THE PERSONAL IDENTIFICATION OF LIVING INDIVIDUALS

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Outlining the history of personal identification, the author explains the principles on which the modern technology of identification is based. This book provides optimum understanding and appreciation of the logic involved in the evolution of identification techniques. Personal identification is discussed on three levels: informal recognition by another person; positive techniques such as fingerprinting, palmprinting and dental analysis; and corroborative methods including sole prints, lip markings, ear typing, voice prints, and handwriting analysis. Particular attention is given to the role of the teeth in personal identification, including several forms of dental charts. Also examined is the Bertillon measurement system and the fingerprint system used in Latin American countries.

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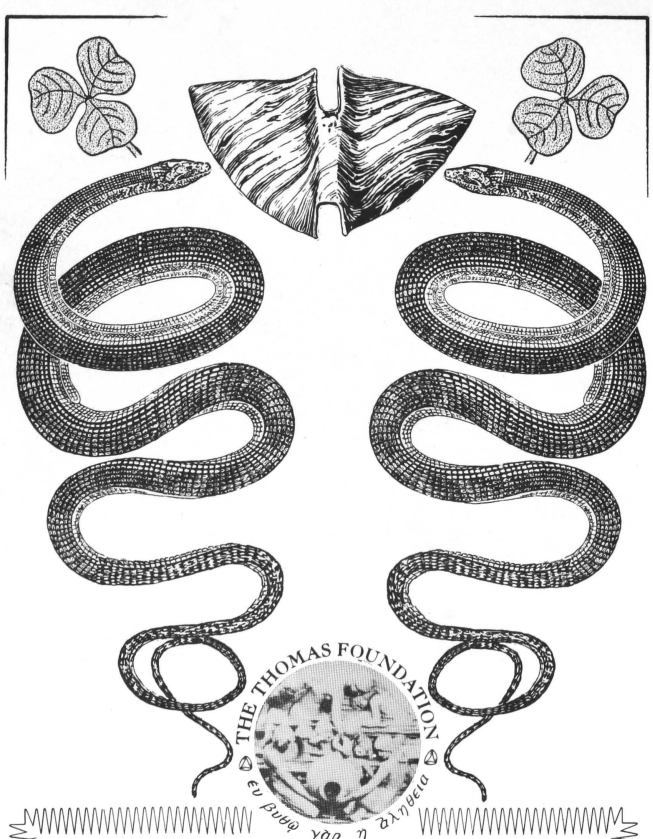

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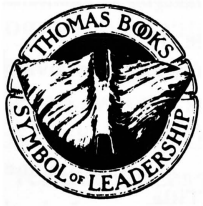

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INTRODUCTION

SENSING AND RECORDING HUMAN UNIQUENESS

THE PERSONAL identification of an individual may be established through one or more of several avenues of investigation. For a living person, or one quite recently dead, there are a number of techniques that may be used to tie a specific identity to a particular body. In our daily experience we continually face this problem. We see a person approaching from a distance. We rapidly become aware of his body size and bulk, his manner of walking, the pigmentation of his skin, hair and eyes and, as he or she comes closer, the details of facial anatomy, mannerisms and voice are noted. We quickly decide whether the person is a stranger, an acquaintance, a friend or a relative. The human brain is able to sort out in a split second of time a myriad of memorized details and give us an interpretation that forms the basis for our attitude and action. This process is usually carried out with both speed and precision. Yet it may be defective when the observer's sense organs and nervous system are impaired, or when the conditions for viewing are poor as a result of inadequate lighting or confusing movement. Such person-to-person recognition is vital in our customary relations with other persons, but it may have shortcomings, particularly in legal matters. While no two persons, even identical twins, are ever complete replicas of each other, the similarities can be very great. After a lapse of time, resemblances may be recalled while dissimilarities may be overlooked. Imperfect recall of body details has, in the past, sent innocent persons to their execution and caused guilty individuals to be released with the opportunity to commit

further crimes. Officers of the law, until the latter part of the nineteenth century, found it difficult or impossible to deal with personal identification in a manner to be a guarantee that a described individual was actually the person purported to be or was not. There was a greatly felt need for identifying descriptions that could be recorded, filed and sent from place to place across national and linguistic barriers in order to aid in the identification and apprehension of criminals and for the identification of persons who, for psychopathological reasons, were deprived of the assurance of their personal identity. During the past one hundred years a great deal of attention has been given to the problem of observing and systematically recording the anatomical details of individuals to the degree that they could be identified without reasonable question.

It is the purpose of this work to summarize the more effective proposals that have been made toward this end. Two objectives are in view. One is to outline the history of efforts in this area; the other is to explain the principles on which the modern technology of identification is based. While this book does not assume the role of a laboratory manual of personal identification, it is hoped that it may provide a better understanding and appreciation of the basic logic involved in the evolution of identification techniques. These have meaning not only in criminal investigation but have possible significance for all citizens in the event of mass disaster, accidents or psychological disorder.

"Personal identification" involves several phases. An individual may be recognized visually in a general way by body size, racial attributes, pigmentation and behavior in movement. He may be further distinguished through physiognomy, voice and mannerisms. All of these we use quickly and efficiently in daily affairs. Another aspect of personal identification may be individually and sociologically important. This involves the criminal to be identified at a distance, or after a lapse of time, or one who strives to conceal his identity; and also a person in a state of coma, or a lost child who lacks the memory or language with which to indicate his name and relationships.

The purpose of this discussion is to consider the criteria of identity that distinguish one human being, living or quite recently dead, from others to the extent that he can be assuredly specified as

to name and connections. Such identification involves the anatomical surface markings of the hands, blemishes and mutilations, body size, proportions and pigmentation, and dental characteristics, and may be supported by voice and handwriting. The problem of attempting to identify an individual after death from bones and deteriorated flesh lies in the province of forensic anthropology and forensic dentistry and will not be dealt with here except to the degree that some body details, notably the teeth, are essentially the same for an individual before and after death.

All identification methods involve the principle of human variability along with the hypothesis of individual uniqueness. An element in the grand strategy of evolution has been the avoidance of precise replication of individuals. Without variability a biological type becomes static, inadaptable and subject to early extinction. Hence successful biological stocks, of which the human is an example, display considerable variation. Each human being is a unique biological product. The mechanism by which this is accomplished is part of the complex apparatus of genetics. In a day-to-day practical sense this means that we rarely have difficulty in recognizing our acquaintances, friends and relatives on first contact. The ways in which human beings differ are myriad. Certain of these are signals through which we conduct relationships during our daily lives. However, in important situations these signals at times become vague and are mistakenly interpreted. For legal, social and emotional reasons it is often important to employ an identification procedure more effective and less subject to erosion with time and transient circumstances than personal recognition.

During the nineteenth century in all countries, an urgent need was felt for a system whereby an individual could be positively identified and distinguished from others. He might be a criminal with a previous record of law violation, or an unfortunate person with lack of consciousness and failure of memory. This need was sensed and responded to by the French anthropologist Auguste Bertillon (1853-1914). Bertillon felt the requirement in several respects. First he saw the necessity for a system by which the physical uniqueness of the individual could become a signalizing device for identification. With his extensive background in dealing with anthropological data pertaining to differences in body measurement,

he was engaged with the concept that individual anatomical differences could be a device for identification. He devoted himself with enthusiastic dedication to the objective of developing a system whereby each human being could be positively designated through a series of numerical measurements of his body. The result of his inventive and thoroughgoing efforts was the **Bertillon System of Identification**. This was adopted by police departments throughout much of the world and was used for some twenty years with excellent results in tracing individuals and thwarting deliberate efforts to disguise identity. This system was eventually replaced by fingerprinting and palmprinting methods, and numerous proposed supplementary techniques, but many of the principles involved are basic to all procedures used today for the identification of individuals.

The personal identification of living individuals is accomplished through three basic ways. A person may be seen and recognized, he may be observed and recorded through fingerprints, palmprints and dental analysis, or he may be further identified through supplementary methods such as voiceprints, handwriting, ear identification and various other procedures.

The table on the following page summarizes the basic ways in which personal identification is established. The three positive identification methods of fingerprinting, palmprinting and detail analysis are the most frequently employed and are the most likely to be useful because of the backlog of records pertaining to these that are available for comparison and matching.

Personal identification is on three levels. The first is recognition by another person, a relative, a friend, or a witness to a crime. Beyond this is the positive identification by established techniques such as fingerprinting, palmprinting and dental analysis. In addition there are less definitive methods that are often useful as supplementary aids to identification. These include prints made by the sole of the foot, markings on the lips, the anatomical description of the external ear, the analysis of voice prints and the examination of handwriting.

THE MEDIA OF PERSONAL IDENTIFICATION

Informal Recognition	**Positive Methods**	**Corroborative Methods**
body build	fingerprinting	sole prints
stature	palmprinting	voice prints
pigmentation	dental analysis	handwriting analysis
hair		ear typing
eyes		lip prints
skin color		
posture and gait		
facial features		
nose		
mouth		
teeth		
jaw and chin		
voice quality		
accouterments		
clothing		
hair style		
jewelry and watches		
documents		

CONTENTS

THE PERSONAL IDENTIFICATION OF LIVING INDIVIDUALS

CHAPTER 1

IDENTIFICATION THROUGH RECOGNITION

IN MOST DAILY situations personal recognition is equivalent to identification. When you meet another person your brain sorts out the identifying details of all the persons of your knowledge in your personal data file, matches the details of the person before you and quickly establishes the identity of the individual, usually, but not always, correctly. The details of body appearance and behavior that we commonly use are these:

Body bulk and form: As an unknown person approaches, our first impression is usually provided by the size and shape of his or her body. Is the person fat or thin; bulgy in certain areas or in general emaciated? From a hasty review of the size and contours of the body the observer may be able to draw tentative conclusions as to the sex and age of the approaching visitor. It must be noted that an impression of height may be exaggerated by headdresses and hairdos; also apparent body bulk may be modified in appearance by clothing and the actual body bulk may be affected in time by nutrition and aging. An indication of sex has in the past been provided by attire, but more recently unisex clothing has made this unreliable.

Pigmentation: The color of the skin, eyes and hair is basically determined by heredity, but many alterations and modifications can be brought about through environmental conditioning and cultural manipulations. Sun tanning can darken the skin, and

confinement in darkened conditions can result in lightening or loss of color. Cosmetic applications can darken or redden the skin, lips can be reddened and the eye region can be modified in appearance through lining with pigment. Hair can be darkened, reddened or bleached. Eyebrows can be darkened, bleached or thinned.

Hair: Hair has the hereditary quality of curling, which may be extreme, moderate, or minimal. Extreme curling results in the kinky hair of many peoples, especially the Black races. Yet persons of strictly non-Negroid ancestry may occasionally have hair of this type. The intermediate or wavy type is common in Europe and the straight type is more or less standard for the peoples of Eastern Asia and aboriginal America. Hair is subject to fantastic manipulations involving curling, straightening, and differential trimming. The male sex, through basic hereditary determination, has a potential for ornate variation in the trimming and arrangement of facial hair. Moustaches, sideburns, beards and chin whiskers have fluttered in and out of history. The clean shaven mode has presumably been the result of metal technology in the development of bronze or steel razors, but it would have been quite possible for prehistoric males to have achieved reasonably clean shaven faces by means of chipped flakes of obsidian or flint. Criminals, for the purpose of concealing identity, have found hair a highly practical way of altering appearance. Men could shave off or grow moustaches or beards, women could dye, curl or wave their hair in a probably successful attempt to disguise their appearance. Furthermore wigs, for both sexes, have provided a quick and easy way for the bald to seem hirsute or the hairy to appear bald. Hair has the property of being quite easily and quickly bleached or dyed which is advantageous to a person who wishes rapidly to conceal his true identity for legalistic or political reasons. An aspect of hair that sometimes plays an important part in personal recognition is hair on the arms. During the course of holding up a bank teller or cashier in a store or restaurant, the criminal is likely to reveal his hands and a part of his arms. A recollection of the amount and color of such hair has at times been a contributing element in a witness's recollection of the appearance of an offender.

Facial contours: On close observation, facial contours establish a distinguishing image of a particular person. Important elements

in this are the prominence of the cheeks, the proportional separation of the two eyes, the epicanthic folds surrounding the eyes, the shape of the nose, the length and prominence of the ears, the fullness of the lips and irregularities and characteristics of the teeth, particularly the upper incisor teeth that show varying degress of overlap. An important element in the distinctive appearance of an individual is in the asymmetry of his facial elements. The importance of this is well brought out when a person sees himself in a mirror that reflects another mirror image. He is frequently surprised at seeing himself as other persons see him when he is accustomed to a reversed image.

Facial features are difficult to modify without surgery and accordingly do not lend themselves to quick concealment of identity. Bank robbers and holdup men often use some type of mask to conceal the face, such as ski masks, Halloween masks or stockings; yet this is at times undesirable for their purposes since in a group situation, such as a store or a bank, a masked person is automatically suspected of being a lawbreaker. The bank robber will often wear dark glasses, realizing that important identifying features are in the color of the eyes and the characteristics of the eye openings, particularly the internal, medial or external epicanthic fold that slightly overlaps the eye opening in the skin of the face.

Terrorists and plane hijackers will often wear masks that conceal the entire face and head, not only in order to conceal identity, but also to create panic and subjection of the part of victims, making use of the universal fear and suspicion associated with an unidentifiable presence, a reaction often utilized by the writers of horror stories and dramas.

Voice: Under normal conditions the quality of voice is an important guide to recognition. This includes not only tonal characteristics, but the speed of speaking, typical pauses and rising and falling inflections at particular points in speaking. Such characteristics, however, are obscured in momentary contacts since the person may not speak much and extraneous sounds may obscure his utterances. It is possible purposefully to modify voice characteristics, but it is doubtful that many of the persons who seek to conceal their identity have the histrionic skill to do this effectively on occasion.

As has been noted, a number of the diagnostic details of appearance and performance that are commonly the basis of personal recognition are often difficult to assess through brief or stressful contacts, such as may often be the case in situations involving lawbreaking and violence. In the past this has led to uncertainty and errors on the part of witnesses and difficulties in apprehending criminals. Police organizations with little to guide them but the often uncertain sight recognition of witnesses and frequently poor physical descriptions, have found it very difficult to prosecute recidivistic criminals who changed their names and modified their appearance. Until well into the nineteenth century this handicap was acute in the administration of justice.

Two difficulties arise that impair the validity of sight recognition as a device for legal and other purposes where positive identification is needed. One difficulty is in putting into suitable terms the details of a person's appearance. Descriptions used by many persons employ such terms as "average," "rather plump," "medium dark," and "somewhat curly," that are subject to a wide range of meanings. In order to avoid such ambiguity for police identification purposes, the French anthropologist Alphonse Bertillon formulated a pattern for the verbal description of an individual and also a standardized procedure for identification photographs. A person trained in this method uses a systematic descriptive pattern and terms that involve a minimum degree of misinterpretation. An abbreviated version of such a formula follows with a number of suitable descriptive terms (O'Hara 1976: 567 ff.).

Behavioral traits:

Walk—athletic, limping, shuffling, bowlegged, flatfooted, pigeon-toed.

Voice—high- or low-pitched, loud or soft.

Speech—educated, uneducated, foreign or regional accent.

Personal habits:

Dress—slovenly, cheap, neat, expensive, conservative.

Physical description:

Age and sex.

Race or color.

Scars and marks: cicatrices, birthmarks, tattoos.
Height—estimated within two inches.
Weight—estimated within five pounds.
Build—thin, slender, medium, stout.
Posture—erect, slouching, round-shouldered.
Head—size: small, medium, large; shape: round, long, dome-shaped, flat on top, bulging at the back.
Hair—color, sheen, parting, straight or curly, areas of baldness.
Face—
- forehead: high, low, bulging, receding.
- eyebrows: bushy, thin.
- moustache: length, color, shape.
- eyes: small, medium, large; color; clear, dull, bloodshot, separation, glasses.
- ears: size, shape, size of lobe, angle or set, degree of attachment of lobe.
- cheeks: high, low or prominent cheekbones; fat, sunken or medium.
- nose: short, medium or long; straight, aquiline or flat, hooked or pug.
- mouth: wide, small or medium.
- lips: shape, thickness, color.
- teeth: shade; missing elements, restorations, irregularities.
- chin: size, shape.
- jaw: length, shape, lean, heavy or medium.

Neck—shape, thickness, length; Adam's apple.
Shoulder—width and shape.
Waist—shape of abdomen: flat, bulging, protruding.
Hands—length, hair, size, skin condition of palms.
Fingers—length, thickness, stains, shape of nails, condition of nails.
Arms—long, medium, short; muscular, normal, thin; thickness of wrist, hair.
Feet—size, irregularities, bunions, toe deformities.

The process of remembering an individual through having seen his face and body form during a brief and perhaps unrepeated ex-

posure is subject to a number of variables. This area of investigation has not been well researched psychologically; however, a number of principles that appear to be involved are these:

Stereotypes established in the mind of an observer may shape his memory of the details of an event. In a psychological experiment a photograph of several persons standing in a subway train was shown to a number of observers who were asked to describe the scene. One of the individuals in the group was holding an open razor. In describing the scene 50 percent of the observers reported that the razor wielder was Black. In the photograph the person holding the razor was White. A number of hypothetical criminal cases were tried by an experimental prosecution and jury. When two persons were accused of burglary, if one was roughly attired and coarse in appearance and the other more neatly dressed, the coarse appearing person was given a heavier sentence. The opposite was true in cases where swindling was the crime. The better dressed and more neat appearing person was given the heavier sentence. Such responses tend to indicate that a person's reactions and judgments may be influenced by an unconscious recall of past events and personalities.

The principle of self-reference is often quite important. Most people appear to regard themselves as normal. Anyone darker or lighter is regarded as above or below average. A tall witness tends to regard a person as taller than a shorter witness would. Also, a White, Black or Oriental appears to remember the face of a person of his own race better than he does that of a person of a different major race. There has been some evidence, although not entirely conclusive, that women remember female faces better than those of males and that men remember male faces better.

It has been quite well established that the emotional loading of the situation during which an event occurs has considerable effect on the memory of facts and faces. The details and personal appearances involved in a robbery have been better recalled than the facts involved with assault or rape. The factors of outrage, confusion, fear and shock all may contribute to a defective memory. The conditions under which persons are seen in connection with a crime are often not conducive to good visual impressions. Lighting may be

poor, exposures may be of short duration, persons may be in motion and the emotional state may be tense on the part of both victims and witnesses. Also, an important criterion of identification may be difficult or impossible to observe. Eye color may be obscured, tattooing and scars may be covered or not clearly visible, dental irregularities may be unobservable and little may be spoken to characterize the voice.

In visual identification connected with criminal prosecution three stages are customarily involved:

1. Witnessing the incident in all its vagaries.
2. Recalling the person's appearance, as an aid to officers and as a basis for a drawing by an artist.
3. The identification of an individual in a parade from the stored image in the witness's mind (Clifford and Bull 1978: 21).

Each of these is subject to certain defects. Before a description is offered as legal evidence it passes through a number of variable determinants: the accuracy of the original observation, the background and mental state of the observer, and the confidence with which the witness can recall and describe details from his stored memory. The habits and pursuit of a person may influence his accuracy of observation and his description of recalled details. A hairdresser, for example, may give a more complete and well expressed description of the condition and style of hair than a shoe salesman would. Also, a witness who is devoted to body building and conditioning would probably give a better description of the physique of an individual than a person whose occupation is with food preparation. In short the description of a witness must be considered along with his testimony in establishing identification through personal recognition.

Photographs are the standard guide to personal recognition when these have been made under suitable conditions. The traditional "mug shots," usually taken according to standardized lighting and posing, are invaluable aids to recognition, but they can do no more than record the image that the lens projects on the film. Accordingly, age changes, hair styling and facial expressions may

prevent this type of portrait from being an accurate current portrayal of the person under investigation. Surveillance photographs, taken at the place and time of a crime, may be useful but have the hazards of possible blurring through motion and the subject's planned disguise of his appearance.

When photographs are not available, or are unsatisfactory, facial portraits by an artist reconstructed from verbal descriptions are often of use. The artist has the problem of getting onto paper the details that are given to him by persons usually unaccustomed to dealing with the observation and description of facial features. By using the descriptions provided by more than one witness and by rechecking preliminary drawings with witnesses, useful sketches are often possible. Also, the artist may have a problem in attempting to reconstruct a full face view of the subject, as is usually required, from a description given by a witness who had seen him from only the side or a three quarter view aspect. As seen from the side the position of the ears with reference to the head and the shape of the eyes, for example, may not be well observed and could not be precisely described, but they are vital elements in portrait reconstruction.

This type of portraiture is an unusual problem for artists. They are required to work from descriptions that are couched in vague language and often confused by emotion. This is a rather specialized field and not many police departments can afford a full-time expert in the area.

Several mechanical aids are available for the development of facial likenesses. Two methods are commonly offered. One provides a series of drawings or photographs that depict segments of the human face: eyes, ears, nose, mouth, chin and jaws. The witness is asked to select item by item the components that best fit the features of the subject in question. The segments selected are fit together in order to create a supposed likeness of the subject. Another method uses photographic transparencies of the facial components. After the selection has been made the transparencies are photographically superimposed and a composite image is produced.

Such systems have the advantage of being relatively fast to manage and being not dependent on artistic expertise. Yet they

have certain obvious defects. As any portraitist can testify, drawing the human face is more than fitting together a number of anatomic elements in a picture puzzle manner. Each human face consists of hereditary components that have been conjoined with adjustive adaptation and none can be considered independent of the others. A nose may be remembered as large when it is in reality normal, if it is associated with a sloping forehead and a receding chin. The selection of specific features without consideration for other elements of facial structure can lead to erroneous reconstruction. Identification kits have their advantages in terms of convenience and speed, but they have shortcomings as a basis for positive identification.

Personal recognition, even though aided by photography, identification kits and sketches, is subject to errors and misjudgments for a variety of reasons: defective original exposure, eagerness to establish identity, and the witnesses' defective memory of characteristic details. Cases are on record where a person positively identified through appearance by a number of individuals, and also by handwriting analysis, was later found to be incorrectly identified and innocent and was compensated for false imprisonment (Gustafson 1866: 21).

CHAPTER 2

BERTILLONAGE: AN ACHIEVEMENT AND A DEAD END

IN OUR COMPLEX society the security of its members requires an approach to identification better than the precarious method of personal recognition. Numerous efforts have been made to apply rigorous scientific procedures to the problem of identifying specific individuals. The first truly scientific extensive approach was the Bertillon measurement system that sought to establish identity through the assumption that no two individuals have the same body dimensions. During the latter part of the nineteenth century the Bertillon system was given wide usage in the police departments of the world, but after a time certain inconveniences in its application became increasingly obvious and questions developed as to its infallibility as an assured positive identification technique. These deterrents eventually led to its reduced employment or near abandonment. It was replaced, or reduced to secondary significance, by fingerprinting that involved easier application and greater certainty of its uniqueness in each individual.

Bertillon's system, known by the French as **bertillonage**, was based primarily on body measurements, but involved also a regimen for recording body details such as scars and markings, along with a prescribed technique for photographing the subject. It had the advantage of being suitable for use at a distance through mail, telegraph and telephone. There were, however, certain problems in its management and operation. Also there was a persisting concern that it might be possible for more than one individual to have

extremely close body measurements. However, in such possible cases that were reviewed, it seemed that there were usually sufficient metrical differences or supplementary observations to indicate non-conformity. The Bertillon system was a well organized procedure and in most cases was a highly useful technique of identification.

Alphonse Bertillon was the product of a unique family and unique surroundings in his childhood and youth. His father was a highly respected Paris physician and statistician, who had among his friends Paul Broca, one of the leading pioneers in physical anthropology, Jules Michelet, prominent historian and head of the historical section of the National Archives of France, and numerous other great scholars of the period (Rhodes 1956: 68). Although slow to develop scholarly interests and aptitudes, Alphonse Bertillon became deeply interested in human anatomy and this led him into the study of body measurements and racial differences. This directed him toward his lifetime dedication to the study of personal identification and his proposal of the philosophy and methods involved in **bertillonage**.

There were two essential aspects to **bertillonage**. The first was the accurate and consistent observation of a limited number of anthropometric measures. These were specified and described with sufficient clarity so that it was hoped that operators in various parts of the world and with differing cultural backgrounds, after suitable training programs, could obtain measurements with consistency. The other important phase of the system was a method of recovery from a large mass of data the evidence of correspondence that would match a particular individual being reviewed with cases previously examined and recorded. This was often a tedious problem that would have been easy today by means of computer technology but in Bertillon's time was done by wearisome hand sorting. Bertillon's procedures were essentially as follows.

A limited number of anthropometric measures were taken and recorded, eleven in all. These were as follows:

1. Standing height
2. Arm reach
3. Sitting height

4. Head length or cephalic length
5. Head width or cephalic breadth
6. Length of right ear
7. Bizygomatic breadth or cheek width
8. Length of left foot
9. Length of left middle finger
10. Length of left little finger
11. Length of the left forearm and hand to the tip of extended middle finger

The metrical value of each of these was divided into three subdivisions — large, medium and small. As a key to retrieval, three measurements were used, head length, length of the left middle finger and length of the left little finger. Each of these measures was categorized as large, medium and small. Each of these categories was again divided into large, medium and small, resulting in nine categories. Two further threefold subdivisions were made which resulted in eighty-one categories. A filing cabinet containing eighty-one drawers was used. When a case was being analyzed for identification the three key measurements were checked in the suitable drawers and this narrowed down the possibilities to a strong likelihood of identification. Specific indication of identity was possible when other measurements and distinguishing characteristics were reviewed. Photographs and sometimes fingerprints were added as further evidence of identity. However, Bertillon felt that measurements were a more reliable indication of identity than fingerprints, although he recognized fingerprints and palm prints as supporting evidence.

There was some justified criticism of the reliability of the Bertillon system in establishing positive identification. Also there were certain problems in administering it. The greatest difficulty in its operation was probably in developing a uniform skill in taking measurements by persons of varying cultural backgrounds in different parts of the world. Even two well trained anthropologists with similar backgrounds often do not obtain precisely the same measurements on the same individual. Bertillon, however, recognized the problem involved in the variability of personal measuring skills. He proposed a statistical technique that he hoped would