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FINGER-PRINT CHARACTERISTICS

L. W. LACHARD¹

The study of the various systems of personal identification has for many years occupied the attention of anthropologists and those upon whom devolves the duty of searching for the antecedents of suspects of the criminal classes; but it is only within comparatively recent times that the value of digital impressions as an effective and irrefutable means of establishing identity has been definitely recognized.

In 1888, Sir Francis Galton, the eminent anthropologist, commenced his investigations into the subject of finger-prints, being at first exclusively interested in its bearings on questions of hereditary and racial distinctions. He was considerably handicapped by the lack of a sufficiently varied and cosmopolitan series of impressions, and although he obtained the necessary data to establish successfully the probability of transmission of patterns by descent, he was unable to trace any correlation between particular types and ethnological variations. He subsequently directed his investigations into practical channels and established the Finger-Print System, which during the last few years has been adopted by the police of almost every country as the simplest and most certain means of identification of criminals.

It will be essential to give a short description of the system, avoiding as much as possible all technicalities. Finger-prints may be described briefly as unerring and unvarying sign-manuals which admit of being so classified as to afford any easy clue to the discovery of the name and also the record of a person who withholds or falsifies it. Impressions of the top bulbs of the ten fingers and thumbs are taken separately with ink, and each is classified according to the trend of the minute ridges which are easily visible on the skin, and whose functions, physiologists have never yet been able to determine with any degree of certainty. These ridges must not be confused with those creases which mark the flexion of the skin in the palms and phalanges, and upon whose tracings the so-called science of palmistry is reputed to be founded. Galton devised three distinct types of ridges, the *arch*, the *loop* and the *whorl*, any of which it is perfectly simple to recognize with a little practice. The pattern is an Arch "when the ridges in the centre run from one side to the other without assuming a backward

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turn or twist"; it is a Loop "when there is a single backward turn but no twist"; and a Whorl "when there is a turn through at least one circle or a double turn in the form of a duplex spiral." By an ingenious system of sub-classification, each of the above three types may be split up into clearly defined sub-types; this, however, although of the greatest importance in the filing and ready manipulation of records, does not concern us at present.

The Finger-Print System was systematically introduced into the Northern Provinces of the Protectorate of Nigeria, the largest and the most ethnologically diversified of our West African Colonies, some ten years ago. As far back as 1903, however, Captain Godwin, Commissioner of Police, had recorded a series of interesting and valuable impressions, including those of the hereditary nomadic robber type, who have now all disappeared beyond the borders into the desert. The finger-prints of all convicted criminals have, however, been taken since 1907, and the Central Bureau now contains a collection of many thousands of records of all tribes and races.

Northern Nigeria is a country remarkable for the diversity of its people and religions. It is the home of the Housa and Fulani, those partially Semitic races professing the Mohammedan faith, whose interesting history, half lost in the dim twilight of fable, has descended in the form of legends thousands of years old. Centuries ago these people drove the weaker races toward the south, occupying themselves the more salubrious and fertile hinterland which now comprises the Housa States. These races exhibit a capacity for self-government seldom observed in African races, and their enterprise and energy as traders is convinced by the fact that the Housa language is spoken in every important mart between the Mediterranean and the Gulf of Guinea.

The Yorubas (who form a large proportion of the population of Southern Nigeria), occupy only a small western corner of the Protectorate, but they also compose the bulk of the alien population. From long contact with European progressive influences, they have absorbed many of the civilizing elements of the latter, and have acquired a fair standard of advancement. Their degree of prognathism and certain other corresponding physical characteristics, however, are far more marked than in the case of the Housa and Fulani.

Towards the south of the Protectorate, the majority of the inhabitants are pagans, whilst there are numerous isolated pagan tribes scattered throughout the Northern Emirates. Amongst these peoples, there are many stages of development varying between the uncivilized

and lawless savage of the hills and forests, and the communal and peaceful handicraftsman and tiller of the soil. Prior to the advent of the British, the great majority led an extremely primitive existence, some living in hill-caves and menacing the chief trade routes. As an example of the remarkable diversity and independence of the pagan, it was estimated that in one province alone, whose entire population is not a quarter of that of Paris, no less than sixty-four different languages are spoken. The pure pagan is an interesting ethnological study. As a rule his personal habits are repulsive; his ideas of things in general, when he can be coaxed into expressing them, are extremely quaint and primitive, and his conceptions of justice fiercely retributive. He exhibits one peculiar physical characteristic, which is an unmistakeable sign of a low type of nervous organization—he possesses a singular insensibility to bodily pain. He cannot live in durance, and when obliged to conform to prison discipline for an extended period, invariably loses appetite and weight and eventually dies.

Two other peoples closely approximating the Huasas in the ethnological standard are the Kanuris and Nupes. They are numerically small in comparison, making up together less than one-ninth of the whole population of the Protectorate.

It will be readily understood, therefore, that in a country so rich in heterogenous material, there is considerable scope for research on the lines of Galton's original theory. Since the inception of the Finger-Print System in 1907 (the Scotland Yard method of filing being adopted), I have been collecting data, and as the numbers of records increased, I observed amongst other things that certain files became quickly and unduly congested. It soon became apparent that the relative proportions of Arches, Loops and Whorls in our records, differed in a marked degree from those in England. Consulting an official return which I had obtained from Scotland Yard, showing the percentages of patterns in 5,000 sets, i. e., 50,000 digits of English criminals, I have found that 69.37% were loops, 25.30% were Whorls and 4.83% were Arches, while there was an unclassified margin of 0.50% representing damaged or amputated fingers.

I accordingly set to work to prepare a corresponding return for West Africa convicts of all races, based upon an equal number of sets of impressions, I have recorded the result in the Appendix which shows also the corresponding percentages in each digit recorded by the Scotland Yard Criminal Investigation Dept. The comparative results are very interesting; 52.56% of the 50,000 digits recorded by me were

Loops, 38.77% were Whorls, 7.82% were Arches and 0.85% represented non-classification due to damaged or missing digits. Briefly, the percentages of Whorls amongst the African races was much higher, the Arches occurred much more frequently while the Loops were much fewer.

These facts accounted for the undue congestion of certain files, but I had frequently observed in addition that these particular files were largely composed of records received from pagan and Southern districts. I started again by dividing my records under six sub-heads—those of Fulanis, Hausas, Kanuris, Nupes, Yorubas and Pagans generally, whilst a small unclassified nondescript margin remained, representing roughly about 3% of the whole. I then went carefully through each class obtaining the number of Arches, Loops and Whorls respectively in each digit, finally reducing the figures to the common level of percentages. The result was somewhat remarkable. I have not shown each race separately for two reasons; first, I consider that it might be impolitic to make invidious comparisons; secondly, certain races are not represented in sufficient numerical strength to justify their segregation. I have summarized the figures as under dividing the whole into two classes—Class A consisting of the first four of the above mentioned races, and Class B, the remainder:

	Loops	Whorls	Arches	Amputated or Damaged
Class A	55.50	35.01	8.63	0.86
Class B	49.62	42.52	7.01	0.85

It will thus be seen that just as the percentage of Whorls is much higher, and the percentage of Loops much lower amongst the West African races when compared with Europeans, so the same general principle appears to hold good, but in a far less marked degree, in the comparison between the ethnologically inferior and superior African races.

There is one marked discrepancy, however, for the Arches occur more frequently amongst the superior races, instead of less as the comparative English and African table in the appendix would lead us to suppose. This at present I cannot explain.

It has been suggested to me that there might be an appreciable variation of digital type amongst Englishmen of diverse intellectual or social classes and that probably the percentages compiled by the Criminal Investigation Department of Scotland Yard, which consist for the greater part of records of habitual criminals, would for in-

stance differ materially from those of an equal number of law-abiding citizens.

Experience refutes this most conclusively, just as it incidentally disproves also the theory of Lombroso and the continental school of criminologists, that the criminal instinct is essentially hereditary and confined with abnormal exceptions to a particular section of society. It must be borne in mind that in the case of the English criminal, the inferior mental type is nowadays the exception rather than the rule and that the hereditary mental and moral weakening, far too inefficient to make a living by professional crime, gravitates to the workhouse rather than the goal. It is well known to those who have had any dealings with the recidivist classes that the habitual criminal is possessed of intelligence probably far in advance of his own social class, and that in spite of the perversion of his moral outlook, his general mental faculties are of a comparatively high standard. There is a definite absence of digital type variation amongst English offenders of the various classes, and this tends to confirm the generally accepted axiom that the true criminal instinct is fortuitous and its subsequent development contingent upon adverse social or moral circumstances. There is little room for doubt that the percentages quoted in the Scotland Yard statistics are fairly representative of the English race as a whole, and observation and experiment have convinced me that the same generalization holds good with regard to the figures quoted for the African communities, amongst whom there is a considerable amount of professional crime.

It will be observed in Appendix 1 that the number of damaged and amputated digits amongst the African races is very nearly double those amongst the English. There are two reasons for this; first, the common occurrence of a certain skin disease which not infrequently destroys the surface of sweat-glands and ridges of the fingers; secondly, the former Fulani custom of amputation of the hands of the professional thieves; this, it may be remarked, being one of those drastic punishments which civilized penological and preventive principles have conclusively proved so ineffective, and whose futility is exemplified by the re-appearance in African prisons of these habitual offenders.

I think it may be interesting to mention the results of certain experiments which I was asked some years ago, to carry out in connection with the finger-printing of Simiadae. This latter task inci-

dentally is by no means an easy one, the animals as a rule struggling during the operation; and to carry it out effectively, I found it necessary in the case of the larger monkeys to administer chloroform. To add to the difficulties, it is a necessary preliminary always to scrub the hands thoroughly in methylated spirits in order to remove adherent cuticle and dirt. However, I succeeded in obtaining some thirty complete sets of impressions, chiefly those of the small brown variety of African monkey. Many of these impressions were distinct when examined under the microscope; and out of the whole of the digital prints which were decipherable, I was unable to detect a single definite loop. Whorls were present in every variety in the majority of cases, and the remainder consisted of peculiar parallel curves, generally quite symmetrical, which might possibly be classified as Arches. The data, of course, are totally inadequate to justify even the attempt to establish any relation between these facts and those general principles enunciated in the preceding paragraphs; I merely wish to emphasize that the results afford a distinct promise of valuable material for further research of a highly important nature.

In conclusion, the study of digital impressions is new to modern science, because until recently even their economic value as unerring sign-manuals has been unrecognized. But now that this is no longer an academic question and a systematic method of classification has been evolved, and moreover hundreds of thousands of impressions of all races and nations are available for research all over the world, the subject must eventually assume considerable anthropological importance. It seems strange that although the primary investigations of Galton demonstrated an important factor in heredity, they have never been persistently followed up; but the second aspect, namely, that of the various characteristic racial co-efficients, promises to open up a far wider field for original research.

When we bear in mind that the whole anterior surface of the hand is traversed by the same distinctive papillary ridges, we may with diffidence even go so far as to speculate upon the possibility of tracing the sources of those extraordinary powers of character divination which we know were, beyond the shadow of doubt, possessed by the ancient Egyptian chiromancers; and of reviving a science which has been discredited and obscured by the charlatanism surrounding modern palmistry.

APPENDIX

TABLE SHOWING THE PERCENTAGES OF EACH PATTERN IN EACH OF THE TEN DIGITS IN 5,000 CASES, (A) ENGLISH, (B) WEST AFRICAN CRIMINALS, RESPECTIVELY

DIGIT	LOOPS		WHORLS		ARCHES		DAMAGED OR AMPUTATED	
	<i>English</i>	<i>West African</i>	<i>English</i>	<i>West African</i>	<i>English</i>	<i>West African</i>	<i>English</i>	<i>West African</i>
Right thumb	55.94	35.63	41.3	51.78	2.46	11.76	0.3	0.82
Right forefinger ...	57.86	46.94	30.54	41.68	10.78	9.79	0.82	1.60
Right middle finger.	76.90	64.29	16.46	27.58	6.06	7.25	0.58	0.87
Right ring finger...	56.84	46.65	40.90	46.68	1.84	5.94	0.42	0.73
Right little finger...	85.28	71.17	13.74	26.75	0.54	1.40	0.44	0.68
Left thumb	65.94	43.31	29.32	44.24	4.50	12.10	0.24	0.35
Left forefinger	61.08	44.32	27.98	41.34	10.30	13.77	0.64	0.56
Left middle finger..	75.44	62.57	16.10	28.46	7.94	8.15	0.52	0.82
Left ring finger.....	69.08	52.71	27.68	42.27	2.74	4.01	0.5	1.01
Left little finger....	89.34	58.03	8.98	36.92	1.16	3.98	0.52	1.09
Total Percentages.	69.37	52.56	25.30	38.77	4.83	7.82	0.50	0.85