The True Measure of the Criminal?
Identification before Fingerprints

Nineteenth-century Europe was a haven for criminals. Life was becoming steadily more urban, anonymous and mobile - in the large cities, one could simply disappear into a milling crowd of individuals and take on new identities that the surveillance and policing methods of the time could never hope to detect. As the historian Alain Corbin puts it, 'until about 1880 a clever person could change identities at will. He could obtain a new birth certificate simply by knowing the date and place of birth of the person whose identity he wished to usurp. Only an unlikely encounter with a witness who knew the person in question could thwart this subterfuge, and recognition based solely on visual memory could easily be contested'. Such a situation, it was widely believed at the time, could only lead to more crime, riots (perhaps even revolution) and, ultimately, total collapse of the moral and social order. The only effective way to control a mass of people was to control its individual members, but in order to do that one had to know *who* those individuals were.

Nobody, however, had yet evolved a foolproof method to establish a person's identity. The documents and procedures that existed were far from adequate and the police had no dependable way of verifying the identity of people they arrested. "Was a man caught for purse-snatching a hardened old offender? In France, convicts had been branded until 1832, but after the end of that practice the police had no irrefutable identification.

An urban criminal's past was essentially inaccessible to the police unless the suspect was personally recognized by a policeman or a witness. There were no records that one could consult for a truly definitive answer. There were forms, to be sure -long, detailed, but of remarkably little use. French policemen were even trained to record a person's hair colour or any prominent identifying marks or disabilities but they were not trained to record them in clear, standardized ways, store them as easily searchable records, and retrieve them speedily when confronted with a person who might be pretending to be another. No experienced policeman relied on the forms, anyway: they were simply a tedious requirement. In the 1870s, photographs were added to the police records of a criminal but again, these were far from standardized in format - gentlemen, for instance, were photographed in hats - and were of little use for identifying a criminal who might have changed his appearance radically. Nor were these photographs indexed: they reposed in immense, unwieldy and practically unsearchable piles. Small wonder, then, that the police of the time did not have excessive faith in photographs: one well-known French method of identifying repeat offenders was, in fact, to assign an officer to greet prisoners on their arrival at the prison as old friends 'in the hope that this unexpected geniality might betray the prisoner into some admission that he had been in prison before'. Since officers were paid five francs to identify such recidivists, there was ample scope for corruption: bent officers often lured prisoners to admit to a previous conviction for a share of the reward.

The British police did not have a system of monetary rewards but the situation was not substantially better than in France, though concern with habitual criminals was no less intense. One journalist defined them as 'those who make crime a profession, the men who have proved their determination to fight against society, and who form a class which is responsible

for by far the larger proportion of the law-breaking of the land'. In 1829, one writer proclaimed that thieves 'are born such, and it is their inheritance: they form a *caste* of themselves, having their peculiar slang, mode of thinking, habits and arts of living'. Such anxieties about a distinct class of hardened, incorrigible criminals became acute from the 1840s, when transportation of criminals to Australia ceased and the law-abiding British subject lost his earlier confidence that the worst criminals would be permanently removed. Around the same period, the growing threat of Chartism ensured that the concept of the dangerous class fused gradually with that of the rebellious poor. Intractable poverty and invincible criminality were supposed to characterize a self-contained and self-perpetuating dangerous class that was wholly separate from, although living within, the nation. In 18 51, the Leeds reformer Thomas Plint claimed that over a third of all urban crimes were committed by this specific 'criminal class'. 'May it not be said of the class', he asked, 'that it is *in* the community, but neither *of* it, nor *from* it? Is it not the fact that a large majority of the class is so by descent, and stands as completely isolated from the other classes, in blood, in sympathies, in its domestic and social organization ... as it is hostile to them in the whole *ways and means* of its temporal existence?' In his classic 1861 survey, *London Labour and the London Poor,* Henry Mayhew asserted that 'there is a large class . . . who belong to the criminal race, living in particular districts of society; the generations being born, and handed down from one age to another . . . until at last you have persons who have come into the world as criminals, and go out as criminals, and they know nothing else'. The cities of Britain, people increasingly felt, would soon be at the mercy of this ruthless enemy within.

Later in the century, with the police securely established and revolutionary threats having receded considerably, this hysterical attitude gave way to more focused fears. In his

comprehensive study *Life and Labour of the People in London,* Charles Booth soothed Victorian nerves by declaiming that 'the hordes of barbarians of whom we have heard, who, issuing from their slums, will one day overwhelm modern civilization, do not exist. There are barbarians, but they are a handful, a small and decreasing percentage: a disgrace but not a danger'. Increasingly, it was one particular kind of malcontent that preoccupied the police: the habitual criminal or the recidivist, the criminal who was persistent, incorrigible, and unstoppable and for whom life imprisonment was the only appropriate punishment. Many theories of the hereditary nature of recidivism circulated at the time in England, including some that were reminiscent of or directly derived from theories of the Italian criminologist Cesare Lombroso, who taught that the 'born criminal' was a reversion to the earlier stages of evolution and could be identified by such distinct physical characteristics as a massive jaw or a misshapen skull. The police might believe in Lombroso's bizarre theories but they were of little use in catching *individual* habitual offenders.

What was needed was a foolproof system whereby a specific prisoner could be identified as having committed other crimes - the shape of his jaw might indicate that he was a 'born criminal' but that was not enough. Moreover, although misidentifications of innocent people as old lags were actually quite rare, there was still much concern about the occasional incident of an innocent person being labelled a recidivist. A Home Office committee argued in 1894 that the introduction of an improved system of identification would not only identify real recidivists accurately but also prevent misidentification of innocent people or first-time offenders as habitual criminals. To decide definitively whether an offender was a *repeat* offender, a recidivist, it was essential to have precise records of identification, which would reveal that an individual under custody had previously passed through police hands.

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Even if one ignored crime and criminals altogether, the importance of identification was demonstrated by the sensational 1871 case of the Tichborne Claimant. Was Arthur Orton indeed Roger, the son of Lady Tichborne, and the heir to the Tichborne estate? Lady Tichborne was convinced that the claimant's ears 'looked like his uncle's' and over eighty witnesses agreed with her. But after a six-month trial, the claim was dismissed and Orton jailed. Photographs and portraits of Roger Tichborne had figured at the trial but failed to shake the faith of those who believed in Orton's claim. An even more dramatic illustration of the need for a dependable system of identification was the notorious Adolf Beck case, a classic of mistaken identity in British jurisprudence. In 1877, a man known as John Smith was convicted at the Old Bailey for introducing himself to successive women 'of loose character' as a nobleman (Lord Willoughby was one of his favourite moni-kers), inviting them to become his mistress, installing them in a house in St John's Wood and then absconding after having pilfered their money or jewellery. Smith was sentenced to five years' imprisonment and released in 1891. In December 1895, a similarly defrauded woman encountered Adolf Beck on the street and denounced him to the police as the man who had robbed her. Beck refused all knowledge but was identified as Smith not only by several other defrauded women but also by the police constable who had originally arrested Smith in 1877. Sentenced to seven years in jail, Beck was treated as a repeat offender. He petitioned the Home Office several times but only in 1896 did the mandarins take the trouble to examine John Smith's records. They found to their consternation that the prison doctor had reported in 1879 that Smith was circumcised, which Beck, on examination, was found not to be. So Beck's 'previous conviction' was struck out but his current conviction was left untouched. He was released in 1901, but was arrested again on similar charges in April 1904 and re-convicted. The

judge, however, postponed sentence, and in July that year Smith was arrested for acts that were shown to be committed whilst Beck was still in prison. This led to Beck's release and pardon for both his convictions with an award of £5,000 as compensation for the miscarriage of justice. A committee of enquiry, headed by the Master of the Rolls, investigated the whole saga, concluding that evidence of identity based solely on personal recognition was unreliable.

By the time the committee investigated the Beck case it was 1904, and as it noted approvingly, a reliable system of identification was then in use which might well prevent the repetition of such a calamity. But in the 1870s, when the Tichborne case was fought, or even in the 1890s, when John Smith was released from prison, there was no way of identifying individuals except through personal recognition by others. There was no system based on precise data that could pronounce incontrovertibly on a person's identity, regardless of who he claimed he was and who other people considered him to be. All Britain had in 1871 was the Alphabetical Register of Habitual Criminals, which was published annually and had been founded only in 1869. At first, it included every person convicted of felonies and certain kinds of misdemeanour - this, predictably, proved to be too large an undertaking and most of the 3 5,000 people added to the register every year could not be defined as habitual criminals. From 1879, the Register listed the names (arranged alphabetically), personal descriptions, distinctive bodily marks, photographs, details of previous conviction and destination on discharge of only those criminals with previous convictions and of every convict released from penal servitude. This was supplemented by the Register of Distinctive Marks, which classified the identifying marks on bodies of criminals. There were nine main groups - head and face, throat and neck, chest, belly and groin, back and loins, arms, hands and fingers, thighs and legs, feet and ankles - which were subdivided into categories such as, for

the arms, 'loss of arms', 'tattoo marks', 'distortion from fracture or dislocation' and so forth. Theoretically, then, if a policeman suspected that an unknown man with a tattoo mark on his left arm might be a recidivist, he might verify his hunch by looking under 'arm, left' and then under 'tattoo marks' in the Register of Distinctive Marks, where he would find a list of all prisoners released that year with such marks and detailed descriptions of those marks. With a successful hit, the policeman could then proceed to the Alphabetical Register of Habitual Criminals and find further information about his suspect.

These registers should have worked well in theory but proved seriously wanting in practice. Even those policemen who consulted them frequently admitted that the information in the registers led to relatively few successful identifications. Some important police forces - such as the Metropolitan Police -tended to ignore the registers altogether but they had cumbersome registers of their own. Scotland Yard's Convict Supervision Office maintained various records, including an index of each prisoner's modus operandi and an unwieldy album of photographs (containing nearly 100,000 portraits in the early 1890s, which, on average, required about eight hours for each successful identification) of all convicts arranged according to age and stature of the individuals and the type of crime committed. Many county and borough forces had their own specialized registers.

This was an inefficient and often nightmarish system. First of all, the way the registers listed the distinctive marks was not detailed enough and the format did not permit the descriptions to be more exhaustive. Since the registers were not cumulative, each volume contained information pertaining only to those convicted during the year. To make matters worse, the annual registers were always published late - so the police often did not have any data on a habitual criminal for months after his release from prison, the very time when, according to authorities, he

was liable to reoffend. Searching the registers could take hours, especially because they were not indexed precisely enough.

Consequently, many policemen still preferred to rely on identification by personal recognition. Convicts released on licence had to report to the police every month and through this, as well as through experience, policemen acquired some skill in facial recognition. As long as a habitual criminal indulged his habit within one particular district, the local police had little difficulty in identifying him, except in the most populous areas - most notably London, the anonymity and wealth of which made it attractive to a vast number of criminals, 'where an offender might be arrested in a dozen police divisions and convicted in a dozen different courts, without being seen twice by the same officer'. It was, therefore, the practice to house all prisoners remanded in London in one prison - Holloway -where they were inspected three times a week by thirty police officers and warders from all divisions of the Metropolitan Police and the City of London Police. The idea behind this was that an unconvicted prisoner, who was unknown to the officer arresting him, might turn out to be a familiar figure to one of the visiting team - perhaps an officer who had arrested him for a previous offence. It was considered a very effective method of identifying recidivists by the police: in 1883, for instance, 1826 repeat offenders were identified by this exercise, 1711 in 1888 and 1949 in 18*93*- There was, however, a price: each successful identification by this method cost a total of ninety hours of detectives' time.

This system, in any case, was in use only within London. The county and borough forces used the 'route form' instead. Considered effective by their users, the route forms carried photographs and descriptions of prisoners whose past convictions the police wished to discover. Five or six police authorities which might have encountered the prisoner before were listed on the form and they constituted the 'route' travelled by the form. (In

some cases, route forms might be sent to every police force in the country.) One after another would receive the form, and at each stop the prisoner's description would be scrutinized by as many members of that force as possible, and then the form would be forwarded to its next recipient with notes on previous convictions or the stark 'not known'. The last police force on the 'route' returned the form to the originating force, the whole process taking usually a week, which was the usual time for a remand. Although the police had faith in route forms, administrators worried about the total amount of time spent on studying the forms and were prepared to welcome a dependable substitute that consumed less official time.

In British courts, the proof of identification was 'always dependent on personal recognition by police or prison officers', observed a committee appointed by the Home Secretary in 1893 and chaired by the civil servant Charles Edward Troup (later Sir Charles Troup, Permanent Under-Secretary of the Home Office from 1908 to 1922,). Although mistaken identifications were rare, a large number of recidivists were thought to slip through the system, especially in London. Sir Robert Anderson, the head of the Criminal Investigation Department, had admitted in 1891 that the legislation for habitual criminals was 'almost a dead letter'. In 1893, only fifty-five recidivists had been taken to court. 'Even with more photographs and more exact descriptions', Charles Troup's committee declared a year later, 'we are agreed that the present system will leave much to be desired. What is wanted is a means of classifying the records of habitual criminals, such as that, as soon as the particulars of the personality of any prisoner (whether description, measurements, marks, or photographs) are received, it may be possible to ascertain readily, and with certainty, whether his case is already in the register, and if so, who he is. Such a system is not, we believe, attainable merely as a development of the existing English methods'.

An effective identification system depended not simply on precision, but also on ease of retrieval. The best identification system in the world would be useless for police purposes were it not easily searchable. Since concern with recidivism was extraordinarily high in France, it is no surprise that the first really dependable method of criminal identification was developed in bustling Third Republic Paris, supposedly the mecca of every kind of malcontent - from burglars to anarchists, from rioters to sneak-thieves, from assassins to saboteurs. The new system was the brainchild of a police clerk named Alphonse Bertillon (1853-1914) and it spread rapidly to other nations, including Britain and its Empire. Before the advent of fingerprinting, it was the policeman's best friend and society's greatest guarantee against that worst group of offenders who went on a lifelong spree of crime safe in the realization that their careers could never be meticulously tracked by existing police methods.

Born to an eminent father (who was a doctor, a pioneer demographer and an anthropologist), Alphonse Bertillon seemed in his youth to be destined if not for a life of crime, then at least for one of utter futility. Uneducable, uncontrollable and frequently unbearable, he was the despair of his teachers and nicknamed the Barbarian. Although keen on collecting and arranging botanical and natural-historical specimens, he seemed to possess no other talent. After being expelled from several schools (including one dedicated to the education of difficult children), he finally displayed some thirst for knowledge when, bored to tears by compulsory military service, he enrolled on an elementary medical course. Fascinated by the human skeleton and its dimensions, Bertillon subsequently developed a keen interest in his father's profession of anthropology and, through his influence, was soon appointed as a clerk in the *premier bureau* of the Prefecture of Police in 1879. Predictably enough, he hated the job. Unpredictably, though, he stuck it out - and, as it happened, eventually attained an international renown that would be envied by no

less a celebrity than Sherlock Holmes himself. In *The Hound of the Baskervilles,* when referred to as the 'second highest expert in Europe', Holmes asks frostily who might be the highest. The answer: 'To the man of precisely scientific mind the work of Monsieur Bertillon must always appeal strongly'. (In reality, it was Bertillon, as his biographers report, who admired the 'analytical genius' of Sherlock Holmes. And Holmes, in spite of professional rivalry, had great respect for Bertillon, once lecturing Watson at length on Bertillon's system during a train journey and expressing 'his enthusiastic admiration of the French savant'.) How and why had the apparently undistinguished Bertillon achieved such fame?

When he started working as a police clerk, some seven or eight thousand francs were being paid every year, Bertillon later recalled, to policemen as reward for recognizing criminals. Although this system managed to identify some fifteen hundred criminals, 'the magistrates and prison directors admitted that more than half of the habitual criminals arrested escaped recognition'. Now, although he was far from well educated in the conventional sense, Bertillon was an anthropologist's son. Nineteenth-century anthropology was preoccupied with physical measurements - it measured bodies with an obsessive thoroughness. The bodies of different races, of course, but also those of people within the same society who were suspected of being of a different kind, of being outside the norm represented by the white, middle-class, male scientist. Bertillon's father and his associates in the Society of Anthropology could not live without their measuring calipers and the child Alphonse, indeed, had spent many a happy hour playing with such instruments.

As he filled in form after routine, useless form at his desk, Bertillon dreamt of producing a system of measurement that would differentiate every human being from another. The surly clerk astounded his colleagues by developing a strange habit of cutting out specific features from photographs and then

mounting pieces from different individuals 'side by side on pieces of cardboard'. The other clerks thought his mind was going, and when they learnt that he was assembling material for a report to the Prefect, they felt their diagnosis had been confirmed. But the report did go in - it was October 1879 and Bertillon had been in the job for a mere eight months.

The body of each individual, Bertillon had realized, was unique in its shape and size. The key to reliable identification of individuals lay in measuring bodies and tabulating those measurements systematically, not in gazing upon people's features and trying to memorize them. All the cutting and pasting of photographs had led to the evolution of a system that, he claimed, could produce a record that was 'the essential portrait of the person described and none other'. In order to determine the identity of an individual, one required eleven precise measurements of bony parts of the body. These measurements were the height of the individual, the length and breadth of his head, span of his arms, height whilst sitting, the width of the cheek and the lengths of the left middle finger, the little finger, the foot, forearm and the right ear. These had to be determined systematically with accurate calipers and rulers and recorded on a standardized card. The point was to measure those parts which were primarily bony and whose dimensions did not greatly change in adult life.

Even this set of eleven measurements, however, was not sufficient for identification. As Bertillon realized, measurements could never *prove* that somebody was the individual described on the card. A perfect match in measurements made identity strongly likely but it did not demonstrate it beyond all conceivable doubt. (It has been suggested that Bertillon was sceptical about the conclusiveness of measurements because he never fully grasped the mathematics of probability. If only he had increased the number of measurements to, say, fourteen, the chances against making a mistake in identity would then have

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RELEVE

SIGNALEMENT ANTHROPOMETRIQUE

I. Taille. — *i.* Envergure. — 3. Buste. —
4. Longueur de la tete. — 5, Largeur de la tete. — 6, Oreille droite _____
7.   Pied gauche. — S. Medius gaucbo. — 9. Goudee gauche.

FIGURE Z Measuring the criminal
by the Bertillon method.

risen to 268,435,456 to I, odds that would have made identity practically irrefutable.) Whether due to ignorance of probability or the disinclination to increase the number of measurements, Bertillon added to the measurements what an admirer described as 'the deadly second barrel of his system'. Each measurement card would also have a physical description in standardized terminology and a list of specific identifying marks such as warts or scars.

Using such marks was nothing new, of course - but what was unprecedented was the language of those descriptions and sheer obsessive precision of the terminology used to describe the location and character of physical peculiarities. Bertillon worked hard to develop a precise, universal vocabulary for every feature of the body, from hair colour to facial wrinkles, from the beard to the voice, from the lips to the inclination of the shoulders, from the shape of the nose to the dimensions of warts and above all, the ear, which a historian has felicitously called 'the jewel of Bertillon's morphological vocabulary'. Each ear had to be described minutely on the Bertillon cards under four heads - border, lobe, antitragus and folds - each of which could be of several precisely named varieties.

Scars and marks had their own formulae: the description *Sc ov of 2.2/1.3 sl x at 6 bk elb bk fa,* for instance, signified an oval scar, *2.2* centimetres in length and 1.3 centimetres in breadth slanting externally at 6 centimetres below the elbow joint on the back of the forearm. Finally, all of this information could be abbreviated in accordance with a standardized scheme evolved by the originator - and transmitted, if need be, by telegraph. Together, these standardized records of an individual's physical appearance, characteristics and peculiarities constituted what Bertillon called a *portrait parle:* a speaking portrait that described a person to the last detail and in terms that were precise, standardized, amenable to being learnt by heart, and of being transmitted purely in words.

Planche 80. REPRODUCTION

PAR LA PHOTOGRAVURE

FIGURE 3 A Bertillon anthropometric fiche with mugshot and measurements.

FIGURE 4
The different forms of nose described in Bertillon's
standard terminology for identification.
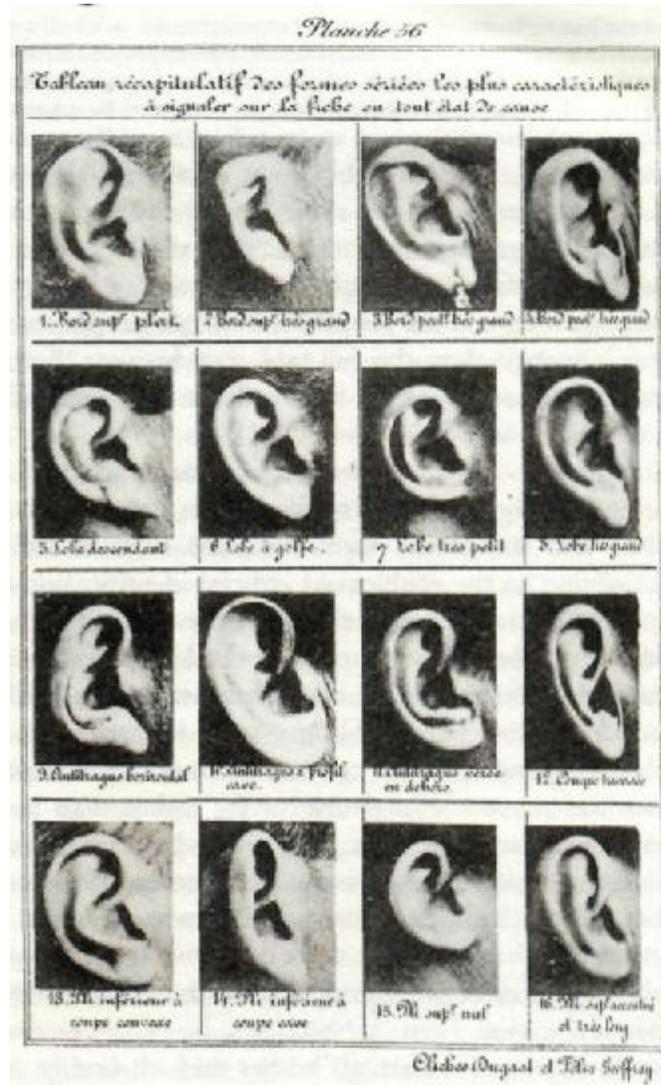
FIGURE 5

'The jewel of Bertillon's morphological system':
the different forms of ears.

To make his system completely watertight, he added a third component: the photograph. Bertillon's photograph, however, was not the police photograph of yore. An accomplished photographer himself, he appreciated that in order to be useful for identification, photographs had to be taken in well-conceived, standardized ways that would highlight all the facial features crucial for identification *in the same way* in *every portrait* of *every individual.* Every anthropometric card was to have a full-face and a right-profile photograph of the subject: it was Bertillon who introduced the classic mugshot. The profile photograph was more important than the full-face shot because, Bertillon explained, 'the silhouette of the forehead, the nose, and, above all, the ear, give an unalterable form'.

So far, so good - but the collection of information was only half the job. The challenge was to file all this data in an easily accessible - and compact - form. Bertillon himself declared that 'the solution to the problem of judicial identification consists less in the search for new characteristic elements of individuality than in the discovery of a method of classification'. His system of anthropometric measurements was a brilliant technical achievement but his filing system was truly a work of genius. The simplest but perhaps the most revolutionary innovation was the use of separate cards, rather than bound volumes as was the case with the British habitual criminal registers, thus permitting any amount of ordering, subordering, reordering and quick flipping through. But what was the best arrangement, one that would be most conveniently and rapidly searchable? Bertillon began by separating the cards of males from those of females. Then, for each sex, he made the deceptively simple assumption that all bodies and all bodily parts could be classified as large, medium, or small. Assuming that he was classifying a total of 90,000 cards, he began by taking the head as the primary part, dividing *all* the cards into three groups (of roughly 30,000 cards each) according to the length

of the head - large-headed (i.e. long-headed), medium-headed and small-headed. Each of these was subdivided into three groups of roughly 10,000 each - once again, large, medium and small - by the *width* of the head. There were now nine groups, each containing about 10,000 cards. These nine groups were subdivided into three groups each, according to the length of the left middle finger, giving a total of twenty-seven groups of about 3,300 cards each. Each of the twenty-seven groups was further divided into three groups according to the length of the left foot, giving eighty-one groups, each containing 1100 cards - each of these was divided into three categories according to the length of the forearm. There were now 243 groups, each with 300-400 cards. This completed the primary classification. Bertillon's card cabinet had twenty-seven sections, each divided into three shelves, and each shelf containing three drawers (243 drawers in all), holding about 400 cards each.

Even 400, however, was not a small enough number for quick searching and easy retrieval. So, each of the 243 groups was divided into three further groups (of about 140 cards each) according to the height of the individual and the latter subdivided into three somewhat unequal groups according to the length of the little finger. Each of these groups was finally ordered by the colour of the eye (of which Bertillon recognized seven for classificatory purposes) into groups of about seven cards each, although, by now, the numbers were no longer equal and these last subdivisions might contain anywhere between three and twenty cards.

The classification was now complete but in order to 'eliminate even the remotest chance of error', Bertillon also recorded the length and width of the right ear, the height when sitting, and the span of the outstretched arms. These measurements appeared on the card but were not used to classify them.

Bertillon is often mistakenly supposed to have discovered the identifying value of fingerprints. He was actually fairly sceptical
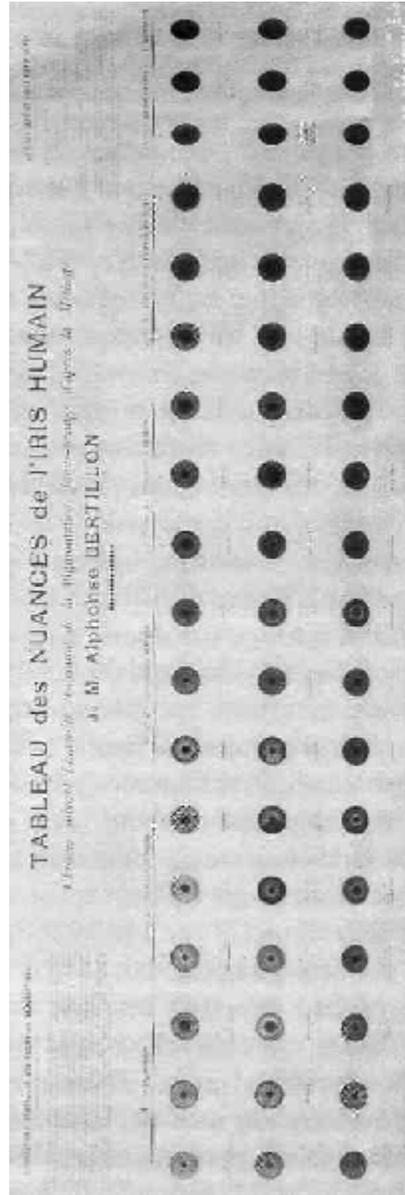
FIGURE 6
The eyes of Alphonse Bertillon.

about their importance, although, from the 1890s, prints of four fingers of the left hand were included on his cards, at the urging of the eminent scientist Francis Galton. But Bertillon's cards were always classified according to measurements - the fingerprints were there only to establish identity - except for juvenile offenders (whose bony parts were still developing and therefore unsuitable for measuring for identification purposes) and for women (whose measurements were considered to be uncertain, because of different hairstyles and 'recurring pathological disturbances'), where he used fingerprints as the sole basis of classification and developed his own system of classification for them. He was particularly interested in studying the special characteristics of the prints of people doing particular kinds of jobs: 'Seamstresses showed punctured prints on the left hand if they were right-handed, and vice versa. Florists had punctures upon all the fingers . . . Continued contact with alkaline water wore down the ridge-marking on the fingers of laundresses . . .' In 1902, he even identified a murderer from fingerprints left at the scene of crime, the earliest conviction for homicide in Europe on fingerprint evidence.

What Bertillon denied, however, was that fingerprints were so distinctly variable that they could be used as the *sole* basis for the identification and classification of 'several hundred thousand cases'. He argued that when matching prints, the identity of prints could be misleading - which he illustrated with some explicitly 'tweaked' prints. The only truly irrefutable evidence prints could offer was that of difference. In other words, dissimilar prints from the same digits could never belong to the same person, but the assumption of identity on discovering a number of similarities between an incomplete print and a complete one could be misleading.

Bertillon, therefore, preferred to rely on his own system and it certainly was a comprehensive one. Each individual's data were recorded in duplicate - one card was placed in an alpha-

betical register according to name and the other in the cabinet ordered by measurements. All the prisoners arrested in Paris were brought to Bertillon's department every morning and if they gave a name and admitted to having been measured previously, their card was found in the alphabetical register. If the prisoner denied having been measured, then his eleven measurements were taken immediately (and other identification marks recorded) and the anthropometric register searched for another card with identical measurements and identifying marks. If one was found, then a recidivist had been caught -and this happened with great regularity. The old French practice of rewarding a police officer identifying a recidivist continued, but now an officer recognizing a criminal who had not been spotted by the new system was given double the amount, the entire sum being deducted from the salaries of the anthropometric operators. This fine, said Bertillon, ensured that his operators were 'pecuniarily interested in the good application of the system'. Whether because of the reward/fine scheme or not, the system did seem to work. By the early 1890s, it had identified hundreds of recidivists and anti-recidivist laws had been passed in France in full confidence that they could be enforced.

Each year, Bertillon's office received and classified about 15,000 measurements from Paris and about 70,000 from elsewhere in France. Out of 30,000 people measured in 1889, there were only four misidentifications of recidivists. 'The probability of being recognized at once by being "bertillone" is thus', its creator boasted, 'equivalent to certainty, as far as it is possible for anything human to approach this ideal'. Such was the reputation of anthropometry amongst crooks that Paris, previously a haven for international pickpockets, was now - supposedly - free of them. 'They prefer now to remain of their own accord', reported Bertillon, 'in foreign capitals'. But, he added, anthropometry was spreading to foreign nations and

'our poor international thieves are seeing all European countries successively closed to them'.

The fame of the Bertillon system reached Britain late in the 1880s, initially through the efforts of Edmund Spearman, a retired civil servant who tried ineffectually to induce the Home Office to adopt the system. The government was soon to be hit with heavier ammunition. The Council of the British Association for the Advancement of Science resolved at its 1892 meeting in Edinburgh that

> considering the recognised need for a better system of identification than is now in use in the United Kingdom and its Dependencies, whether for detecting deserters who apply for re-enlistment, or old offenders among those who are accused of crime, or for the prevention of personation, more especially among the illiterate . . . the Anthropometric methods in use in France and elsewhere deserve serious inquiry as to their efficiency, the cost of their maintenance, their general utility, and the propriety of introducing them, or any modification of them, into the Criminal Department of the Home Office, into the Recruiting Departments of the Army and Navy, or into Indian and Colonial Administration.

Letters urging the adoption of anthropometry were sent to the Secretaries of State for the Home Department, Army, Navy, India and the Colonies. The War Office and the Admiralty declined to institute anthropometric identification, while the Secretary of State for India informed the Association that anthropometry was already being used in India on an experimental basis. (We shall explore this at some depth later because it was crucial to the emergence of fingerprinting as the system of criminal identification.)

No reply from the Home Office is on record but it was the Home Office that responded most constructively to the letter. In October 1893, the Secretary of State for the Home Department, Herbert Henry Asquith, appointed Charles Troup's committee

to recommend the best system for apprehending habitual criminals. Members of the Committee (Troup, Major Arthur Griffiths, Inspector of Prisons, and Melville Macnaghten, Chief Constable of the Criminal Investigation Department of the Metropolitan Police) visited Bertillon's department in Paris and observed his work with great interest. What floored the Committee was Bertillon's classification. 'If, it reported, 'absolutely invariable and accurate measurements could be obtained, then from the measurements of any person the card giving his name and antecedents could be found in M. Bertillon's cabinet as certainly and almost as quickly as an accurately spelt word could be found in the dictionary . . . M. Bertillon has obtained a primary basis of classification as nearly perfect as possible'.

But essential as it was, a sophisticated and easily searchable system of classification was not sufficient in itself. Were the measurements used by Bertillon sufficiently precise and sufficiently distinctive so as to identify an individual beyond conceivable doubt? Surely there would be many individuals so close to the average measurements that their dimensions would be practically indistinguishable? 'Nature', Bertillon had proclaimed, 'never repeats herself. Choose any part of the human body, examine it, and compare it carefully with the same part of another person, and differences will appear, more or less numerous, as your examination has been more or less minute'. The Director of the Penitentiary Department of the French Interior Ministry agreed that Bertillon's system gave every human being 'an identity, a certain individuality, lasting, unchangeable, always recognisable, easily proved'. The British committee, however, would have none of it. The possibility of two individuals having identical measurements might be slim but could not be discounted.

There were, moreover, formidable legal problems in adopting the system in toto in Britain. 'In Paris every person arrested for any offence is at once subjected to the process of measurement

and is sometimes photographed before being brought before any magistrate. It would not', the Troup Committee emphasized, 'be consistent with English ideas to entrust to the police an arbitrary power of measuring or photographing every person arrested without authority from a magistrate and without regard to the necessity for the purposes of justice of discovering his antecedents and character'. An anonymous reader of *The Times* later denounced the Committee's recommendation for limited introduction of the Bertillon system in Britain as 'opposed ... to the sentiments and principles of Englishmen'. It may all 'answer very well', he explained, 'on the Continent where everyone submits patiently to the inevitable, but it would not do in England'. It seemed, too, that the system required far too many measurements and it was doubtful whether 'prison warders or police officers of ordinary intelligence' could measure people speedily and with the kind of accuracy demanded by Bertillon's system. Bertillon himself was emphatic that he had calculated the 'maximum of tolerable deviation' between different examinations of the same person: as long as the measurements did not exceed this deviation, they could be taken to identify the individual. This, however, was not enough to reassure the British Committee.

Still, Bertillon's classification scheme was so magnificent that the Committee did not want to do without it. Consequently, it recommended that only those measurements be taken that were least subject to error due to 'actual variations in the body and from want of skill in the operator': head length and width, length of left middle finger, length of left foot and length of left forearm. Bertillon's seven eye colours were rejected as too difficult to distinguish, the height because it could be 'altered by trickery', and the length of the little finger because its dimensions were closely correlated with the length of the middle finger and had little independent importance. The remaining three of Bertillon's measurements - the length and width of the

ear, the sitting height, and the span of arms - were also quietly excluded but of course, even in Bertillon's own system, they were not used for classification. (Once put into practice, the British system reinstated the height and added a new measure: the width of the face between the highest points of the two cheekbones. Bertillon had never taken this measurement but later used it in his own system to replace the width of the ear.)

The measurements, in any case, would be used only to classify records. Positive identification of the individual would be based on fingerprint matching. The Troup Committee had spent much time investigating the use of fingerprints for identification, and Francis Galton, in his evidence and through his demonstrations of the technique, had persuaded the members that it was the easiest, most convincing and most reliable way of proving the identity of an individual. In its report, the Committee declared that it would have recommended fingerprinting as the sole system to identify recidivists but for one crucial problem. There seemed to be no way of classifying fingerprint patterns as precisely and reliably as one could classify Bertillon measurements. Galton demonstrated his own system of fingerprint classification but it was considered too complicated for use by non-scientists. Hence, the Committee recommended a quintessentially British compromise. The five anthropometric measurements would be supplemented by prints of all ten fingers and, as in Bertillon's own system, a precise record of the scars and other physical marks in standardized terminology, giving exact locations and measurements.

In liberal England, however, the measurement of every prisoner and suspect was inconceivable. Only those sentenced to imprisonment with at least one proven previous conviction were subjected to measurement, although the system was soon extended to all convicts sentenced to penal servitude or to imprisonment followed by police supervision. The measurements as well as prints would be taken in prison by warders

and then classified and maintained in a central registry, which should be based in the Convict Supervision Office of Scotland Yard and have a scientific adviser to supervise the training of warders, deciding on the limits of 'small', 'medium' and 'large', and to provide instruction on the 'decipherment and classification of finger prints'. (Dr John G. Garson, former Vice-President of the Anthropological Institute and for many years an assistant in the Anthropological Department of the Museum of the Royal College of Surgeons, was appointed to this post at a salary of £600 per annum.) Photographs should be taken in all cases -with a clear profile shot showing 'the forms of the ear and the nose' - and filed with the measurements and prints. The measurements would make the records easy to search, the photographs would supply some evidence of identity, and finally, fingerprints would 'afford in most cases the scientific proof of identity, and, wherever the system is applied, will render a wrong identification practically impossible'. (Women were included, but in the case of juvenile offenders, to whom the Bertillon system was inapplicable, only the finger impressions were recorded and arranged according to Galton's classificatory scheme (pp. 205-12), which would have been too complicated to use in a larger collection.)

The new identification regime was designed to supplement the older methods for several years rather than replace them immediately. The Metropolitan Police were not exempted from regular visits to Holloway Prison and the Committee recommended that the various registers and route forms should be continued 'until gradually and naturally superseded by the new system'. There was, however, no supersession and the modified Bertillon system did not have much impact in Britain. Although 822 applications were made for a search of the Register in 1900, and 293 former convicts were thus identified, the police continued to rely greatly on the older methods of personal recognition, whether route forms or the weekly visits to Holloway.

Many of the country's police forces did not use anthropometry at all and even the Metropolitan Police used it only 'when all other methods have been tried in vain'.

The British may have been right to be cautious. The principles of Bertillonage were fine, but in practice the system was subject to individual error and omission. And to the deficiencies of instruments: the slightest defect in a caliper could lead to an error greater than the tiny permissible margin and thus make the measurement useless for establishing identity. Leaving aside doubts about the capabilities of prison warders, there were also fundamental problems in adopting the anthropometric data on which Bertillon divided his cards into large, medium and small. What was small in Paris was not necessarily small elsewhere. Even in a (then) homogeneously white nation like England, the system had to be recalibrated at the time of its introduction in 1894: the British authorities believed that what Bertillon had defined as a 'small' head, for instance, was small only when compared to other French heads and the police used Francis Galton's data to adapt Bertillonage to Britain. And in India, where Bertillonage had been introduced as early as 1892., the Parisian system came up against the obstacle of race. Although the Indian police, as we shall see in a later chapter, introduced an anthropometric system of criminal identification before Britain did, some of Bertillon's fine classificatory distinctions (such as his seven eye colours) or some of the points used in his precise personal descriptions (such as differences in skin pigmentation) simply did not occur in a dark-skinned population and had to be eliminated. Troup's committee had taken due notice of the Indian experience, observing that considerable readjustments were necessary before 'adapting Bertillonage to the requirements of another country'. Sooner than the Committee suspected, the colonial police would eliminate the need for Bertillonage altogether and transform identification practices in the mother country.

The eminent jurist James Fitzjames Stephen defined the criminal tribe or caste (the terms remained interchangeable) in 1870 in words that rang through the years, striking dread into the hearts of administrators. 'Trades', Stephen explained,

> go by castes in India; a family of carpenters now will be a family of carpenters a century or five centuries hence ... If we only keep this in mind when we speak of 'professional criminals', we shall then realise what the term really does mean. It means a tribe whose ancestors were criminals from time immemorial, who are themselves destined by the usages of caste to commit crime and whose descendants will be offenders against the law, until the whole tribe is exterminated or accounted for . . . Therefore when a man tells you that he is a *Buddhuk* or a *Kunjar* or a *Sunoria* he tells you what few Europeans ever thoroughly realise - that he is an offender against the law and has been so from the beginning and will be so to the end, that reform is impossible for it is his trade, his caste, I may say his religion to commit crime.

Stephen's words were novel and striking but the concept itself was not. At least from the 1860s, British administrators had evolved ways to exercise surveillance over the nomadic, idle and violent criminal tribes. In one district of the Punjab, for example, the Commissioner recommended that each member of three designated tribes should be registered at local police stations, that the headmen of the villages where these people lived be ordered to pay security deposits to the police and obliged to report the movements of the villagers to the police. The registered persons would be permitted to leave their villages only if they had a ticket-of-leave from the police. As a gesture toward the reclamation of these tribes into civil society, it was also recommended that local landholders be encouraged to provide the tribesmen with land. Turning them into peasants was the obvious way to wean them away from their inborn

criminality - an idea charming in its inconsistency with ideas of the inflexibility of caste.

The courts, however, rejected such measures of surveillance and reclamation, insisting that the Indian Penal Code already offered sufficient means to deal with all kinds of criminals. The 'native police', moreover, were considered infinitely corruptible by the courts: surveillance by them could never succeed. The lure of sharing in the criminals' ill-gotten wealth would give them the courage to disregard all government instructions. Administrators grumbled and fumed at this judicial interference. 'If a shepherd saw a wolf coming out of its den, he would not wait until there was tangible proof that his flock was in danger', one of them thundered. What did judges know of the depredations committed by these tribes? Courts, in any case, should confine themselves to judging committed crimes rather than interfere with crime prevention. Nevertheless, the legal difficulties were insuperable and the surveillance techniques had to be withdrawn.

But concerns over criminal tribes did not cease. After years of debates, localized attempts and reams of memoranda, the Criminal Tribes Act finally went on the statute book in 1871, ordering 'the registration, surveillance and control' of these tribes. Their reputation for moving around the country, thieving and pillaging wherever they went, made them 'the gypsies of India' and the new law decreed that they should be confined to distinct settlements and a complete register of the tribes was to be maintained by the district magistrate. Members of the tribe were confined to their village or town, and if they wanted to travel they had to apply to the police for a pass, which recorded their residence, the places they were allowed to visit, how long they were permitted to be absent from their domicile, and the police stations where they would have to report periodically while travelling. Even those who did not wish to travel were subject to periodic roll-calls by the magistrate and a *daily*

inspection by the village headman, each evening. Magistrates were given the power to order tribal residences to be searched on suspicion and to order the arrest - without warrant - of any tribal member straying beyond the ambit of his pass. Even a village headman could make this arrest and headmen and landholders were obliged - under the threat of punishment - to inform 'the nearest police station of the arrival of any person who may reasonably be suspected of belonging to any tribe, class or gang'. A member of such a tribe or group violating the boundaries determined by his pass was liable to six months of rigorous imprisonment - a British-Indian term for penal servitude that is still standard in India - or to a fine and whipping, even if he had not committed any criminal offence. With a second violation of the limits of movement, the punishment was a year's rigorous imprisonment *and* a fine *and* the whip.

Colonial administrators took a very dim view of nomadism of any kind: people with no fixed residence came automatically under suspicion of being criminals and one of the primary aims of the Criminal Tribes Act was to force roving and supposedly dishonest bands into settled, productive cultivators. Hence, the Act allowed the government to resettle designated criminal tribes where they could be compelled to adopt productive practices such as agriculture. The resettlement plans of the government, however, never worked particularly well and it remained, on the whole, more a pious objective than a realized or even a realizable goal. Resettling tribes and converting them into agriculturists required arable land - and the expense proved a strong disincentive for enforcing the Act. Later, in the early twentieth century, institutional options were also tried: reformatories were established for the purpose, some of them run by the Salvation Army.

Reform, not surprisingly, proved more difficult than surveillance. Edward Henry pointed out in 1891 that successful reclamation of criminal tribes 'has proved in practice . . . insurmountable', not least because of the expense involved in resettling

nomadic tribes on cultivable land. But pessimistic as he was about reclamation, Henry was enthusiastic in applying Bertillon-age to identify members of criminal tribes straying from their settlements. (Ethnologists such as Thurston were often called in to train policemen to take these measurements.) In his early assignments as magistrate to different parts of the huge Bengal presidency, Edward Henry had often encountered the problem of confining the criminal tribes to one location and precise anthropometric identification of each individual seemed to him to be the best way to achieve the government's object. 'With anthropometry on a sound basis professional criminals of this type', he claimed, 'will cease to flourish, as under the rules all persons not identified must be measured, and reference concerning them made to the Central Bureau'.

Apart from the issue of the criminal tribes, the government had no intention of ignoring individual habitual criminals -inconsistent as always, colonialists, in suitable circumstances, could forget their conviction of every profession in India being based on caste - defined as 'any person convicted on two or more occasions of offences' of specific kinds defined by the Indian Penal Code. In a reprise of debates over criminal tribes and the need for surveillance, government officials again engaged in a prolonged correspondence on the subject in the 1880s. Again, mobility was what administrators were anxious to control and the railway, otherwise the most resplendent jewel in the crown of the British Raj and held up regularly as a great justification for British dominion over India, was blamed for making a bad situation worse. The Secretary to the Government of the Punjab explained, 'the development of the railways and the increased means of procuring employment at a distance from their homes, has rendered the loose characters more able and willing to leave their villages . . . The offender is not bound thereby to remain in any particular locality, and neither by inclination nor by the difficulty of communications is he precluded from seeking new

FIGURE 20
Bertillonage in Bengal.

The doctor mumbled that there was nothing irregular about his actions, since he was an independent witness, and the judge quipped: 'An absolutely untrustworthy one, I should think.' Garson averred that his evidence would not have differed whatever side he was on and the defence counsel battled on valiantly, denouncing fingerprint evidence as a dubious French import incompatible with British justice. The judge delivered a fair summing-up, pointing out that the cash-box print was made by perspiration - a 'latent' in modern jargon - and not an inked print like the one it was being compared to. The jury should not rely only on the evidence of the print, although the resemblances between the two were marked and should be counted as corroborative evidence against Alfred Stratton. After two hours of deliberation, the jury pronounced against the brothers, both of whom were sentenced to death.

Garson was not the only expert on the defence team. Although he did not appear on the witness stand, Henry Faulds had advised the defence and was present at the trial. Later, he argued in his *Guide to Finger-Print Identification* that the mark found on the cash box was so indistinct that it differed from the thumbprint of Alfred Stratton on at least as many points as it resembled it. If, as Scotland Yard seemed to think, four points of congruence were enough to pronounce a pair of prints as identical, then would the presence of 'four successive disagreements of pattern' permit a declaration of non-identity? 'A smudge of this quality', he concluded, 'should not be presented in court as evidence. The results are necessarily ambiguous or equivocal. It would be quite easy to find thousands of innocent men in whose finger patterns a few apparent coincidences could be read into such a hazy smudge'.

It was, in fact, the confession of one of the brothers in prison that finally reassured people that the technique was valid. Nevertheless, the guilty verdict robbed the already marginal Faulds of any significant audience. The trial of Harry Jackson

had brought out all the strengths of the fingerprint system but it had not, of course, been sensational enough to grab public attention. The trial of the Deptford murderers, however, was tailor-made for publicity and fingerprints were now part of the national vocabulary. Without even mentioning the trial, which had taken place less than three months previously, the *Daily Express* began a 'finger-print competition' that ran weekly from July to September 1905. It was a murder mystery serial, specially written for the paper, each instalment of which was illustrated with the fingerprints of the characters.

The reader who successfully identified the murderer - who had obligingly left a print on the scene of crime, reproduced in the first instalment of the story - would win £100. (In order to guide its readers on the new technique, the newspaper commissioned a long article explaining the nature of fingerprint evidence in untechnical language from an expert 'who was most eminent among British authorities' and had 'long been identified with the science of identification by finger-prints'. This authority on fingerprinting was the recently humiliated Dr John Garson.) The final legal battle for the validity of fingerprint identification was won with the 1909 *Castleton* case, when the Criminal Appeal Court ruled that the court or a jury might accept 'the evidence of finger-prints though it be the sole ground of identification'. Fingerprinting was now home and dry.

The most piquant irony of this story is that from the north Bengal case onward, the history of fingerprinting followed a path first marked out - and partly explored - by Henry Faulds, the one man who had been completely excluded from the official history. It was Herschel, Galton and Henry who now formed what the historian George Wilton would later mockingly describe as the Fingerprint Triumvirate. At one level, this was simply because the history of fingerprinting was first authoritatively recounted by Francis Galton and no subsequent historical outline moved far beyond that account, except for

FIGURE 16

Fingerprinting in the media.

A competition in the *Daily Express* in the summer of the Deptford murder trial.

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George Wilton's revisionist account of 1938, which argued passionately that it was Faulds who should be honoured as the founder of fingerprint identification. Until the end of his long life - he was to die at the age of 101 - the pugnacious Wilton kept up his battle with Scotland Yard and the government to win posthumous recognition for Faulds and a pension for his daughters but none of his efforts was to bear much fruit.

Why was Faulds marginalized? For Galton, it was not only Herschel's august lineage but also the unrivalled collection of evidence that were crucial. Faulds may have foreseen the future of fingerprinting far more clearly than Herschel or even Galton, but at no point in the early history of the technique did he *publish* sufficient evidence to demonstrate the persistence of fingerprint patterns through life - his experimental shaving-off of the ridges, only to watch them grow again was rightly dismissed by Galton, Herschel and others as insufficient in comparison with Herschel's collection of prints of the same individuals over decades. Secondly, Faulds could not produce a satisfactory classification scheme - although he claimed to have one - before the turn of the century, and by then the Henry system was already up and running.

Most of the factors that militated against Faulds were ultimately related to the Empire. Herschel's introduction of fingerprinting into the Registration Department and the jail at Hooghly was to provide Galton with some of his most valuable evidence. Faulds, a lone individual in Tokyo and then in England, simply never had that kind of administrative opportunity to try out the procedure; nor does he seem to have collected and preserved fingerprint specimens as extensively and meticulously as Herschel. A usable classification, of course, could have been evolved anywhere, at least in theory, but it so happened that it, too, was evolved at the heart of the Empire and had to be imported with its originator.

In its passage home, however, fingerprinting rapidly lost its

imperial character. Fingerprinting in India had always been as important in civil situations as in the identification of criminals. Indeed, Herschel's only remotely criminological venture was to introduce it in the jail - and not to identify recidivists but to prevent the substitution of prisoners. Once Henry took it up, fingerprinting rapidly became central to police work but it was still used extensively in the civil domain, whether for registration, pensioner identification, or a variety of contractual matters unique to the Empire. When Henry came home with his technique, however, it was criminals alone (and initially, only recidivists, the most reprehensible of criminals) who came under its purview. The types of criminal subject to fingerprinting soon came to be extended but fingerprinting never really had an impact on non-criminal identification in England. As the judge Lord Atkin pointed out, 'we do not use finger-prints much on paper as merely a means of authenticating signatures. Most people can write their signature. The importance of finger-prints in this country is for the purpose of identifying the presence of individuals on the scene of a crime'. At the same gathering, the medical jurist and writer C. Ainsworth Mitchell suggested that the application of fingerprinting in civil matters had been prevented in England by 'the stigma which had become attached to the finger-print method of identification, through its exclusive use in criminal cases', a sentiment that, as we have seen, was echoed later by Karl Pearson in his biography of Galton.

Galton's vision of fingerprinting had been, like Herschel's, an imperial one: he was eager enough for fingerprinting to be used in crime, but above all he wanted it to be employed as a universal form of identification for the populace. Its need in the Empire for that purpose was, of course, greater because so many imperial subjects were illiterate, because coloured people were supposedly hard to distinguish and because they were so chronically dishonest, but Galton was emphatic that its use at home, too, would be beneficial in certain contexts. None of that

The Classification of Fingerprints:
From Galton to Henry

Although this book is not concerned with the technicalities of fingerprint identification and classification, so much of the history of fingerprinting has turned upon the issue of classification that readers might appreciate a brief overview of the major problems and their ultimate resolution.

Although quickly convinced of the value of fingerprints in identification, Francis Galton realized that the very diversity of patterns which made them unique identifiers ensured that one could not easily divide all fingerprints into a few clearly defined categories. 'A complex pattern', he observed, 'is capable of suggesting various readings, as the figuring on a wall-paper may suggest a variety of forms and faces to those who have such fancies'. Different prints from the same finger could deceive the eye, especially when focusing on the pattern as a whole. Such errors could be avoided only by fixing on 'a well-defined point or points of reference in the patterns'. What could serve as these points? The whole palm and all the fingers were covered with ridges but the ridges ran roughly parallel to each other on the fingers until they approached the tips, where, the fingernail

> disturbs their parallelism and squeezes them downwards on both sides of the finger. Consequently, the ridges that run close to the tip are greatly arched, those that successively follow are gradually less arched until, in some cases, all signs of the arch disappear at about the level of the first joint.
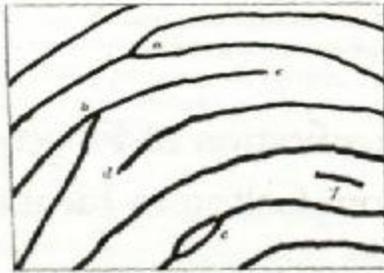
Characteristic peculiarities in Ridges
(about 8 times the natural size).
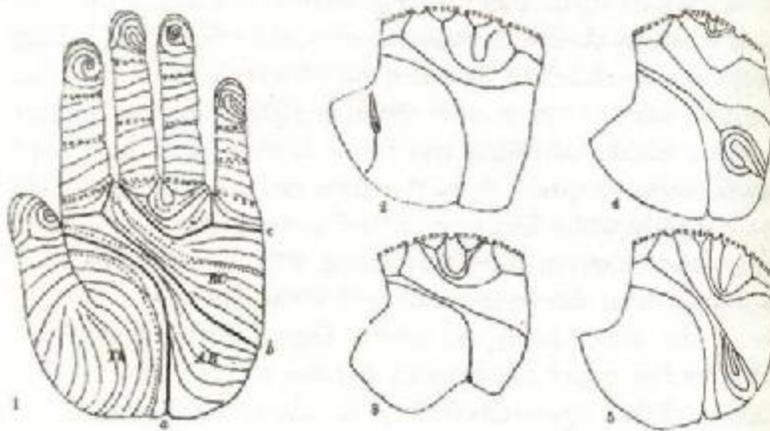
Systems of Ridges, and the Creases in the Palm.

FIGURE 27 Francis Galton's attempts to explain different fingerprint patterns.

Usually, however, this gradual transition from an arch to a straight line fails to be carried out, causing a break in the orderly sequence, and a consequent interspace.

And within this interspace one could find 'an independent system of ridges arranged in loops or in scrolls, and this interpolated system forms the "pattern"'. If one drew a line to connect the spots on the sides of the fingers from where the ridges began to diverge to form the interspace, it could serve as the 'base line whereby the pattern may be oriented, and the position of any point roughly charted'. The pattern within the interspace should then be studied with a lens of moderate magnifying power - a very powerful lens narrowed the field of view far too much - and outlined on the print by pen.

A carefully traced outline immediately converted the print into an intelligible pattern. 'What seemed before to be a vague and bewildering maze of lineations over which the glance wandered distractedly, seeking in vain for a point on which to fix itself, now suddenly assumes the shape of a sharply-defined figure.' With sufficient practice, the eye learnt to trace outlines by habit and it proved unnecessary to actually trace one on the print.

The predominant patterns found in all fingerprints were the arch, the loop and the whorl. These could serve as the starting-point for a classificatory scheme. 'The Arch-Loop-Whorl, or more briefly, the A.L.W. system of classification', Galton remarked,

while in some degree artificial, is very serviceable for preliminary statistics ... A minute subdivision under numerous heads would necessitate a proportional and somewhat overwhelming amount of statistical labour. Fifty-four different standard varieties are by no means an extravagant number, but to treat fifty-four as thoroughly as three would require eighteen times as much material and labour. Effort is economised by obtaining broad results from a discussion of the
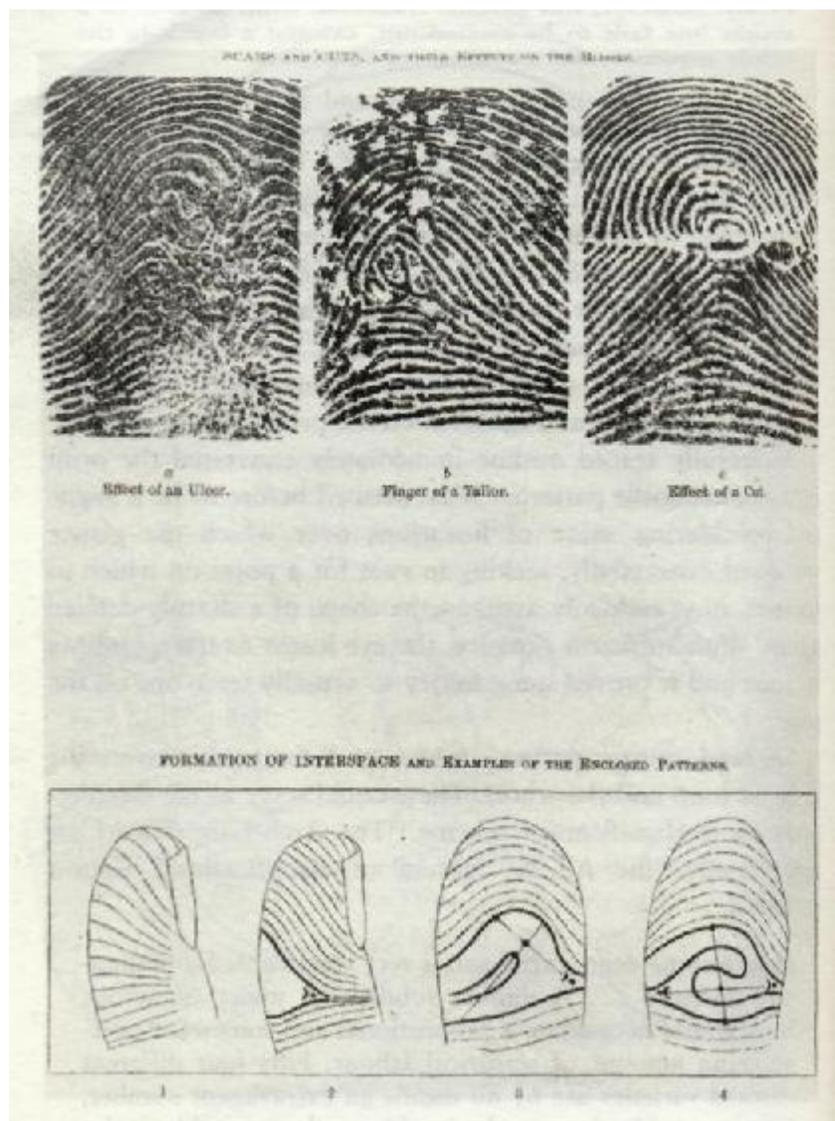
FIGURE 28

The patterns within patterns in the ridges on the fingers.
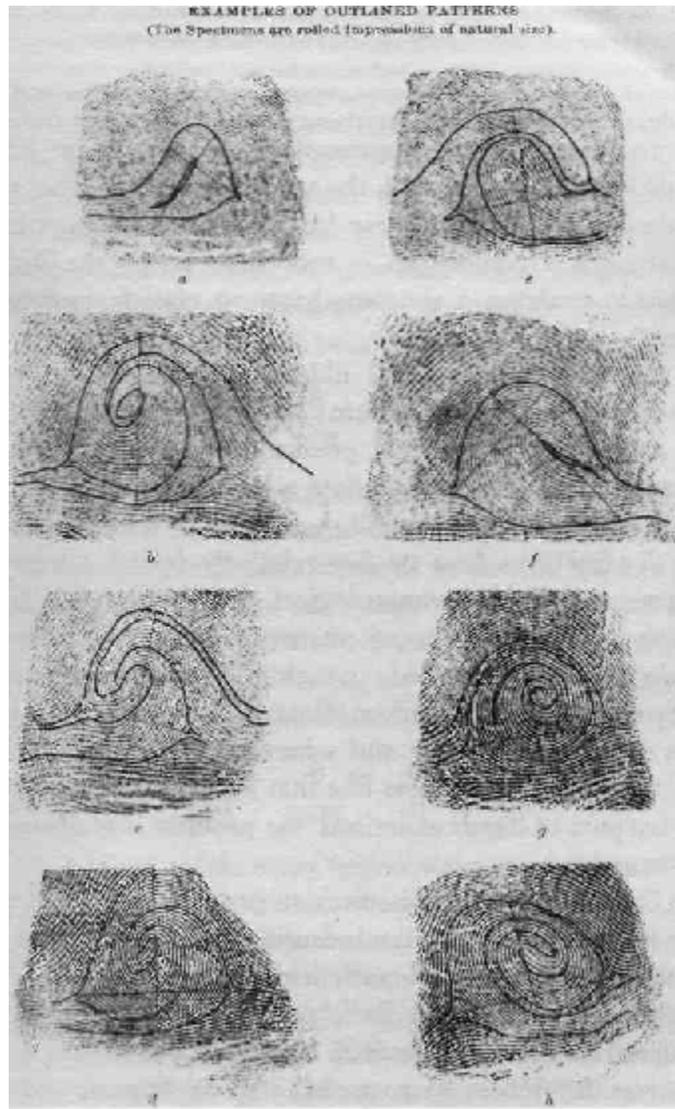
FIGURE 29 How to
outline patterns.