURES AND BONE MALFORMATIONS

Healed fracture of right tibia

WOUNDS OR INJURIES

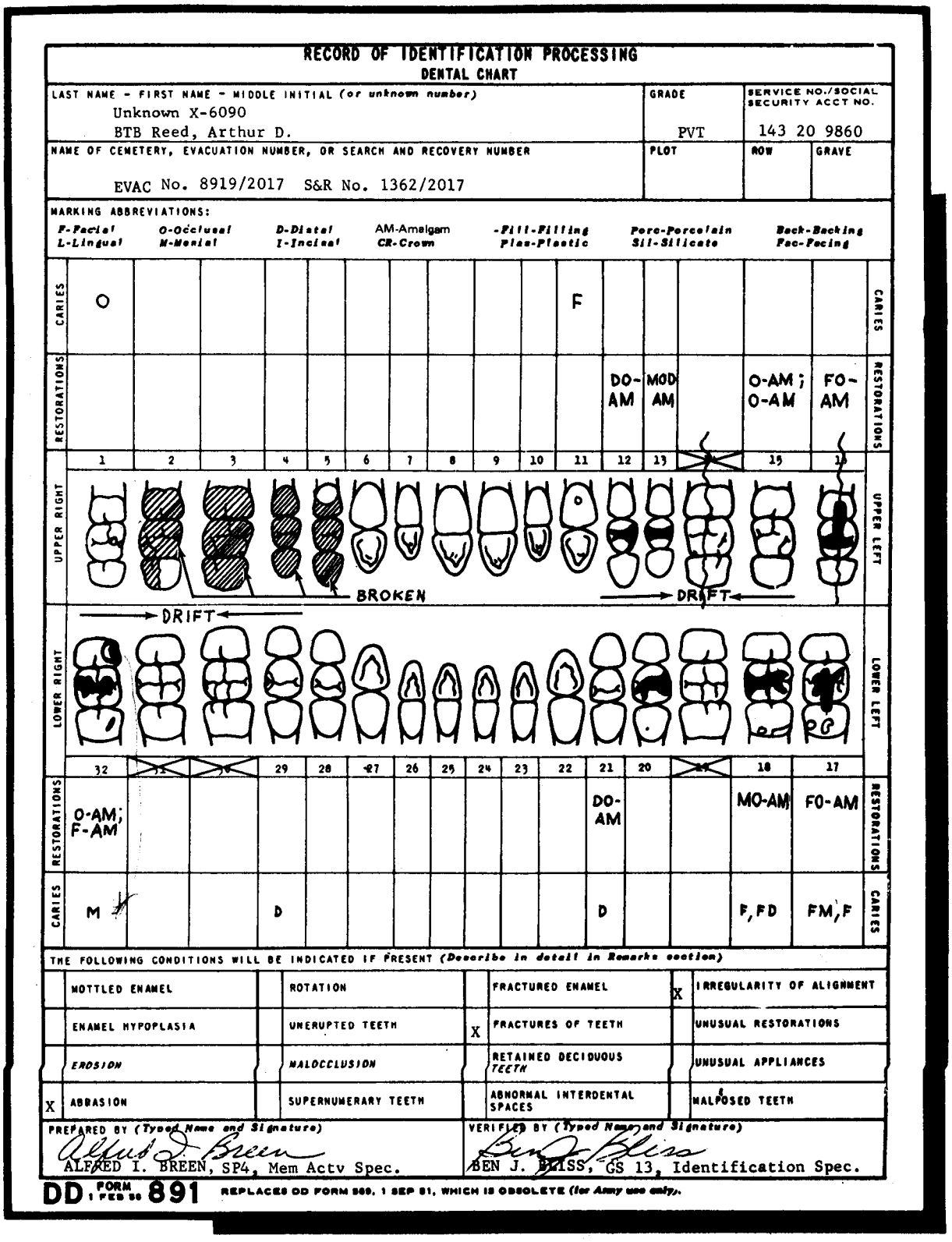
Penetrating wound of face

I HAVE PERSONALLY VIEWED THE REMAINS OF THIS DECEASED AND ALL RESULTING INFORMATION HAS BEEN RECORDED TO THE BEST OF MY KNOWLEDGE.

NAME, GRADE, AND ORGANIZATION	SIGNATURE
HARVEY MUSSER GS-13, US Army Mortuary, Erewhon	Harvey Musser

DD FORM 1 JAN 68 890 PREVIOUS EDITION OF THIS FORM IS OBSOLETE.

Figure I-8. DD Form 890 (Record of Identification Processing (Effects and Physical Data)).



RECORD OF IDENTIFICATION PROCESSING
DENTAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL (or unknown number)	GRADE	SERVICE NO./SOCIAL SECURITY ACCT NO.
Unknown X-6090 BTB Reed, Arthur D.	PVT	143 20 9860

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
EVAC No. 8919/2017 S&R No. 1362/2017			

MARKING ABBREVIATIONS:
F-Facial O-Occlusal D-Distal AM-Amalgam -Fill-Filling Pore-Porcelain Back-Backing
L-Lingual M-Mesial I-Incisal CR-Crown Plas-Plastic Sil-Silicate Fac-Facing

	1	2	3	4	5	6	7	8	9	10	11	12	13		15	16
CARIES	O										F					
RESTORATIONS												DO-AM	MOD AM		O-AM; O-AM	FO-AM

UPPER RIGHT / UPPER LEFT

BROKEN — DRIFT

LOWER RIGHT / LOWER LEFT

DRIFT

	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
RESTORATIONS	O-AM; F-AM											DO-AM			MO-AM	FO-AM
CARIES	M			D								D			F,FD	FM,F

THE FOLLOWING CONDITIONS WILL BE INDICATED IF PRESENT (Describe in detail in Remarks section)

	MOTTLED ENAMEL		ROTATION		FRACTURED ENAMEL	X	IRREGULARITY OF ALIGNMENT
	ENAMEL HYPOPLASIA		UNERUPTED TEETH	X	FRACTURES OF TEETH		UNUSUAL RESTORATIONS
	EROSION		MALOCCLUSION		RETAINED DECIDUOUS TEETH		UNUSUAL APPLIANCES
X	ABRASION		SUPERNUMERARY TEETH		ABNORMAL INTERDENTAL SPACES		MALPOSED TEETH

PREPARED BY (Typed Name and Signature)
Alfred I. Breen
ALFRED I. BREEN, SP4, Mem Actv Spec.

VERIFIED BY (Typed Name and Signature)
Ben J. Bliss
BEN J. BLISS, GS 13, Identification Spec.

DD FORM 1 FEB 56 891 REPLACES DD FORM 569, 1 SEP 51, WHICH IS OBSOLETE (for Army use only).

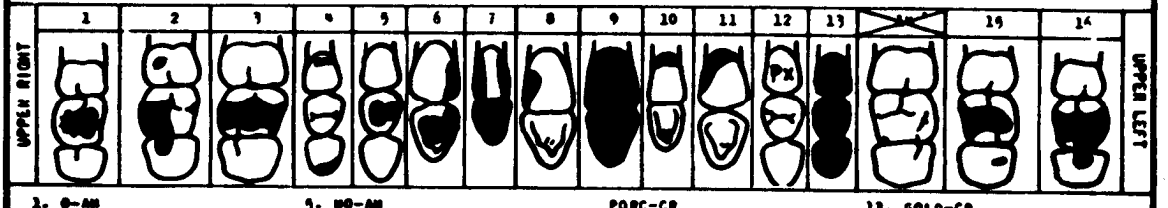
Figure I-9. DD Form 891 (Record of Identification Processing—Dental Chart).

DENTURES (*Plates*): DESCRIBE DENTURES INCLUDING NATURAL TEETH REPLACED AND TEETH WHICH HAVE RETAINING CLASPS. *(For example: Lower Acrylic Partial Denture with Lingual Bar, replacing Teeth nos. 17, 18, 19, 30, 31, 32. Clasps on natural teeth nos. 20 and 29)* SHOW ANY NUMBERS OR LETTERS APPEARING ON DENTURE.

REMARKS *(If no abnormalities are found make notation to that effect)*

1. Wear on Nos. 8 and 9.
2. Nos. 2, 3, 4, and 5 are broken.
3. Maxilla is fractured at Nos. 14 and 16.
4. No. 24 is in a slight lingual position.

EXAMPLE METHOD OF PREPARATION



1. O-AM
2. DOL-AM; F-AM
3. MOD GOLD FILL
4. F-GOLD FILL; ML-AM
5. MO-AM
6. ML-GOLD FILL
7. 3/4 GOLD CR
8. O-PORC FILL
9. PORC-CR
10. F-PORC FILL; L-AM
11. MF-PORC FILL
12. PX-POSTHUMOUSLY MISSING
13. GOLD-CR
14. MISSING
15. MO-AM; L-AM
16. MODL-AM

Figure 1-9—Continued

RECORD OF IDENTIFICATION PROCESSING
SKELETAL CHART

LAST NAME - FIRST NAME - MIDDLE INITIAL *(or unknown number)* Unknown X-6090
BTB Reed, Arthur D.

GRADE	SERVICE NUMBER
PVT	143 20 9860

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER
EVAC No. 8919/2017 S&R No. 1362/2017

PLOT	ROW	GRAVE

ESTIMATED AGE *(Years)*	ESTIMATED HEIGHT
19-21	Fem + Fib=5' 8 1/3'' Fem + Tib=5' 8 1/2''

SKELETAL MEASUREMENTS *(Centimeters)*

SKELETAL MEMBER	METHOD	RIGHT	LEFT
SKULL			
HUMERUS		31.7	31.3
ULNA		27.8	
RADIUS		25.4	
FEMUR		46.1	
TIBIA		38.8	
FIBULA		38.2	

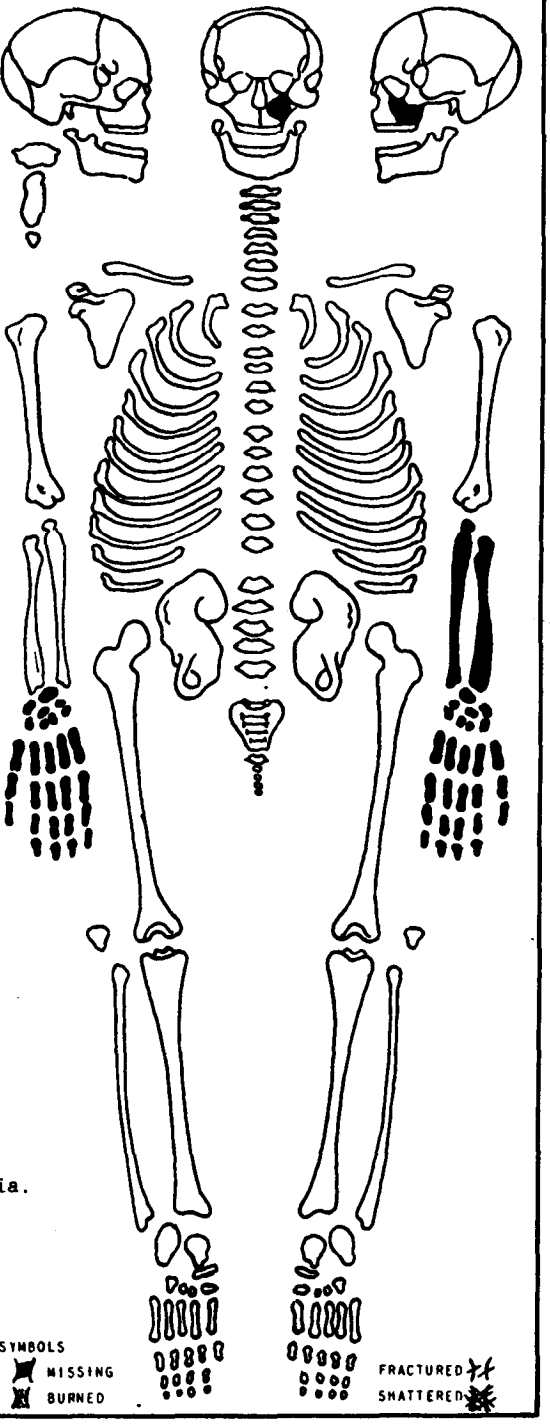
REMARKS OR STATEMENT OF ANTHROPOLOGIST *(Continue on reverse if more space is required)* These are the semiskeletal remains of an average-size man of average muscularity. The skull is medium in size and oval in shape, with moderate parietal bones and a rounded occiput. The forehead is of medium height and presents a slightly sloping profile. The median brow ridges are medium in size. The interorbital space is medium in width with medium sized nasal bones. The nasal bridge is high. These remains were determined to be of the Caucasoid race. There is evidence of a penetrating wound of the face and healed fracture of right tibia.

THE PARTS PRESENT AS INDICATED ON THIS SKELETAL CHART REPRESENTS ONE AND THE SAME INDIVIDUAL

PHYSICAL ANTHROPOLOGIST *(Name)*
Thomas R. Clay

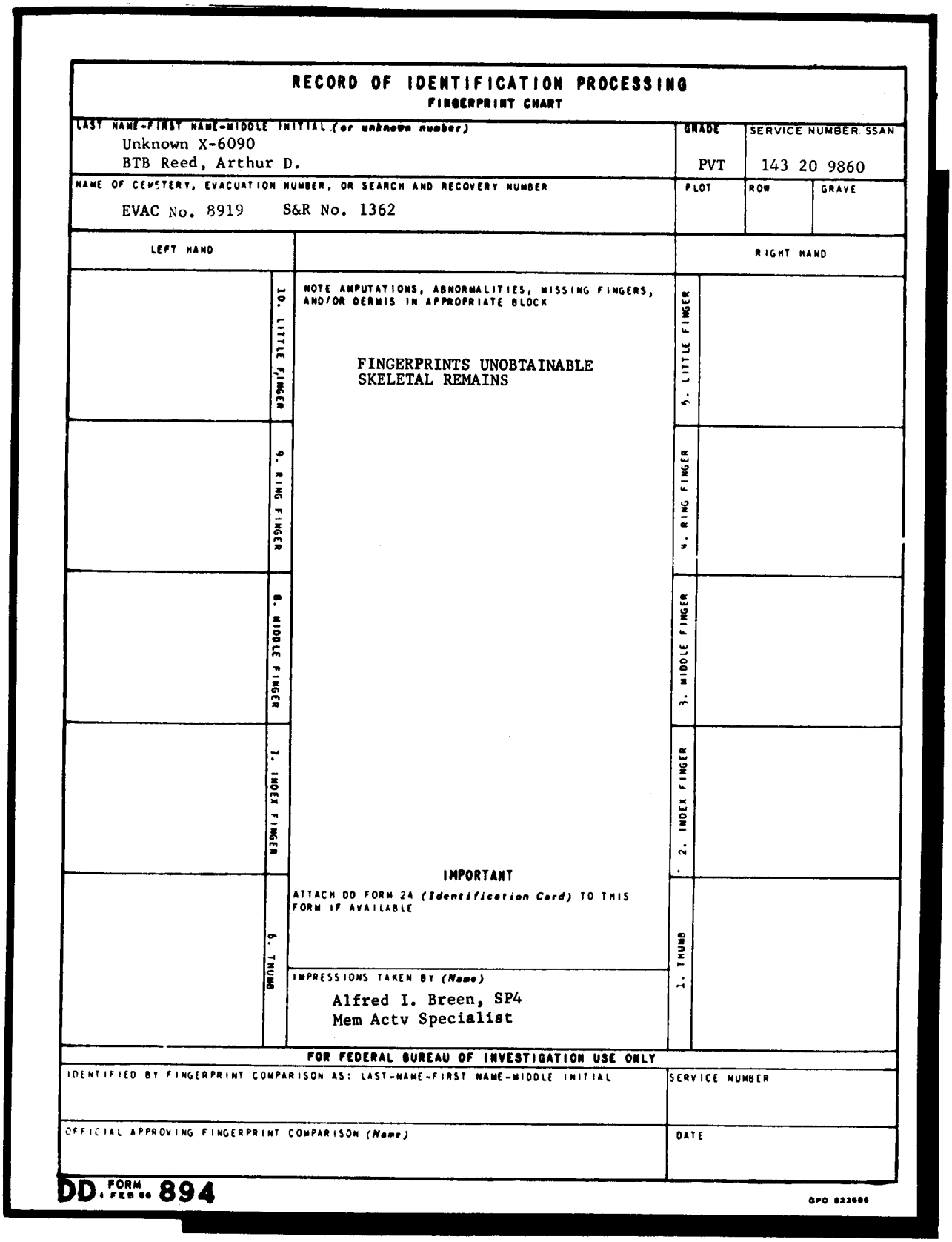
SIGNATURE
Thomas R Clay

BLACK OUT PORTIONS NOT RECOVERED



DD FORM 1 FEB 56 892 REPLACES QMC FORM 1044, 18 MAR 47, WHICH IS OBSOLETE.
U. S. GOVERNMENT PRINTING OFFICE : 1956 O - 317993

Figure I-10. DD Form 892 (Record of Identification Processing—Skeletal Chart).



RECORD OF IDENTIFICATION PROCESSING
FINGERPRINT CHART

LAST NAME-FIRST NAME-MIDDLE INITIAL (or unknown number)	GRADE	SERVICE NUMBER SSAN
Unknown X-6090 BTB Reed, Arthur D.	PVT	143 20 9860

NAME OF CEMETERY, EVACUATION NUMBER, OR SEARCH AND RECOVERY NUMBER	PLOT	ROW	GRAVE
EVAC No. 8919 S&R No. 1362			

LEFT HAND			RIGHT HAND	
	10. LITTLE FINGER	NOTE AMPUTATIONS, ABNORMALITIES, MISSING FINGERS, AND/OR DERMIS IN APPROPRIATE BLOCK FINGERPRINTS UNOBTAINABLE SKELETAL REMAINS	5. LITTLE FINGER	
	9. RING FINGER		4. RING FINGER	
	8. MIDDLE FINGER		3. MIDDLE FINGER	
	7. INDEX FINGER		2. INDEX FINGER	
	6. THUMB	IMPORTANT ATTACH DD FORM 24 (*Identification Card*) TO THIS FORM IF AVAILABLE	1. THUMB	

IMPRESSIONS TAKEN BY (*Name*)
Alfred I. Breen, SP4
Mem Actv Specialist

FOR FEDERAL BUREAU OF INVESTIGATION USE ONLY

IDENTIFIED BY FINGERPRINT COMPARISON AS: LAST-NAME-FIRST NAME-MIDDLE INITIAL	SERVICE NUMBER
OFFICIAL APPROVING FINGERPRINT COMPARISON (*Name*)	DATE

DD FORM 1 FEB 66 894

GPO 823686

Figure I-11. DD Form 894 (Record of Identification Processing—Fingerprint Chart).

g. Statements of Laboratory Findings. Chemical, X-ray, and fluoroscopic findings are given in narrative reports and attached to DD Form 890. Figure I-12 illustrates the three reports: A, the statement of chemical findings; B, the statement of X-ray findings; and C, the statement of fluoroscopic findings.

CENTRAL IDENTIFICATION LABORATORY
CHEMICAL FINDINGS FOR IDENTIFICATION

21 December 19__

Unknown X-6090
(Unknown No.)

26,364 (CIL Case No.) Evac No. 8919/2017 S&R 1362/2017 (Place of Burial) (Plot) (Row) (Grave)

FINDINGS:

1. Two pieces of a boot top, russet, size 9½D, bearing in ink: ''PVT A?THUR REED D,'' one time.
2. One piece of belt, web, waist, bearing:
   a. in ink ''ARTHUR D. R??D, ???279867'' one time.
   b. stamp ''R-078?,'' one time.
3. One piece of trouser, bearing laundry mark:
   a. ''S5573,'' one time.
   b. ''S5573,'' one time.
4. One piece of jacket, size 36 R medium, bearing laundry mark ''B__5__,'' one time.

Infrared photograph was taken of the above listed items.

JAMES L. LOVE
DAC
Chemical Technician

Figure I-12. Statements of laboratory findings.

CENTRAL IDENTIFICATION LABORATORY
X-RAY FINDINGS FOR IDENTIFICATION

21 December 19__

Unknown X-6090
(Unknown No.)

26,364 (CIL Case No.)

Evac No. 8919/2017 S&R 1362/2017
(Place of Burial) (Plot) (Row) (Grave)

FINDINGS:

In examining the X-rays made of subject remains, I noted a small piece of shrapnel lodged in the ulna about 4 inches below the right elbow. Also, I saw a healed fracture of the right tibia about 3 inches above the ankle. The fracture appeared to have been one occurring during childhood. The calcaneous growth at the site is extensive.

Thomas R. Clay
THOMAS R. CLAY
DAC
Anthropologist

Figure I-12—Continued

CENTRAL IDENTIFICATION LABORATORY
FLUOROSCOPIC FINDINGS FOR IDENTIFICATION

21 December 19__

Unknown X-6090
(Unknown No.)

26,364 (CIL Case No.)

Evac No. 8919/2017 S&R 1362/2017
(Place of Burial) (Plot) (Row) (Grave)

FINDINGS:

The fluoroscopic examination of the remains revealed a piece of shrapnel lodged near the right elbow and a healed fracture of the right tibia. X-ray plates were made of the two areas.

Ronald J. Sweeney

RONALD J. SWEENEY
SP-4
X-Ray Technician

Figure I-12—Continued

h. DD Form 898. Data on DD Form 898 and attached DA Form 1155 (Witness Statement on Individual) and SF 603 (Health Record—Dental) are used in establishing an association between the unknown remains and another casualty (fig I-13, I-14, 1-15).

RECORD DATA
(DECEASED AND MISSING PERSONNEL)

CHECK ONE: ☐ DEAD ☒ MISSING | DATE: 5 Aug 19__

STATUS

LAST NAME - FIRST NAME - MIDDLE INITIAL	GRADE	SERVICE NUMBER
REED, Arthur D.	PVT	143 20 9860

ORGANIZATION	FORMER SERVICE NUMBERS
Co. A, 66th Inf Bn, 15th Inf Div	None

DATE OF DEATH - MISSING STATUS	CAUSE OF DEATH	PLACE OF DEATH - OR LAST SEEN IF MISSING
11 July 19__		CT 268337 Jerseyville, Erewhon
DATE OF BIRTH: 19 Jul		

PHYSICAL CHARACTERISTICS

RACE	CREED	HEIGHT	WEIGHT
Caucasian	Not of record	68 inches	143 pounds

COLOR EYES	COLOR HAIR	SHOE SIZE	BLOOD TYPE
Blue	Brown	Not of record	O pos

FRACTURES AND/OR BREAKS	TATTOOS AND SCARS
Old fracture of right tibia	None of record

RECORD INCLOSURES

DENTAL DATA ☐ NONE OF RECORD ☒ INCLOSED *(Itemize by Form Number and Date of Record)*

SF 603 w/X-rays dated 9 Apr __
SF88, Report of medical examination 7 Apr. ___.

CASUALTY DATA ☒ CASUALTY REPORT [x] STATEMENTS OF WITNESSES ☐ MISSING PERSONS SUPPLEMENTARY REPORT *(AF Form 484)*
☐ OTHER *(Specify)*

DA Form 1155, dated 15 Jul __

ADDITIONAL DATA

PVT Reed was reported missing from his unit after a ground engagement with the enemy. The ground was lost to the enemy; therefore, no search was made on termination of the action.

DD FORM 1 FEB 66 898 REPLACES OQMG FORM 371, 24 JAN 51, WHICH IS OBSOLETE. GPO 1966 O - 377784

Figure I-13. DD Form 898 (Record Data (Deceased and Missing Personnel)).

WITNESS STATEMENT ON INDIVIDUAL (AR 600-10)

CHECK APPLICABLE BOX: ☐ MIS ☒ MIA ☐ CAP ☐ DET ☐ DEAD (Remains not recovered)

1. LAST NAME - FIRST NAME - MIDDLE NAME: REED, Arthur D.	2. SERVICE NO.: 143 20 9860
3. GRADE: Private	4. DATE OF DEATH OR WHEN LAST SEEN: 0400 11 Jul __
5. ORGANIZATION: Co A, 66th Inf Bn, 15th Inf Div	6. GEOGRAPHICAL LOCATION (Include grid coordinates and nearby town): Jerseyville Erewhon CT 266337

7. IF ITEMS 1 AND 2 ARE UNKNOWN OR NOT POSITIVE, COMPLETE ITEMS LISTED BELOW:

AGE	WEIGHT	HEIGHT	HAIR	EYES	RACE
21	143	5'8''	Brown	Blue	Cau

HOME TOWN	CIVILIAN OCCUPATION	NICKNAME
Knoxville, Tenn	Bank Clerk	Danny

WAS HE MARRIED? (If so, give wife's name if known)	DID HE HAVE ANY CHILDREN? (If so, give names if known)
NO	NO

OTHER IDENTIFYING MARKS (such as tattoos or birthmarks)	OTHER PERSONS WHO MAY HAVE WITNESSED THIS INCIDENT OR HAVE FURTHER INFORMATION
UNKNOWN	PVT Mark Hale, Co A, 66th Inf Bn, 15th Inf Div

DA FORM 1155, 1 Jun 66 — REPLACES EDITION OF 1 JUN 61, WHICH WILL BE ISSUED AND USED UNTIL EXHAUSTED.

8. CIRCUMSTANCES SURROUNDING INCIDENT (If known, include cause of death or condition when last seen, and how identified)

Last seen in ground engagement with the enemy area at 0400 in Jerseyville CT 266337 Erewhon.

Company muster taken on arrival at company area at 0600 hours, 12 Jul __ PVT Reed not present and/or accounted for.

The ground was lost to the enemy; therefore, no search of the grounds could be made.

9. NAME OF PERSON MAKING STATEMENT	10. SERVICE NO.	11. UNIT
SGT Charles Vick	321 84 1210	Co A, 66th Inf Bn, 15th Inf Div

12. DATE	13. SIGNATURE
15 Jul __	Charles Vick

☆ U.S. GOVERNMENT PRINTING OFFICE 1966 O—222-226

Figure I-14. DA Form 1155 (Witness Statement on Individual).

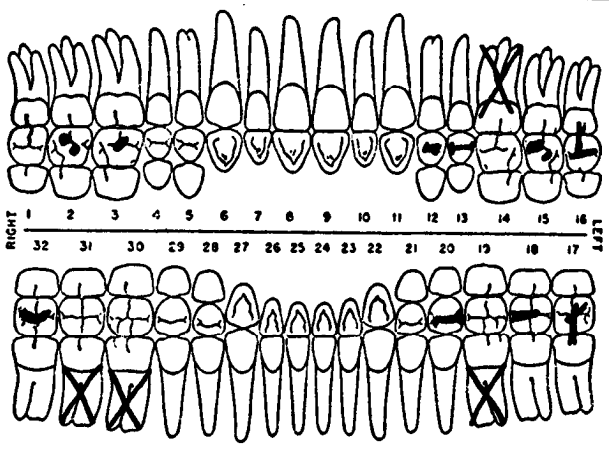
Standard Form 603
Rev. November 1953
Bureau of the Budget
Circular A-32 (Rev.)

HEALTH RECORD — **DENTAL**

SECTION I. DENTAL EXAMINATION

1. PURPOSE OF EXAMINATION: INITIAL | SEPARATION | OTHER (*Specify*) Re-examination
2. TYPE OF EXAM.: X | 1 | 2 | 3 | 4
3. DENTAL CLASSIFICATION: X | 1 | 2 | 3 | 4 | 5

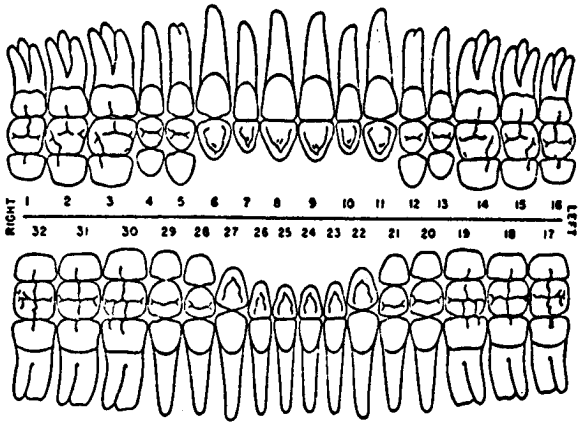
4. MISSING TEETH AND EXISTING RESTORATIONS



REMARKS

PLACE OF EXAMINATION: Ft. Blank, Calif.
DATE: 9 Apr ___
SIGNATURE OF DENTIST COMPLETING THIS SECTION: Robert L. Lee

5. DISEASES, ABNORMALITIES, AND X-RAYS



A. CALCULUS: | SLIGHT | X | MODERATE | | HEAVY
B. PERIODONTOCLASIA: | LOCAL | | GENERAL | | INCIPIENT | | MODERATE | | SEVERE
C. STOMATITIS (*Specify*) | GINGIVITIS | | VINCENT'S
D. DENTURES NEEDED (*Include dentures needed after indicated extractions*)

FULL		PARTIAL	
U	L	U	L

ABNORMALITIES OF OCCLUSION—REMARKS

#7 slightly laps #8
#24 in lingual version

E. INDICATE X-RAYS USED IN THIS EXAMINATION

	FULL MOUTH PERIAPICAL		POSTERIOR BITE-WINGS		OTHER (*Specify*)
X		X			

DATE: 9 Apr ___
PLACE OF EXAMINATION: Ft. Blank, California
SIGNATURE OF DENTIST COMPLETING THIS SECTION: Robert L. Lee

SECTION II. PATIENT DATA

6. SEX	7. RACE	8. GRADE, RATING, OR POSITION	9. ORGANIZATION UNIT	10. COMPONENT OR BRANCH	11. SERVICE, DEPT., OR AGENCY
M	W	PVT	Co A, 66th Inf Bn, 15th Inf Div	Inf	Army

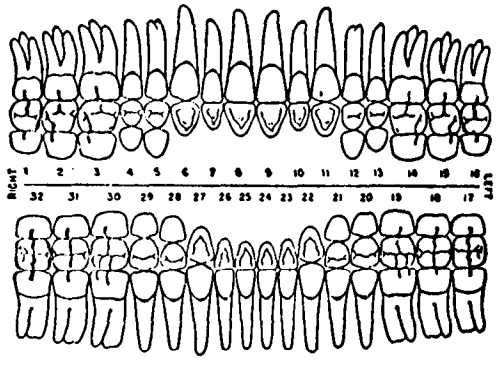
12. PATIENT'S LAST NAME—FIRST NAME—MIDDLE NAME	13. DATE OF BIRTH (DAY-MONTH-YEAR)	14. IDENTIFICATION NO.
Reed, Arthur D.	19 July 19 ___	143 20 9860

DENTAL
Standard Form 603
603-102

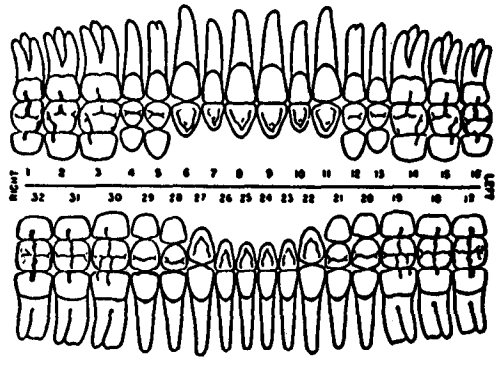
Figure I-15. SF 603 (Health Record—Dental).

SECTION III. ATTENDANCE RECORD

15. RESTORATIONS AND TREATMENTS (*Completed during service*)



16. SUBSEQUENT DISEASES AND ABNORMALITIES



REMARKS

REMARKS

17. SERVICES RENDERED

DATE	DIAGNOSIS—TREATMENT	CLASS	OPERATOR AND DENTAL FACILITY	INITIALS
9 Apr	Car #32 - F-AM		Ft. Blank, California	
		1	Robert L. Lee	R.L.L.

PATIENT'S LAST NAME—FIRST NAME—MIDDLE NAME

REED, Arthur D.

GPO : 1969—618—16—80360-1 332-644

Figure I-18—Continued

i. *DD Form 897*. Army physical and dental records for the casualty associated with the remains are compared on DD Form 897 in figure 1-16.

PHYSICAL AND DENTAL COMPARISON CHART

REMAINS OF X-6090 Evac No. 8919/2017		NAME REED, Arthur D. 143 20 9860	
1	O (Carious)	1	
2	Broken	2	O-AM O-AM
3	Broken	3	O-AM
4	Broken	4	
5	Broken	5	
6		6	
7		7	
8	Wear on incisal edge	8	
9	Wear on incisal edge	9	
10		10	
11	F (Carious)	11	
12	DO-AM	12	DO-AM
13	MOD-AM	13	MOD-AM
14	X	14	X
15	O-AM O-AM	15	O-AM O-AM
16	FO-AM	16	FO-AM
17	FO-AM FM.F (Carious)	17	FO-AM
18	MO-AM DF.F. (Carious)	18	MO-AM
19	X	19	X
20	DO-AM	20	DO-AM
21	D (Carious)	21	
22		22	
23		23	
24		24	
25		25	
26		26	
27		27	
28		28	
29	D (Carious)	29	
30	X	30	X
31	X	31	X
32	O-AM F-AM M (Carious)	32	O-AM F-AM
ESTIMATED HEIGHT Fem + Fib- 5'8 1/3" Fem + Tib- 5'8 1/2"		HEIGHT 5' 8"	
ESTIMATED WEIGHT UTD		WEIGHT 143	
ESTIMATED AGE 19 - 21 years		AGE 21 years	
HAIR Brown		HAIR Brown	

REMARKS

Race: White
Boots: 9½D

Wear on teeth Nos. 8 and 9.

Tooth No. 24 in slight lingual position

Race: White
Shoe size: No record

Tooth No. 7 slightly laps tooth No. 8.

Tooth No. 24 in lingual version

DD Form 897, 1 Feb 56 Replaces OQMG Form 1961, 23 Feb 51, which is obsolete.

Figure I-16. DD Form 897 (Physical and Dental Comparison Chart).

I-4. Action by US Army Memorial Activities Directorate

The US Army Memorial Activities Directorate reviews and researches the case further, when necessary, to establish adequacy of identification.

APPENDIX J

ESTIMATES OF STATURE FROM MAXIMUM LENGTHS OF LONG BONE MEASUREMENTS

J-1. General

Studies conducted indicate that the established height of deceased persons may be determined from bone measurements of their skeletal remains. The studies were based on measurements of military personnel taken when they entered the service and on the maximum lengths of long bones of the skeletal remains of these persons. Data for a large number of American White and Negro males and a small number of Mongoloids, Mexicans, and Puerto Ricans were used.

J-2. Formulas

Formulas' for estimating the stature of each of the five racial groups of American males were determined from data obtained from studies. Scales were developed using formulas, furnished for each racial group, with the exception of Puerto Ricans because of the small number of samples used for this group. However, since the values for Puerto Ricans differ only slightly from those for the American Negro, the table for estimating the stature of the American Negro is used for a Puerto Rican. Estimates of stature from long bones of each racial group are given in tables J-1 through J-4. To achieve precise stature estimates, the user must *not* average stature estimates obtained from several bones. Table J-5 gives estimates of stature based on the sum of measurements of the femur plus the fibula. Table J-6 gives estimates of stature from maximum lengths of the sum of measurements of the femur plus the tibia.

J-3. Bone Length-Stature Relationship

Studies of bone length-stature relationship show the leg bones correlate better with the stature than do the arm bones. Therefore, the lengths of the leg bones are preferred over those of the arm bones. However, when: leg bones are missing or badly fractured, then arm bone measurements are used.

J-4. Applying the Formulas

First the race of the skeletal remains is determined and the lengths of the long bones are measured in centimeters. Then the appropriate formula is selected from table J-7 in the order of preference shown for each racial group. Only one formula should be used for an individual remains, and it should be the formula with the least standard error of estimate according to the bones that are available.

[1] In the published studies, the authors speak of the formulas as either regression equations or regression formulas.

Table J-1. Estimation of Stature From Long Bones of American White Males[1]

[Raised number indicates numerator of fraction of inch expressed in 10ths; thus, 60⁹ reads 60 9/10 inches]

Humerus		*Radius*		*Ulna*		*Femur*		*Tibia*		*Fibula*	
CMS	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*
25.6	59⁰										
25.9	60¹					37.3	59⁰				
26.2	60³	19.1	59⁰	20.8	59⁰	37.7	60¹	28.7	59⁰	29.5	59⁰
26.5	60⁰	19.3	60¹	21.1	60¹	38.1	60⁰	29.1	60⁰	29.9	60¹
26.8	61¹	19.6	60³	21.3	60³	38.5	61⁰	29.5	60⁴	30.3	60⁷
27.1	61⁰	19.8	60⁰	21.6	61⁰	38.9	61¹	29.9	60⁷	30.7	61¹
27.5	62⁰	20.1	61¹	21.9	61⁴	39.3	61⁷	30.3	61¹	31.3	61⁵
27.8	62⁴	20.4	61⁷	22.2	61⁸	39.8	62¹	30.7	61⁵	31.4	61⁰
28.1	62⁷	20.6	62⁰	22.4	62¹	40.2	62³	31.1	61⁰	31.8	62¹
28.4	63¹	20.9	62³	22.7	62³	40.6	62⁰	31.5	62¹	32.3	62⁷
28.8	63³	21.2	62⁰	23.0	63⁰	41.0	63¹	31.9	62⁸	32.6	63¹
29.1	63⁰	21.4	63²	23.2	63³	41.4	63⁵	32.3	63⁰	32.9	63⁴
29.4	64¹	21.7	63⁰	23.5	63⁷	41.9	64¹	32.7	63⁴	33.3	63⁸
29.7	64³	22.0	64¹	23.8	64¹	42.3	64⁴	33.1	63⁸	33.7	64⁷
30.1	65⁰	22.2	64⁴	24.0	64⁴	42.7	64⁸	33.5	64⁷	34.0	64³
30.4	65³	22.5	64⁸	24.3	64⁸	43.1	65²	33.9	64⁸	34.4	64⁸
30.7	65⁷	22.8	65⁴	24.6	65³	43.5	65³	34.3	64⁸	34.8	65¹
31.0	66⁰	23.0	65⁸	24.9	65⁷	44.0	66⁰	34.7	65¹	35.2	65³
31.4	66³	23.3	66⁰	25.1	66⁰	44.4	66⁴	35.1	65⁷	35.5	66¹
31.7	66⁸	23.5	66³	25.4	66⁴	44.8	66⁷	35.5	66¹	35.9	66³
32.0	67²	23.8	66⁸	25.7	66⁸	45.2	67¹	35.9	66³	36.3	66⁸
32.3	67³	24.1	67²	25.9	67²	45.6	67⁴	36.3	66⁸	36.7	67¹
32.7	68⁰	24.3	67³	26.2	67⁶	46.1	67⁸	36.7	67²	37.0	67⁵
33.0	68³	24.6	68⁰	26.5	68⁰	46.5	68¹	37.1	67⁵	37.4	68⁰
33.3	68⁶	24.9	68⁴	26.7	68³	46.9	68³	37.5	68⁰	37.8	68⁴
33.6	69⁰	25.1	68⁷	27.0	68⁸	47.3	69⁰	37.9	68⁴	38.1	68⁷
33.9	69³	25.4	69²	27.3	69²	47.7	69⁴	38.3	68⁷	38.5	69¹
34.3	69⁸	25.7	69⁶	27.6	69⁶	48.2	69⁸	38.6	69⁰	38.9	69³
34.6	70¹	25.9	69⁸	27.8	69⁸	48.6	70²	39.0	69⁴	39.3	70⁰
34.9	70³	26.2	70⁴	28.1	70³	49.0	70⁶	39.4	69⁸	39.6	70¹
35.2	70⁸	26.5	70⁸	28.4	70⁸	49.4	70⁰	39.8	70²	40.0	70⁷
35.6	71³	26.7	71¹	28.6	71¹	49.8	71³	40.2	70³	40.4	71¹
35.9	71⁶	27.0	71⁶	28.9	71³	50.3	71⁷	40.6	70⁰	40.8	71³
36.2	71⁰	27.2	71⁰	29.2	71⁰	50.7	72¹	41.0	71³	41.1	71⁸
36.5	72³	27.5	72³	29.4	72²	51.1	72⁵	41.4	71⁷	41.5	72²
36.9	72⁷	27.8	72⁷	29.7	72⁷	51.5	72⁸	41.8	72¹	41.9	72⁵
37.2	73¹	28.0	73⁰	30.0	73¹	51.9	73²	42.2	72⁵	42.2	72⁰
37.5	73⁴	28.3	73⁵	30.3	73⁵	52.4	73⁷	42.6	72⁸	42.6	73³
37.8	73⁸	28.6	73⁰	30.5	73⁸	52.8	74⁰	43.0	73²	43.0	73⁷
38.3	74²	28.8	74²	30.8	74²	53.2	74⁴	43.4	73⁶	43.4	74¹
38.5	74⁶	29.1	74⁷	31.1	74⁷	53.6	74.8	43.8	74⁰	43.7	74⁴
38.8	74⁹	29.4	75¹	31.3	75⁰	54.0	75¹	44.2	74⁴	44.1	74⁸
39.1	75²	29.6	75⁴	31.6	75⁴	54.5	75⁶	44.6	74⁷	44.5	75³
39.5	75⁷	29.9	75⁹	31.9	75⁸	54.9	75⁹	45.0	75¹	44.9	75⁷
39.8	76⁰	30.2	76²	32.1	76¹	55.3	76²	45.4	75⁵	45.2	76⁰
40.1	76⁴	30.4	76⁶	32.4	76⁴	55.7	76⁷	45.8	75⁹	45.6	76⁴
40.4	76⁷	30.7	77¹	32.7	77⁰	56.1	77⁰	46.2	76³	46.0	76⁸
40.8	77²	30.9	77⁴	33.0	77⁴	56.6	77⁵	46.6	76⁵	46.3	77¹
41.1	77⁵	31.2	77⁸	33.2	77⁷	57.0	77⁸	47.0	77⁰	46.7	77⁵
41.4	77⁹	31.5	78²	33.5	78¹	57.4	78²	47.4	77⁴	47.1	77⁸

[1] When the stature estimate of a White male is compared with the stature measurement taken before the man was 21 years of age, the measured stature should increased according to the time lapse between measurement and death (table J-8). The stature estimate for a man over 30 years of age should be reduced by .06 (a in years—30) cm.

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based a study made by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-2. Estimation of Stature From Long Bones of American Negro Males[1]

[Raised number indicates numerator of fraction of inch expressed in 10ths; thus, 60⁹ reads 60 9/10 inches]

Humerus		*Radius*		*Ulna*		*Femur*		*Tibia*		*Fibula*	
CMS	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*
26.4	59⁴										
26.7	60⁰										
27.0	60³	20.0	59⁸	21.7	59⁸	37.9	59⁸				
27.3	60⁷	20.3	60²	22.0	60³	38.3	60¹	29.6	59¹		
27.6	61⁰	20.6	60⁶	22.3	60⁷	38.7	60⁴	30.1	59⁸	30.3	59⁴
27.9	61⁴	20.9	61⁰	22.6	61¹	39.1	60⁸	30.6	60⁰	30.8	59⁸
28.2	61⁷	21.2	61³	22.9	61⁴	39.6	61²	31.0	60³	31.2	60³
28.5	62⁰	21.5	61⁷	23.2	61⁸	40.1	61⁶	31.5	60⁸	31.7	60⁷
28.8	62⁴	21.8	62¹	23.5	62²	40.6	62⁰	32.0	61²	32.1	61¹
29.1	62⁷	22.1	62⁵	23.8	62⁶	41.0	62³	32.4	61⁵	32.6	61⁵
29.4	63¹	22.4	62⁹	24.2	63¹	41.5	62⁷	32.9	62⁰	33.0	61⁹
29.7	63⁴	22.6	63²	24.5	63⁴	42.0	63²	33.3	62³	33.5	62⁴
30.0	63⁷	22.9	63⁶	24.8	63⁸	42.5	63⁶	33.8	62⁷	33.9	62⁸
30.3	64¹	23.2	64⁰	25.1	64²	43.0	64⁰	34.2	63¹	34.4	63²
30.6	64⁴	23.5	64⁴	25.4	64⁶	43.4	64³	34.7	63⁵	34.9	63⁷
31.0	64⁹	23.8	64⁷	25.7	65⁰	43.9	64⁷	35.2	64⁰	35.3	64⁰
31.3	65²	24.1	65¹	26.0	65³	44.4	65¹	35.6	64³	35.8	64⁵
31.6	65⁵	24.4	65⁵	26.3	65⁷	44.9	65⁵	36.1	64⁷	36.2	64⁸
31.9	65⁹	24.7	65⁹	26.6	66¹	45.3	65⁹	36.5	65¹	36.7	65³
32.2	66²	25.0	66³	26.9	66⁵	45.8	66³	37.0	65⁵	37.1	65⁷
32.5	66⁶	25.3	66⁷	27.2	66⁹	46.3	66⁷	37.4	65⁹	37.6	66²
32.8	66⁹	25.6	67¹	27.5	67²	46.8	67¹	37.9	66³	38.1	66⁶
33.1	67²	25.9	67⁵	27.8	67⁶	47.2	67⁵	38.3	66⁶	38.5	67⁰
33.4	67⁶	26.2	67⁹	28.1	68⁰	47.7	67⁹	38.8	67¹	39.0	67⁵
33.7	67⁹	26.4	68¹	28.4	68⁴	48.2	68³	39.3	67⁵	39.4	67⁸
34.0	68³	26.7	68⁵	28.7	68⁷	48.7	68⁷	39.7	67⁸	39.9	68³
34.3	68⁶	27.0	68⁹	29.1	69²	49.1	69⁰	40.2	68³	40.3	68⁷
34.6	68⁹	27.3	69³	29.4	69⁶	49.6	69⁴	40.6	68⁶	40.8	69¹
34.9	69³	27.6	69⁷	29.7	70⁰	50.1	69⁹	41.1	69⁰	41.3	69⁵
35.2	69⁶	27.9	70¹	30.0	70⁴	50.6	70³	41.5	69⁴	41.7	69⁹
35.6	70¹	28.2	70⁵	30.3	70⁸	51.0	70⁶	42.0	69⁸	42.2	70⁴
35.9	70⁴	28.5	70⁹	30.6	71¹	51.5	71⁰	42.5	70³	42.6	70⁸
36.2	70⁸	28.8	71³	30.9	71⁵	52.0	71⁴	42.9	70⁶	43.1	71²
36.5	71¹	29.1	71⁷	31.2	71⁹	52.5	71⁸	43.4	71⁰	43.5	71⁶
36.8	71⁴	29.4	72¹	31.5	72³	52.9	72²	43.8	71⁴	44.0	72¹
37.1	71⁸	29.7	72⁵	31.8	72⁶	53.4	72⁶	44.3	71⁸	44.5	72⁵
37.4	72¹	30.0	72⁹	32.1	73⁰	53.9	73⁰	44.7	72¹	44.9	72⁹
37.7	72⁵	30.2	73¹	32.4	73⁴	54.4	73⁴	45.2	72⁵	45.4	73⁴
38.0	72⁸	30.5	73⁵	32.7	73⁸	54.8	73⁷	45.6	72⁹	45.8	73⁷
38.3	73¹	30.8	73⁹	33.0	74²	55.3	74²	46.1	73⁴	46.3	74²
38.6	73⁵	31.1	74³	33.3	74⁵	55.8	74⁶	46.6	73⁸	46.7	74⁵
38.9	73⁸	31.4	74⁷	33.6	74⁹	56.3	75⁰	47.0	74¹	47.2	75⁰
39.2	74²	31.7	75¹	34.0	75⁴	56.7	75³	47.5	74⁵	47.6	75⁴
39.5	74⁵	32.0	75⁵	34.3	75⁸	57.2	75⁷	47.9	74⁹	48.1	75⁸
39.8	74⁸	32.3	75⁹	34.6	76²	57.7	76¹	48.4	75¹	48.6	76³
40.1	75²	32.6	76²	34.9	76⁵	58.2	76⁵	48.8	75⁷	49.0	76⁷
40.5	75⁶	32.9	76⁶	35.2	76⁹	58.6	76⁹	49.3	76¹	49.5	77¹
40.8	76⁰	33.2	77⁰	35.5	77³	59.1	77³	49.8	76⁵	49.9	77⁵
41.1	76³	33.5	77⁴	35.8	77⁷	59.6	77⁷	50.2	76⁹	50.4	78⁰
41.4	76⁷	33.7	77⁷	36.1	78⁰	60.1	78¹	50.7	77³	50.8	78¹
41.7	77⁰	34.0	78¹	36.4	78⁴	60.5	78⁵	51.1	77⁷	51.3	78⁵

[1] The stature estimate for a man over 30 years of age should be reduced by .06 (age in years—30) cm.

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based on a study made by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-3. Estimation of Stature From Long Bones of American Mongoloid Males[1]

[Raised number indicates numerator of fraction of inch expressed in 10ths; thus, 60" reads 60 9/10 inches]

Humerus		*Radius*		*Ulna*		*Femur*		*Tibia*		*Fibula*	
CMS	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*
25.5	59[7]										
25.8	60[0]										
26.1	60[3]					36.7	59[6]				
26.4	60[6]					37.1	60[0]				
26.7	60[9]	19.7	59[7]	21.4	59[8]	37.5	60[3]				
27.0	61[2]	20.0	60[2]	21.7	60[2]	37.9	60[7]				
27.3	61[4]	20.3	60[6]	22.0	60[6]	38.3	61[0]	29.6	59[9]	29.8	59[11]
27.6	61[9]	20.6	61[0]	22.3	61[0]	38.7	61[3]	30.1	60[4]	30.3	60[3]
27.9	62[2]	20.9	61[4]	22.6	61[5]	39.1	61[7]	30.6	60[9]	30.8	60[8]
28.2	62[5]	21.2	61[8]	22.9	61[9]	39.6	62[1]	31.0	61[2]	31.2	61[2]
28.5	62[8]	21.5	62[2]	23.2	62[3]	40.1	62[5]	31.5	61[7]	31.7	61[7]
28.8	63[1]	21.8	62[7]	23.5	62[7]	40.6	62[9]	32.0	62[2]	32.1	62[0]
29.1	63[5]	22.1	63[1]	23.8	63[1]	41.0	63[3]	32.4	62[6]	32.6	62[5]
29.4	63[8]	22.4	63[5]	24.2	63[6]	41.5	63[7]	32.9	63[0]	33.0	62[11]
29.7	64[1]	22.6	63[8]	24.5	64[1]	42.0	64[1]	33.3	63[4]	33.5	63[4]
30.0	64[4]	22.9	64[2]	24.8	64[5]	42.5	64[5]	33.8	63[9]	33.9	63[7]
30.3	64[7]	23.2	64[6]	25.1	64[9]	43.0	65[0]	34.2	64[2]	34.4	64[2]
30.6	65[0]	23.5	65[0]	25.4	65[3]	43.4	65[3]	34.7	64[7]	34.9	64[7]
31.0	65[4]	23.8	65[4]	25.7	65[7]	43.9	65[7]	35.2	65[2]	35.3	65[1]
31.3	65[8]	24.1	65[9]	26.0	66[1]	44.4	66[2]	35.6	65[6]	35.8	65[5]
31.6	66[1]	24.4	66[3]	26.3	66[5]	44.9	66[6]	36.1	66[0]	36.2	65[10]
31.9	66[4]	24.7	66[7]	26.6	66[9]	45.3	66[9]	36.5	66[4]	36.7	66[4]
32.2	66[7]	25.0	67[1]	26.9	67[3]	45.8	67[3]	37.0	66[8]	37.1	66[8]
32.5	67[0]	25.3	67[5]	27.2	67[6]	46.3	67[6]	37.4	67[1]	37.6	67[2]
32.8	67[4]	25.6	68[0]	27.5	68[2]	46.8	68[2]	37.9	67[7]	38.1	67[7]
33.1	67[7]	25.9	68[4]	27.8	68[5]	47.2	68[5]	38.3	68[1]	38.5	68[1]
33.4	68[0]	26.2	68[8]	28.1	69[0]	47.7	68[9]	38.8	68[5]	39.0	68[5]
33.7	68[3]	26.4	69[1]	28.4	69[4]	48.2	69[4]	39.3	69[0]	39.4	68[10]
34.0	68[6]	26.7	69[5]	28.7	69[8]	48.7	69[8]	39.7	69[4]	39.9	69[4]
34.3	68[9]	27.0	69[9]	29.1	70[0]	49.1	70[1]	40.2	69[8]	40.3	69[8]
34.6	69[3]	27.3	70[3]	29.4	70[5]	49.6	70[5]	40.6	70[1]	40.8	70[1]
34.9	69[6]	27.6	70[7]	29.7	71[2]	50.1	71[0]	41.1	70[7]	41.3	70[7]
35.2	70[0]	27.9	71[2]	30.0	71[6]	50.6	71[4]	41.5	71[1]	41.7	71[1]
35.6	70[3]	28.2	71[6]	30.3	72[0]	51.0	71[7]	42.0	71[6]	42.2	71[6]
35.9	70[6]	28.5	72[10]	30.6	72[4]	51.5	72[2]	42.5	72[1]	42.6	72[0]
36.2	70[9]	28.8	72[4]	30.9	72[8]	52.0	72[6]	42.9	72[4]	43.1	72[4]
36.5	71[3]	29.1	72[9]	31.2	73[2]	52.5	73[0]	43.4	72[8]	43.5	72[8]
36.8	71[6]	29.4	73[3]	31.5	73[6]	52.9	73[4]	43.8	73[3]	44.0	73[3]
37.1	71[9]	29.7	73[7]	31.8	74[1]	53.4	73[9]	44.3	73[8]	44.5	73[8]
37.4	72[2]	30.0	74[1]	32.1	74[5]	53.9	74[2]	44.7	74[1]	44.9	74[1]
37.7	72[5]	30.2	74[4]	32.4	74[9]	54.4	74[6]	45.2	74[5]	45.4	74[5]
38.0	72[8]	30.5	74[9]	32.7	75[3]	54.8	75[0]	45.6	75[0]	45.8	75[0]
38.3	73[2]	30.8	75[2]	33.0	75[7]	55.3	75[4]	46.1	75[4]	46.3	75[3]
38.6	73[5]	31.1	75[6]	33.3	76[1]	55.8	75[9]	46.6	75[8]	46.7	75[7]
38.9	73[8]	31.4	76[0]	33.6	76[5]	56.3	76[3]	47.0	76[3]	47.2	76[3]
39.2	74[1]	31.7	76[5]	34.0	77[1]	56.7	76[8]	47.5	76[8]	47.6	76[7]
39.5	74[4]	32.0	76[9]	34.3	77[5]	57.2	77[0]	47.9	77[1]	48.1	77[2]
39.8	74[7]	32.3	77[3]	34.6	77[9]	57.7	77[4]	48.4	77[6]	48.6	77[6]
40.1	75[1]	32.6	77[7]	34.9	78[2]	58.2	77[9]	48.8	78[0]	49.0	78[0]
40.5	75[5]	32.9	78[1]	35.2	78[7]	58.6	78[2]	49.3	78[5]	49.5	78[5]
40.8	75[9]	33.2	78[6]	35.5	79[1]	59.1	78[6]	49.8	78[10]	49.9	78[10]
41.1	76[1]	33.5	79[0]	35.8	79[5]	59.6	79[0]	50.2	79[3]	50.4	79[3]
41.4	76[4]	33.7	79[3]	36.1	80[0]	60.1	79[4]	50.7	79[8]	50.8	79[7]
41.7	76[8]	34.0	79[7]	36.4	80[4]	60.5	79[8]	51.1	80[1]	51.3	80[2]

[1] The stature estimate for a man over 30 years of age should be reduced by .06 (age in years—30) cm.

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based a study by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-4. Estimation of Stature From Long Bones of American Mexican Males[1]

[Raised number indicates numerator of fraction of inch expressed in 10ths; thus, 60⁶ reads 60 9/10 inches]

Humerus		*Radius*		*Ulna*		*Femur*		*Tibia*		*Fibula*	
CMS	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*	*CMS*	*Inches*
26.7	59⁸										
27.0	60¹	20.0	59⁷	21.7	59⁸	37.9	59⁵				
27.3	60³	20.3	60¹	22.0	60²	38.3	59⁶	29.6	59²		
27.6	60⁴	20.6	60⁴	22.3	60⁴	38.7	60³	30.1	59⁷	30.3	59⁵
27.9	61²	20.9	61⁰	22.6	61⁰	39.1	60⁷	30.6	60²	30.8	60⁰
28.2	61⁵	21.2	61⁴	22.9	61⁴	39.6	61¹	31.0	60⁵	31.2	60⁴
28.5	61⁹	21.5	61⁸	23.2	61⁹	40.1	61⁶	31.5	61⁰	31.7	60⁶
28.8	62²	21.8	62²	23.5	62¹	40.6	62¹	32.0	61⁵	32.1	61³
29.1	62⁶	22.1	62⁷	23.8	62⁷	41.0	62⁵	32.4	61⁹	32.6	61⁸
29.4	62⁹	22.4	63¹	24.2	63³	41.5	63⁰	32.9	62³	33.0	62²
29.7	63³	22.6	63⁴	24.5	63⁷	42.0	63⁴	33.3	62⁷	33.5	62⁷
30.0	63⁶	22.9	63⁸	24.8	64¹	42.5	63⁹	33.8	63¹	33.9	63¹
30.3	63⁹	23.2	64²	25.1	64⁴	43.0	64⁴	34.2	63⁵	34.4	63⁶
30.6	64³	23.5	64⁶	25.4	65⁰	43.4	64⁸	34.7	64⁰	34.9	64¹
31.0	64⁷	23.8	65⁰	25.7	65⁴	43.9	65³	35.2	64⁴	35.3	64⁴
31.3	65¹	24.1	65⁵	26.0	65⁸	44.4	65⁸	35.6	64⁸	35.8	64⁹
31.6	65⁴	24.4	65⁹	26.3	66²	44.9	66²	36.1	65³	36.2	65³
31.9	65⁸	24.7	66³	26.6	66⁶	45.3	66⁶	36.5	65⁷	36.7	65⁸
32.3	66¹	25.0	66⁷	26.9	67¹	45.8	67¹	37.0	66¹	37.1	66²
32.5	66⁵	25.3	67¹	27.2	67⁵	46.3	67⁶	37.4	66⁵	37.6	66⁷
32.8	66⁸	25.6	67⁶	27.5	67⁹	46.8	68¹	37.9	67⁰	38.1	67²
33.1	67²	25.9	68⁰	27.8	68³	47.2	68⁴	38.3	67³	38.5	67⁶
33.4	67⁵	26.2	68⁴	28.1	68⁷	47.7	68⁸	38.8	67⁸	39.0	68¹
33.7	67⁹	26.4	68⁷	28.4	69²	48.2	69⁴	39.3	68³	39.4	68⁵
34.0	68²	26.7	69¹	28.7	69⁶	48.7	70⁰	39.7	68⁸	39.9	69⁰
34.3	68⁵	27.0	69⁵	29.1	70¹	49.1	70³	40.2	69¹	40.3	69⁴
34.6	68⁹	27.3	69⁹	29.4	70⁶	49.6	70⁷	40.6	69⁵	40.8	69⁹
34.9	69²	27.6	70⁴	29.7	71⁰	50.1	71²	41.1	69⁹	41.3	70⁴
35.2	69⁶	27.9	70⁸	30.0	71⁴	50.6	71⁷	41.5	70³	41.7	70⁷
35.6	70⁰	28.2	71²	30.3	71⁸	51.0	72¹	42.0	70⁸	42.2	71²
35.9	70⁴	28.5	71⁶	30.6	72²	51.5	72⁶	42.5	71²	42.6	71⁶
36.2	70⁷	28.8	72⁰	30.9	72⁷	52.0	73¹	42.9	71⁶	43.1	72¹
36.5	71¹	29.1	72⁴	31.2	73¹	52.5	73⁵	43.4	72¹	43.5	72⁵
36.8	71⁴	29.4	72⁸	31.5	73⁵	52.9	73⁹	43.8	72⁴	44.0	73⁰
37.1	71⁸	29.7	73³	31.8	73⁹	53.4	74⁴	44.3	72⁹	44.5	73⁵
37.4	72¹	30.0	73⁷	32.1	74³	53.9	74⁹	44.7	73³	44.9	73⁹
37.7	72⁴	30.2	74⁰	32.4	74⁸	54.4	75⁴	45.2	73⁷	45.4	74⁰
38.0	72⁸	30.5	74⁴	32.7	75²	54.8	75⁷	45.6	74¹	45.8	74⁸
38.3	73¹	30.8	74⁸	33.0	75⁶	55.3	76²	46.1	74⁶	46.3	75³
38.6	73⁵	31.1	75²	33.3	76⁰	55.8	76⁷	46.6	75⁰	46.7	75⁷
38.9	73⁸	31.4	75⁷	33.6	76⁴	56.3	77²	47.0	75⁴	47.2	76²
39.2	74²	31.7	76¹	34.0	77⁰	56.7	77⁸	47.5	75⁹	47.6	76⁶
39.5	74⁵	32.0	76⁵	34.3	77⁴	57.2	78⁰	47.9	76²	48.1	77⁰
39.8	74⁹	32.3	76⁹	34.6	77⁸	57.7	78⁵	48.4	76⁷	48.6	77⁵
40.1	75²	32.6	77³	34.9	78³	58.2	79⁰	48.8	77¹	49.0	77⁹
40.5	75⁷	32.9	77⁸	35.2	78⁷	58.6	79⁴	49.3	77⁸	49.5	78⁴
40.8	76⁰	33.2	78²	35.5	79¹	59.1	80⁰	49.8	78⁰	49.9	78⁸
41.1	76⁴	33.5	78⁶	35.8	79⁵	59.6	80⁴	50.2	78⁴	50.4	79³
41.4	76⁷	33.7	78⁹	36.1	80⁰	60.1	80⁸	50.7	78⁸	50.8	79⁷
41.7	77⁰	34.0	79²	36.4	80⁴	60.5	81²	51.1	79²	51.3	80²

[1] The stature estimate for a man over 30 years of age should be reduced by .06 (age in years—30) cm.

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based on a study made by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-5. Estimation of Stature Based on the Sum of Measurements of the Femur Plus Fibula (Centimeters)[1]

Bone lengths	*Estimated stature (inches)*		
Fem + Fib (CMS.)	*White*[2]	*Negro*	*Mongoloid*
68.1	59.9	59.0	60.4
69.0	60.4	59.3	60.8
69.9	60.9	59.7	61.2
70.8	61.3	60.1	61.7
71.8	61.9	60.6	62.1
72.7	62.3	61.0	62.6
73.6	62.8	61.5	63.0
74.5	63.2	62.3	63.4
75.5	63.8	62.4	63.9
76.4	64.2	62.8	64.3
77.4	64.7	63.2	64.8
78.3	65.2	63.7	65.3
79.2	65.7	64.1	65.7
80.2	66.2	64.6	66.2
81.1	66.7	65.0	66.6
82.0	67.1	65.4	67.0
82.9	67.6	65.8	67.5
83.9	68.1	66.3	68.0
84.9	68.6	66.8	68.4
85.7	69.0	67.2	68.8
86.7	69.5	67.6	69.3
87.6	70.0	68.1	69.7
88.6	70.5	68.5	70.2
89.4	70.9	68.9	70.6
90.4	71.5	69.4	71.1
91.4	72.0	69.9	71.6
92.3	72.4	70.3	72.0
93.2	72.9	70.7	72.4
94.1	73.4	71.1	72.9
95.1	73.9	71.6	73.3
96.0	74.3	72.0	73.8
96.9	74.8	72.5	74.2
97.9	75.3	72.9	74.7
98.8	75.8	73.4	75.1
99.8	76.3	73.8	75.6
100.6	76.7	74.2	76.0
101.6	77.2	74.7	76.5
102.5	77.7	75.1	76.9
103.5	78.2	75.6	77.4
104.3	78.6	76.0	77.8
105.3	79.1	76.4	78.2
106.3	79.6	76.9	78.7
107.2	80.1	77.3	79.1
108.1	80.6	77.8	79.6
109.0	81.0	78.2	80.0
110.0	81.6	78.7	80.5
110.9	82.0	79.1	80.9
111.8	82.5	79.5	81.4

[1] The stature estimate for a man over 30 years of age should be reduced by .06 (age in years—30) cm.

[2] When a stature of a White male is to be compared with a stature measurement taken before the man was 21 years of age, the measured stature should be increased according to the time lapse between measurement and death (table J-8).

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based on a study made by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-6. Estimates of Stature From Maximum Lengths of the Sum of Measurements of the Femur Plus Tibia[1]

[Raised number indicates numerator of fraction of inch expressed in 10ths; thus, 60[9] reads 60 9/10 inches]

Bone lengths		*Estimated statures (inches)*	
Fem + Tib	*White*[2]	*Negro*	*Mongoloid*
66.4	59[4]	58[3]	59[6]
67.2	59[7]	58[7]	60[0]
68.0	60[1]	59[0]	60[4]
68.8	60[5]	59[4]	60[8]
69.6	60[9]	59[8]	61[1]
70.5	61[4]	60[2]	61[6]
71.3	61[8]	60[5]	62[0]
72.1	62[2]	60[9]	62[3]
72.9	62[6]	61[3]	62[7]
73.7	63[0]	61[6]	63[1]
74.6	63[4]	62[0]	63[5]
75.4	63[8]	62[4]	63[9]
76.2	64[2]	62[7]	64[3]
77.0	64[6]	63[1]	64[7]
77.8	65[0]	63[5]	65[1]
78.7	65[5]	63[0]	65[6]
79.5	65[9]	64[2]	65[9]
80.3	66[3]	64[6]	66[3]
81.1	66[7]	64[9]	66[7]
81.9	67[0]	65[3]	67[0]
82.8	67[5]	65[7]	67[5]
83.6	67[9]	66[1]	67[9]
84.4	68[3]	66[4]	68[2]
85.2	68[7]	66[8]	68[6]
86.0	69[1]	67[2]	69[0]
86.8	69[5]	67[5]	69[4]
87.6	69[9]	67[9]	69[8]
88.4	70[3]	68[3]	70[2]
89.2	70[7]	68[6]	70[6]
90.0	71[1]	69[0]	70[9]
90.9	71[5]	69[4]	71[4]
91.7	71[9]	69[7]	71[7]
92.5	72[3]	70[1]	72[1]
93.3	72[7]	70[5]	72[5]
94.1	73[1]	70[9]	72[9]
95.0	73[6]	71[3]	73[3]
95.8	74[0]	71[6]	73[7]
96.6	74[4]	72[0]	74[1]
97.4	74[8]	72[3]	74[5]
98.2	75[2]	72[7]	74[9]
99.1	75[6]	73[1]	75[3]
99.9	76[0]	73[5]	75[7]
100.7	76[4]	73[8]	76[1]
101.5	76[8]	74[2]	76[5]
102.3	77[2]	74[6]	76[9]
103.2	77[7]	75[0]	77[3]
104.0	78[1]	75[3]	77[7]
104.8	78[5]	75[7]	78[0]

[1] The stature estimate for a person over 30 years of age should be reduced by .06 (age in years—30) cm.

[2] When a stature of a White male is to be compared with a stature measurement taken before the man was 21 years of age, the measured stature should be increased according to the time lapse between measurement and death (table J-8).

The above information and scale, obtained by applying formulas for estimating stature (cm) to given bone lengths (cm), are based on a study made by Mildred Trotter and Goldine C. Gleser, 1958.

Table J-7. Formulas to Estimate the Living Stature of American Males[1] [2]

White[3]		Negro	
1.31 (Fem + Fib) + 63.05	±3.62	1.20 (Fem + Fib) + 67.77	±3.63
1.26 (Fem + Tib) + 67.09	±3.74	1.15 (Fem + Tib) + 71.75	±3.68
2.60 Fib + 75.50	±3.86	2.10 Fem + 72.22	±3.91
2.32 Fem + 65.53	±3.94	2.19 Tib + 85.36	±3.96
2.42 Tib + 81.93	±4.00	2.34 Fib + 80.07	±4.02
1.82 (Hum + Rad) + 67.97	±4.31	1.66 (Hum + Rad) + 73.08	±4.18
1.78 (Hum + Ulna) + 66.98	±4.37	1.65 (Hum + Ulna) + 70.67	±4.23
2.89 Hum + 78.10	±4.57	2.88 Hum + 75.48	±4.23
3.79 Rad + 79.42	±4.66	3.32 Rad + 85.43	±4.57
3.67 Ulna + 75.55	±4.72	3.20 Ulna + 82.77	±4.74

Mongoloid		Mexican	
1.22 (Fem + Fib) + 70.24	±3.18		
1.22 (Fem + Tib) + 70.37	±3.24		
2.40 Fib + 80.56	±3.24	2.44 Fem +58.67	±2.99
2.39 Tib + 81.45	±3.27	2.50 Fib + 75.44	±3.52
2.15 Fem + 72.57	±3.80	2.36 Tib + 80.62	±3.73
1.68 (Hum + Ulna) + 71.18	±4.14		
1.67 (Hum + Rad) + 74.83	±4.16		
2.68 Hum + 83.19	±4.25	3.55 Rad + 80.71	±4.04
3.54 Rad + 82.00	±4.60	3.56 Ulna + 74.56	±4.05
3.48 Ulna + 77.45	±4.66	2.92 Hum + 73.94	±4.24

[1] Formulas are based on long bone measurements (cm), with standard errors, and are given in order of preference.
[2] The stature estimate for a man over 30 years of age should be reduced by .06 (age in years−30) cm.
[3] When the stature estimate of a White male is compared with the stature measurement taken before the man was 21 years of age, the measured stature should be increased according to the time lapse between measurement and death (table J-8).

a. First Example. The remains under observation is of the Mongoloid race. Both femur are missing; however, bone measurements are made of the fibula and tibia. Referring to the order of preference for Mongoloids, the formula for the fibula precedes that for the tibia; therefore, the formula to be applied for stature estimate is 2.40 Fib + 80.56 or 2.40 x length in centimeters for fibula + 80.56. This gives the estimated stature in centimeters for the remains under observation.

b. Second Example. The recorded height of a White male when he entered the service may vary from the height of the remains associated with this person. Table J-8 shows the average increase (cm) in stature of American White males in half-year intervals and multiples thereof from 17 to 21 years of age. The average increase in height of a White male, as determined from the table, is added to the stature measurement taken at the time he entered the service. This figure is the approximate height of the person at the time of death. The complete skeletal remains of a White male are recovered. Bone measurements obtained are as follows:

Humerus 31.7cm	Femur .. .46.1cm
Ulna 27.8cm	Tibia . . .38.8cm
Radius . .25.4cm	Fibula . . ...38.2 cm

Since the table for White males (table J-7) indicates first preference to the equation using measurements for the femur plus the fibula and since these bones are present, the formula furnished, 1.31 (Fem + Fib) + 63.05, is applied as follows:

(1) Substitute bone measurements for femur and fibula, in centimeters, in the formula:

1.31 X (46.1 + 38.2) + 63.05

or

1.31
x84.3 = the sum of bone measurements of femur plus fibula
393
524
1048
110.433
+63.05
173.483 cm = Estimated stature for the remains

Note: To convert centimeters to inches, divide result by 2.54. To convert inches to centimeters, multiply result by 2.54.

The estimated stature of 173.483 centimeters for the above remains is corrected to inches as follows:

173.483 ÷ 2.54 = 68.3 or 68-3/10 inches = Stature of remains in inches

(2) Assume that the recorded height for the person believed to be associated with the remains was 67% inches (171.45 cm) when he entered the service. At that time the soldier was 18 years 3 months old. He was killed in action 2 years later. Refer to table J-8 and determine the approximate stature that he had attained at the time of his death. In the first column, find the 2-year interval between measurement of stature and death. Next, check the age interval for 18-18.5, and you find that the man had an average growth of 1.31 centimeters. Add this amount to the recorded height when he entered the service (17 1.45 cm), and you find that he measured approximately 172.76 centimeters in stature at the time of his death. This height is more closely related to the estimated height for the remains as determined from the measurement of the maximum lengths of the long bones.

Table J-8. Average Increase (cm) in Stature of American White Males in Half-Year Intervals and Multiples Thereof From 17 to 21 Years of Age

Time elapsed, years	Age in half-year intervals							
	17-17.5	17.5-18	18-18.5	18.5-19	19-19.5	19.5-20	20-20.5	20.5-21
½	1.03	.72	.51	.36	.26	.18	.13	.09
1	1.75	1.23	.87	.62	.44	.31	.22	.16
1½	2.26	1.59	1.13	.80	.57	.40	.29	.20
2	2.62	1.85	1.31	.93	.66	.47	.33	
2½	2.88	2.03	1.44	1.02	.73	.51		
3	3.06	2.16	1.53	1.09	.77			
3½	3.19	2.25	1.60	1.13				
4	3.28	2.32	1.64					
4½	3.35	2.36						
5	3.39							

APPENDIX K

DETERMINATION OF AGE FROM BONE MORPHOLOGY

K-1. General

Many technical and anatomical studies have been conducted to improve methods and techniques of identifying deceased personnel. One study made of the skeletal age changes in the American male was based on the skeletal observation of 450 deceased American servicemen and the research conducted on them. As a result, a system of scoring was established for recording different stages of bone development in relation to the specific age range for the remains. To determine age accurately, more than one bone was used in the scoring. A similar procedure was established for obtaining a total score for bone development throughout the entire skeleton.[1]

K-2. Anatomical Study

As a result of anatomical study, it was determined that the innominate, or hip, bone would serve as the best indicator of estimated age. The innominate bone, when mature, is one of a pair of large irregularly shaped bones which, with the sacrum, make up the pelvis. Before maturity, each innominate is composed of three main parts— ilium, ischium, and pubis[2] — and several epiphyses.[3] At 17 years of age, the three main elements of the innominate are almost completely united, and three ephiphyses – the iliac crest, ischial tuberosity, and ramus— are ununited. The symphyseal face' of the pubis undergoes a succession of changes in structure and shape. These changes in the symphyseal face of the pubis occur later in adult life than do changes in other parts of the skeleton. The separate components of each symphyseal face as well as the transformation by stages occuring in the symphyseal face of the pubic bone are evident. Visual recognition of the stages may be expressed in a formula to provide the basis for estimating the age for the remains being examined. The developmental stages are recorded by using a formula consisting of three component parts– the dorsal plateau, the ventral rampart. and the symphyseal rim. Since the components develop gradually, it is necessary to number the developmental stages of all components from one to five. In addition, a preliminary stage (0), denoting absence of the feature in question, precedes each set of stages. The three symphyseal components and their development stages are defined as follows:

a. Component Z, Dorsal Plateau. In the early age groups (up to 17-18 years), the symphyseal surface is covered by a pattern of transverse ridges and grooves. With progressing age, a dorsal margin appears that eventually outlines the entire dorsal half (demiface[5]) of the surface. Then, through the interacting processes of resorption and fill-in, the ridge-groove pattern disappears as the grooves near the dorsal margin begin to fill in with finely textured bone, and the ridges begin to show resorption. This gives the demiface a flat, platformlike appearance and, for this reason, the component is named "dorsal plateau." The six developmental stages of component I are described below; the five active stages are shown in figure K-1.

0. A dorsal margin absent.

1. A slight margin formation first appears in the middle third of the dorsal border.

2. The dorsal margin extends along the entire dorsal border.

3. The filling in or grooves and a resorption of the ridges begins forming a plateau in the middle third of the dorsal demiface.

4. The plateau, still exhibiting traces of billowing, extends over most of the dorsal demiface.

5. The billowing disappears completely, and the surface of the entire demiface becomes flat and slightly granular in texture.

[1]For complete information on findings for individual bones and predicted age based on a complete analysis of all boned d the skeletal remains, the reader is referred to "Skeletal Age Changes in Young American Males" by Dr. T. D. Stewart and Dr. T. W. McKern, Quartermaster Research and Development Center, Environmental Protection Division, Technical Report EP-45, May 1957.
[2]Pubis: The two pelvic bones.
[3]Epiphysis: A piece of bone separated from a long bone in early life by cartilage but later becoming pert of the larger bone.
[4]Symphyseal face: The line of junction or fusion between bones originally distinct.
[5]Since the changes in components I and II are confined to the dorsal and ventral halved of the symphyseal face, the term "demiface" (dorsal and ventral) is used when referring to these components.

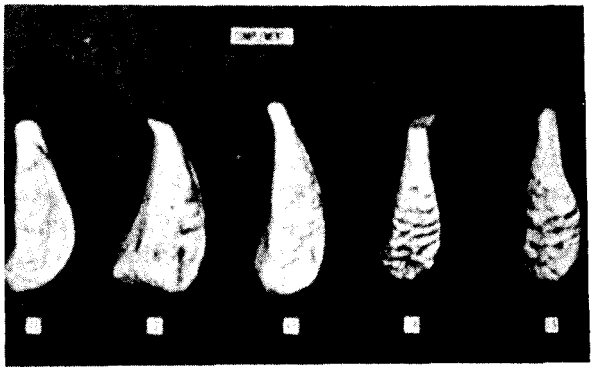


Figure K-1. The five active stages of component I.

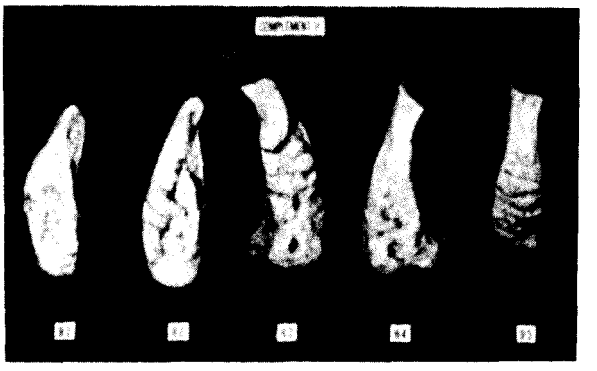


Figure K-2. The five active stages of component II.

b. Component II, Ventral Rampart. Early in the development. of component 1, the ventral demiface has a porous appearance and is beveled. Over this porous, beveled surface, an elongated growth, or rampart, forms, produced by ossification extending from the upper and lower extremities of the bone. At times, independent ossicles (small bones) along the line of future ventral margin aid the formation of the rampart. The pattern is variable, however, and the rampart may remain incomplete even in older age groups, or it may bridge only certain portions of the beveled surface. The gap usually occurs in the middle two-thirds of the ventral border. The six developmental stages of component I are listed below; the five active stages are shown in figure K-2.

0. The ventral beveling is absent.

1. The ventral beveling is present only at the superior extremity of the ventral border.

2. The bevel extends inferiorly along the ventral border.

3. Bony extensions from either or both extremities indicate the beginning of the ventral rampart.

4. The rampart is extensive, but gaps are still evident along the earlier ventral border, especially in the upper two-thirds.

5. The rampart is complete.

c. Component III, Symphyseal Rim. The symphyseal articular face is in final stages of development when a distinct and elevated rim forms around the level face of the bone. At the same time, the bony texture of the face begins to change from granular to finely grained and smooth. Traces of the ridge-groove pattern may still be present in the lower third of the dorsal demiface. However, determining whether the ridge. groove pattern is present or whether it only appears to be present may be difficult, since the regular wavy surface of the smooth bone sometimes looks like traces of the ridges and grooves. After the symphyseal rim is formed, minor and infrequent changes may continue for a while. Finally, the rim wears down through resorption, and a smooth surf-ace extends to the margins. As the face levels off, erosion and erratic ossification take place, and the margins may become lipped. The six developmental stages of component II are described below: the five active stages are shown in figure K-3.

O. The symphyseal rim is absent.

1. A partial dorsal rim is present, usually at the superior end of the dorsal margin. The rim is round and smooth in texture and elevated above the symphyseal face.

2. The dorsal rim is complete, and the ventral

rim is beginning to form. There is no absolute site at which formation begins.

3. The symphyseal rim is complete. The inclosed symphyseal surface is finely grained in texture and irregular (wavy) in appearance.

4. The rim begins to break down. The face becomes smooth and flat, and the rim is no longer round but sharply defined. There is some evidence of lipping on the ventral edge.

5. A further breakdown of the rim, especially along the superior ventral edge, and refinement of the symphyseal face take place. Also, disintegration and erratic ossification occur along the ventral rim.

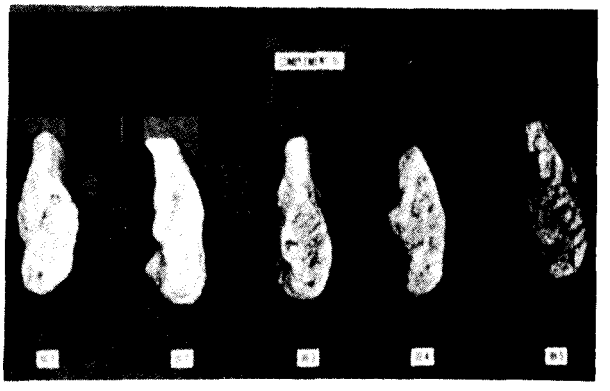


Figure K-3. The five active stages of component III.

K-3. Analysis of Symphysis

a. *General.* Sets of plastic model symphyseal casts have been fabricated to aid in recognizing symphyseal features. The models represent the three components and their five active stages of development (fig K-1, K-2, and K-3). By comparing paired pubic symphyses of skeletal remains with these plastic models, the estimated age may be determined.

b. *Symphyseal Formula.* Specific features within each component must be carefully selected to match the symphysis being observed. The selections make up the symphyseal formula. For example, the formula 3-3-0 indicates that the symphysis being observed was in the third stage of the dorsal plateau component (component I), in the third stage of the ventral rampart component (component II), and that metamorphosis of the symphyseal rim (component III) had not begun. The plastic models may be used in estimating the skeletal age of American males 17 to 40 years of age. The component and stage numbers for all models are stamped on the base of the model. Instructions for using the models are given below:

(1) View each model with the superior and inferior extremities in the vertical axis. Elements of the symphyseal components of the pubic bone are shown in figure K-4. All models represent left symphyses except 1, 2, 4, and 5 of component II.

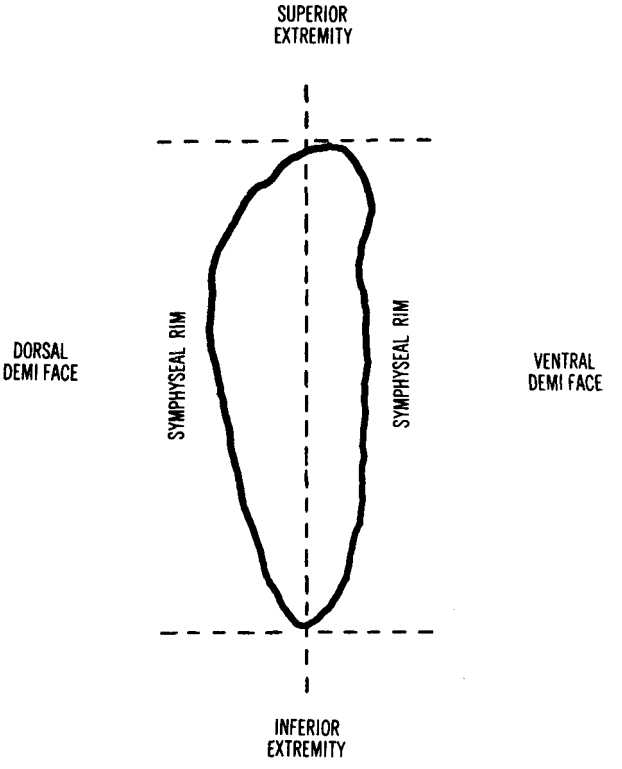


Figure K-4. Elements of the symphyseal components of the pubic bone.

(2) Place the symphyseal face of the pubic bone for age determination in similar relation to the plastic models.

(3) Compare the dorsal demifaces (component 1) and select the model stage that is most like the unknown demiface. If symphyseal change has not begun, score the component as 0. When the appropriate stage has been selected, score the component by reading the stage number (1 through 5) from the base of the model. Component I is for the dorsal demiface only.

(4) Follow the same procedures as above for the ventral demiface (component II).

(5) Compare the symphyseal rim and inclosed surface (component III) of the unknown symphysis wit h the model component stages. If the rim has not begun to form, score the component as 0. Match and select the appropriate stage and score as before.

(6) Add the scores for the three components and find the estimated age for that total score by referring to table K- 1.

[6]For more detailed information, the reader is referred to McKern and Stewart. **op cit.**

Table K-1. Calculated Mean Ages Based on Total Component Scores

Total score	*Calculated mean age*	*Standard deviation*	*Observed age range*
0	17.29	.49	—17
1-2	19.04	.79	17—20
3	19.79	.85	18—21
4-5	20.84	1.13	18—23
6-7	22.42	.99	20—24
8-9	24.14	1.93	22—28
10	26.05	1.87	23—28
11-13	29.18	3.33	23—39
14	35.84	3.89	29+
15	41.00	6.22	36+

APPENDIX L

MAJOR ACCIDENT PROCEDURES AND REPORTS

L-1. General

A major accident may include an airplane crash. train or bus wreck, tank accident. ship sinking, fire, or explosion. This appendix designates Army responsibility for carrying out multiple search and recovery operations, outlines procedures followed at the scene of a major accident, and gives examples of after-action reports.

L-2. Responsibilities

The military installation nearest the scene of a major accident, which has the necessary facilities and personnel, takes immediate action to recover. identify, and, unless requested to the contrary by the parent service, prepare the remains. When a common carrier is involved, the local civil authorities initiate the action; however, military authorities offer to help and cooperate with civil authorities. When the accident involves military aircraft or a Government carrier, the responsible military installation coordinates closely with the services whose personnel are involved. The commander of the responsible installation immediately dispatches a recovery team consisting of an officer in charge and those enlisted personnel needed to reconnoiter the accident site. The officer in charge obtains, if possible, a list of the persons involved (passenger list. company roster, or other list): determines the need for supplies. personnel, and equipment: and arranges for transportation to the site. Figure L-1 illustrates a sample passenger list. If appropriate, he warns all persons in the area against disturbing the site until his personnel arrive. Military or other police may be required to protect the site against pilfering.

PASSENGER MANIFEST

(Check applicable box) X NONREVENUE ☐ REVENUE

1. CARRIER: MAC
2. AIRCRAFT NO.: 86523
3. ORIGIN: TRAVIS AFB
4. DESTINATION (Name and location): TAN SON NHUT AFB
5. MANIFEST NO.: L603
6. TRIP NO. AND DATE: 23 / 14 Jul 19XX
7. CABIN ATTENDANT: SP4 Murphy

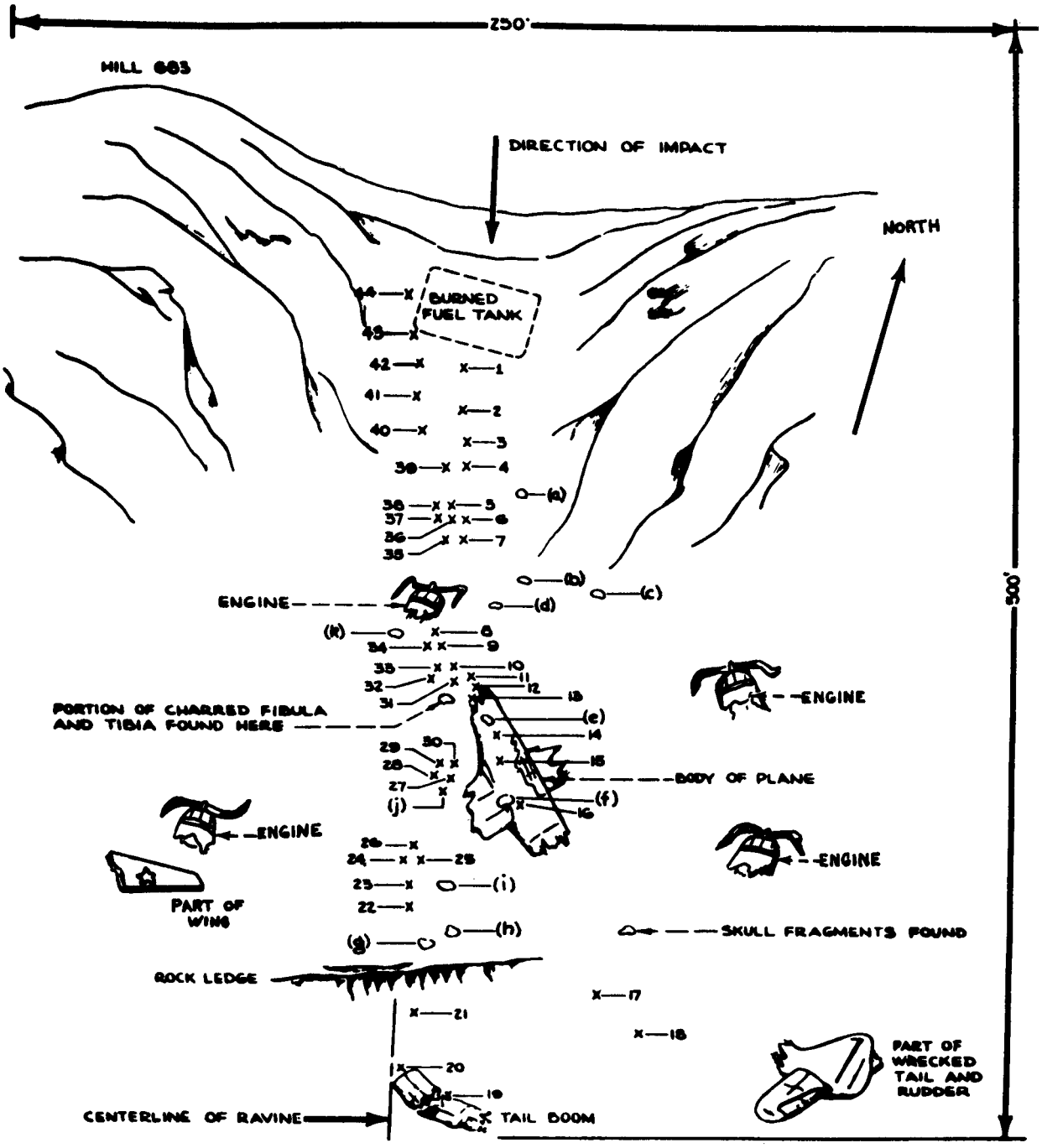
MANIFEST

LINE NO.	GRADE OR TITLE	U.S. ARMED FORCES PASSENGERS (Name and AFSN or SSAN) U.S. CIVILIANS AND FOREIGN NATIONALS (Name-Last, First, M.I.- and Passport No.)	CHECKED BAGGAGE PIECES	CHECKED BAGGAGE WEIGHT	PASSENGER WEIGHT PLUS CABIN BAGGAGE	AUTHORITY AND/OR PRIORITY IDENTIFICATION (HQS., Order No., and Date)
	A.	B.	C.	D.	E.	F.
1	CPT	WHITE, ROBERT J. 081-17-0581	1	35	185	DA S069-237 9 APR 19XX
2	1LT	SMITH, ARAM Q. 521-19-8532	2	83	243	DA S069-237 9 APR 19XX
3	2LT	RAMSEY, WILLIAM C. 807-95-2258	2	71	201	DA S069-237 9 APR 19XX
4	WO1	PALMER, CHRIS T. 925-07-6251	1	40	190	DA S069-237 9 APR 19XX
5	DAC	HERSHFIELD, SALLY T. PSPT NO. J2285807	2	52	197	DA S069-362-1 10 APR 19XX
6	DAC	MANNERS, MARION P. PSPT NO. L8702333	1	47	192	DA S0363174 10 APR 19XX
7	DAC	WIDEMAN, JOHN N. PSPT NO. B6397346	2	65	215	DA S0723616 10 APR 19XX
8	DAC	FERNANDEZ, ELIZABETH L. PSPT NO. Q2561430	1	37	162	DA S0832450 9 APR 19XX
9	DAC	HOQUE, MARGARET S. PSPT NO. N5673241	3	112	237	DA S0453824 8 APR 19XX
10	DAC	KENNEY, THOMAS K. PSPT NO. M7323879	1	33	193	DA S0453823 8 APR 19XX
11	1LT	LIVINGSTONE, ALVIN R. 015-63-7982	2	49	229	DA S069-238 7 APR 19XX
12	2LT	PROCTOR, JAMES S. 516-72-8241	2	47	207	DA S069-238 7 APR 19XX

Figure L-1. Sample passenger list.

L-3. Procedure at the Scene of the Accident

The procedure used in multiple recovery and removal of remains at the scene of an accident is a major factor in the final separation and identification of the casualties. This is particularly true when the remains are dismembered. Since no two disasters present the same problems, a rigid procedure cannot be established. Recovery and removal should, therefore, be accomplished in such a manner that all clues of identity are retained. The officer in charge exercises his best judgment by improvising methods whenever necessary and by preparing a complete report of all activities undertaken. The position of the remains and effects in relation to the scene is a most important clue. Therefore, the officer in charge accompanied by a draftsman surveys the immediate area of the accident and prepares a detailed sketch containing all obvious features of the terrain and parts of the wreckage (fig L-2). After completing this sketch, the officer orders a systematic search to locate all remains and personal effects. Search and recovery operations should not be started in darkness if avoidable. The area of search must extend beyond the immediate disaster area to locate everything thrown clear of the immediate wreckage. All remains and effects discovered are plotted on the sketch in their relative positions by a team consisting of a clerk and the draftsman. Each plotted position is designated by a symbol and a number or letter. A remains is symbolized by an X and a search and recovery (S&R) number. Personal effects that cannot immediately be identified with a remains are symbolized by an 0 and an S&R letter. A photographer makes pictures where necessary to support the sketch. No remains, portions thereof, or effects should be removed until its position is plotted. When the position of a given remains has been plotted, a medical NCO prepares DD Form 1380 (US Field Medical Card) and fastens the card to the remains.



x—DENOTES REMAINS

0—DENOTES PERSONAL EFFECTS, OTHER THAN THOSE FOUND ON REMAINS

Figure L-2. Sketch of wreckage site.

a. Tagging the Remains. A remains is placed in a human remains pouch, securely wrapped in a shelter half, mattress cover, or blanket and tagged with the plotted S&R number before being removed from the site. Sometimes the S&R number is written on the end of the DD Form 1380. The S&R number is retained as the temporary designation of the remains until final identification is established. Each grouping of commingled remains is placed in a separate human remains pouch and tagged with an individual S&R number. Dismembered portions of remains are not assigned an S&R number but are tagged with information indicating their position relative to numbered remains. Tags fastened to remains or portions of remains removed from a vehicle should contain information indicating the location of the remains in the vehicle.

b. Preserving Personal Effects. Personal effects and other identifying media must not be separated from the remains at the accident site. These items are sealed in an effects tab and kept with the remains to which they belong. Effects bags are tagged with the S&R number of the remains upon which the effects were found. Great care must be exercised to insure that the S&R number for a remains and his personal effects correspond.

L-4. After-Action Reports

After completing search and recovery operations, the officer in charge prepares DD Form 567 (Record of Recovery of Remains) and a summary of recovery activities.

a. DD Form 567. In the case of multiple remains, one DD Form 567 may be used to record the entire operation (fig L-3). This form requires detailed information concerning the location of the accident site. Such information is obtained from a map (fig L-4). Later, during processing, an individual DD Form 567 is completed for each remains.

RECORD OF RECOVERY OF REMAINS
(FM 10-63 and TM 10-286)

DATE
18 July 19__

REMAINS		SPACE FOR USE OF UNIT MAKING FINAL DISPOSITION
Recovery Number 620/293/(1 of 44)	**Evacuation Number**	**Unit designation**
Date of recovery 15-18 July 19__		**Identified as (Last Name-First Name-Middle Initial)**
Estimated date of death 14 July 19__		**Grade** **Service Number**
Nationality (Check one) U. S. Allied Enemy Unknown		**Means of Identification**

Place of Recovery (Indicate Map Sheet Number; Grid Coordinates; name of nearest village or town; name, description or number of roads, mountains or other landmarks; type of grave (shallow - deep - surface); type of position (infantry, field artillery, etc.). If recovered from a vehicle, tank or plane, give position therein.

Remains recovered from the scene of an airplane crash at grid coords CS 469580, Map Sheet 6626-I, Vietnam 1:50,000, near the village of Di Linh, nearest mountain: Hill 683, nearest main supply route: #2.

Identification media found in grave and surrounding area (Include serial numbers found on vehicles, tanks, aircraft and weapons)

See Record of Identification Processing DD Forms 890-894 for each recovered remains.
Plane: C-119, tail number 2551

RECOVERED WITH REMAINS (Use Reverse Side for Additional Space) No. 620/293/(1 of 44)		SPACE FOR USE OF UNIT MAKING FINAL DISPOSITION **Unit designation**
Recovery Number	**Evacuation Number**	**Identified as (Name, grade, service number)**
Recovered by (Name, grade, service number and organization)		**Signature**
Received at Collecting Point by (Name, grade, service number and organization)		**Signature**
Officer-In-Charge (Name, grade and branch of service and organization) 2LT, QMC, USA, Operations Officer		**Signature** Robert B. Dale

DD Form 567, 1 Feb 56

Army-Fort Lee, Va.-7035-71-500-1

Figure L-3. DD Form 567 (Record of Recovery of Remains).

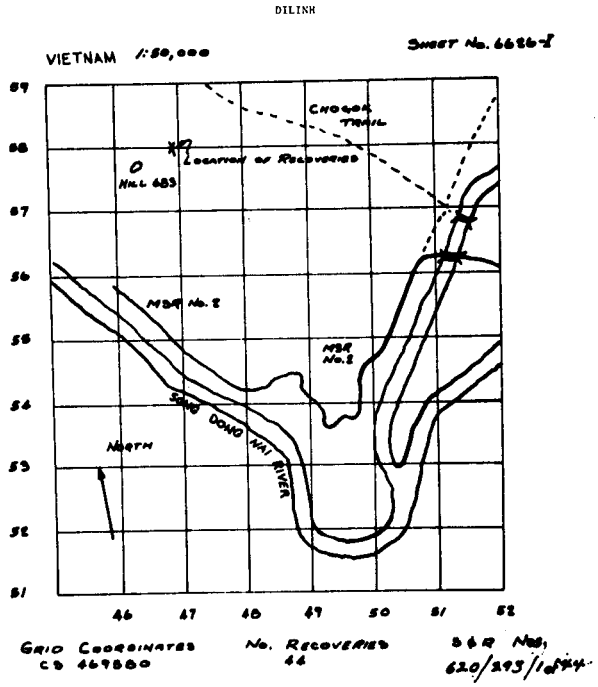


Figure L-4. Map of accident site.

b. Summary of Recovery Activities. The officer in charge of the recovery team prepares a report of the recovery activities carried out by his team. Figure L-5 contains a sample report.

REPORT OF RECOVERY ACTIVITIES

Remains found in the crash of a C-141 Aircraft at 1445 hours 14 July 19--, on Hill 683, Map Sheet 6626-I, AMS Vietnam 1:50,000, CS 469580 were recovered in 3 days. The initial party consisted of the company operations officer and one enlisted man. An Air Force search party accompanied the party, which arrived at the scene of the crash at approximately 1100 hours on 15 July.

Before leaving the company area, the operations officer arranged for the necessary supplies and personnel and for transportation. On the first day of the operation, supplies were moved to the scene of the crash from a base established at the foot of Hill 683.

The operations officer, accompanied by a draftsman, surveyed the immediate area of the crash and prepared a detailed sketch which was used on following days to plot the location of each remains as recovered. No remains were moved on 15 July.

The operations officer noted that numerous personnel, both US and local citizens, apparently visited the crash site before the Air Police assumed control. This may account for the fact that some of the personal effects were scattered, and the probability that some pilfering had taken place. Moreover, guards posted by the Air Police during periods when memorial activities personnel were not present could not adequately control the local population during the hours of darkness because of the extent of the crash area and terrain.

Actual recovery operations began 16 July after memorial activities personnel had cleared a landing area for the Army helicopter. As remains were located, a team composed of a clerk and a draftsman plotted their locations on the detailed sketch of the area and examined the remains for identification media. A medical NCO prepared DD Form 1380 and fastened the cards to the remains. When the DD Form 1380 was prepared, a search and recovery number was entered on the card and indicated on the detailed sketch.

Personal effects found on a remains were placed in a properly labeled effects bag and fastened to the remains. It is the opinion of all observers of the crash that most of the effects in personal luggage, stowed aboard the aircraft, were burned with the forward portion of the fuselage.

In several cases, identification tags were found embedded in the flesh of partly incinerated remains. These tags were removed and fastened to the remains with wire. In two cases, which are noted on recovery reports, identification tags were detached from remains and placed with the remains. Those tags recovered separately were placed in a personal effects bag and forwarded as common effects with location of recovery noted on the detailed sketch.

Memorial activities personnel placed the remains in human remains pouches. The immediate area of the recovery was then raked by hand and any portions recovered placed with the remains. The terrain was so rugged that six men were required to transport each pouched remains to the helicopter landing area. The remains were secured to Medical Corps litters, placed on racks in the helicopter, and evacuated to the base of the mountain, which was accessible by road.

Communication among the various operational areas on the mountain and at the base camp was maintained by radio.

Thirteen remains were evacuated to the mortuary on 16 July and 31 remains on 17 July. On 18 July, a search party consisting of one officer and eight enlisted men returned to the crash area and searched thoroughly for additional portions of remains. Results of this search were negative.

Figure L-5. Sample report of recovery activities.

APPENDIX M

SHORT-WAVE ULTRAVIOLET RAYS FOR SEGREGATION OF COMMINGLED REMAINS

M-1. General

The short-wave ultraviolet lamp can be used in certain instances for accurately segregating commingled remains. Equipment used consists of a portable ultraviolet lamp (2537 angstrom units). Bone surfaces exposed to short-wave ultraviolet irradiation generally reflect a variety of colors. The wide range of colors emitted and the fixed relationship of these colors to the substances that emit them justify the attempt to apply these qualities to the segregation of commingled skeletal remains. The color range includes varying shades of red, orange, yellow, green, blue, purple, and brown.

M-2. Sources of Color

The radiated color is derived from two sources which may be generally classified as fluorescence and reflected light.

a. Fluorescence. Fluorescence accounts for most of the color radiation seen in bone. The ultraviolet rays excite certain organic elements which in turn fluoresce. Therefore, the radiated color is directly related to the elements present on the bone surfaces. When a remains is buried, a variety of chemical interactions begin between the bones and their burial environment. These interactions may add a number of inorganic substances to the bone surfaces, all emitting their characteristic color patterns. The importance of surface contamination to color emission should be borne in mind. Scraping of the surface area of a bone which radiated one color under the ultraviolet lamp may emit another color and show no trace of the original color emitted.

b. Reflected Light. Although most ultraviolet rays are absorbed by the bone surface, a certain percentage, which varies depending on the condition of the bone, is reflected back. This reflected light (blue, because of the blue filter used in the ultraviolet source) may be great enough to completely cloak low levels of organic or inorganic fluorescence, or it may blend with that of the fluorescing substances. The visible radiation seen under ultraviolet exposure cannot be identified solely as bone fluorescence but represents a combination of the fluorescence of organic substances, fluorescence of variable quantities of mineral substances introduced to the bone surfaces from external environment, and the reflected blue filter color of the ultraviolet source.

M-3. Exposure of Remains to Ultraviolet Irradiation

a. Skeletal Remains. Mixed skeletal remains exposed to ultraviolet rays emit color differences which differentiate sufficiently to justify segregation. Bones belonging to some individuals are differentiated on the basis of color similarity, although when color differences cannot be detected, segregation may be accomplished by matching similar patterns of color. Shading differences may not be immediately noticeable but are detectable after the bone has been exposed for approximately 30 seconds.

b. Mixed Cadaver Material. Bone segregation in mixed cadaver material may be accomplished by observing the color differences as well as the depth and shade of color. Also, the color is usually spotty and forms complex patterns. Most cadaver bone emits a white, pale yellow, or light green fluorescence, especially from the shafts of the long bones and the flat surfaces of the other skeletal members. Many of these bones emit light blue, non fluorescent spots on the areas of articulation. Paired cadaver humeri generally exhibit equal color intensities as well as color pattern; for example, the pattern of light blue spots are approximately the same for both the right and left bones. There does not appear to be any distinguishable color or pattern differences between the sexes or racial groups.

M-4. Conclusion

When other techniques for segregating commingled skeletal remains have failed, short -wave ultraviolet irradiation may be used as a possible supplement. The procedure is fast, and the investigator sees either distinct and dramatic color differences or undifferentiated uniformity.

APPENDIX N

SUPERIMPOSITION

On rare occasions, a conclusive identification cannot be made because recorded information is insufficient. This applies principally to personnel whose records, being carried at time of death, have been lost or destroyed, and also for nonmilitary casualties that are without benefit of military health and dental records. Such cases can usually be resolved by matching a life-portrait photograph with a similar one taken of the decedent. The head of the viewable, or skeletal, remains is first photographed from the same angle used for the original portrait, and both comparison photographs are then reproduced to equal size. A negative, or overlay tracing, prepared from one of the photographs, can now be superimposed on the other for direct comparison. All surfaces, contours, orifices, and relative measurements will match if the photographs represent the same individual. It is especially effective if the subject was smiling and exposing several teeth in the original photograph. Enlarged views of these teeth— for comparison as to size, spacings, alinements, beveling, chipping, rotation, and overlap— are convincing factors in establishing identity.

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