

Winter 1935

## Racial Differences in Finger-Prints

Harold Cummins

Follow this and additional works at: <https://scholarlycommons.law.northwestern.edu/jclc>

 Part of the [Criminal Law Commons](#), [Criminology Commons](#), and the [Criminology and Criminal Justice Commons](#)

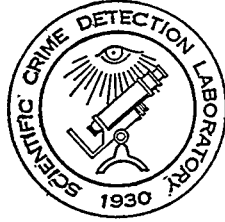
---

### Recommended Citation

Harold Cummins, Racial Differences in Finger-Prints, 25 Am. Inst. Crim. L. & Criminology 829 (1934-1935)

This Criminology is brought to you for free and open access by Northwestern University School of Law Scholarly Commons. It has been accepted for inclusion in Journal of Criminal Law and Criminology by an authorized editor of Northwestern University School of Law Scholarly Commons.

# POLICE SCIENCE



FRED E. INBAU [Ed.]

---

## RACIAL DIFFERENCES IN FINGER-PRINTS

---

HAROLD CUMMINS†

---

Doctor Heinrich Poll, formerly Director of the Anatomical Institute at Hamburg, presented before the International Congress of Anthropological and Ethnological Sciences, meeting in London in August, 1934, an important paper dealing with finger-prints as correlated with race<sup>1</sup> and predisposition to certain conditions of disease. The appeal of this topic to finger-print experts, medical men and students of anthropology, not to omit thoughtful persons generally, doubtless offers an explanation for the wide publicity accorded to his findings. By unfortunate phrasing, however, the press notices have given the impression that race may be determined by examination of the prints of *an individual*. Thus a newspaper "column filler" which appeared within a month after the Congress reads as follows: "Fingerprint experts, peering through lenses at the telltale arches, loops, whorls left by the finger tips of a fleeing criminal, may be able to give the police useful tips as to whether the 'wanted' man is white or black, Gentile or Jew, Italian or Spaniard, sane or insane." This squib is essentially a quotation of the first paragraph of the Science Service report released at the time of the meeting, which continues: "They will be able to do this, if a new method of reading a man's

---

†Department of Anatomy, Tulane University School of Medicine.

<sup>1</sup>The word "race" is here employed in the broadest sense, embracing not only grand divisions of mankind but also their geographical, linguistic and other classes.

race or nationality from his fingerprints . . . is developed to the point of practical application." The reservation here indicated hardly offsets the caption under which the report is printed: "FINGERPRINTS SHOW NATIONALITY!" The present writer being named as having discussed Dr. Poll's paper, he has received many inquiries from persons interested in obtaining additional information regarding the status of finger-prints as indicators of race. This note accordingly aims to provide an outline of the methods and findings in investigation of racial variation in finger-prints. It is not designed as a review of the subject in the sense of outlining findings in all racial groups that have been studied.<sup>2</sup> The account is intended rather as a more general discussion, embodying selected data only sufficient to illustrate the *group variations* in finger-prints which distinguish races, and emphasizing that it is the *group* representing a race rather than the *individual* in which such trends have been demonstrated.

In order that the finger-print studies may be viewed in their proper setting it should be pointed out that they are but one of many items which have been subjected to study in the analysis of races. Stature; bodily proportions; shape of head; shape of face; special characters of eyes, nose, lips; hair form and color; skin color: these are only examples of features observable in the living man, and the list might be greatly enlarged by adding further characteristics available for observation in life as well as features exposed by dissection, and physiological and psychological traits which vary racially. There is, in short, an effort to compare among races observations of all accessible traits, and finger-prints have shared this attention.

The term "finger-prints" commonly signifies not only the contact impression of the finger, which it literally is, but the original skin pattern itself. (Being accustomed to this usage, no exception would be taken to an expression such as the present title, "Racial differences in finger-prints," yet it might be compared in indirection to

---

<sup>2</sup>Neither is it possible within the limits of this paper to give full bibliographic references. Only several of the more recent publications are here listed as sources of detailed information and citations of original literature. Blotvogel, H. and W., "Blutgruppe und Daktylogramm als Konstitutionsmerkmale der Poliomyelitiskranken," Zeitschr. f. Kinderheilk., vol. 56, 1934; Bonnevie, K., "Studies on Papillary Patterns of Human Fingers," Jour. Genetics, vol. 15, 1924; Cummins, H., and M. Steggerda, "Finger Prints in Maya Indians," Pub. No. 7, Dept. Middle American Research of Tulane University, 1935; Dankmeijer, J., "De Beteekenis van Vingerafdrukken voor het Anthropologisch Onderzoek," Thesis, Utrecht, 1934, pp. 98; Henckel, K. O., "Beiträge zur Anthropologie Chiles. III. Über die Papillarlinienmuster der Fingerbeeren bei Indianern der Provinz Cautin," Zeitschr. Morph. Anthropol., vol. 34, 1934; Poll, H., "Seltene Menschen," Ergänz.-H. Anat. Anz., vol. 66, 1928; Poll, H., "Daktylographischer Index," Die Naturwiss., year 22, no. 1, 1934.

“Racial differences in photographs of noses!”) Finger-tip patterns are components of the *Dermatoglyphics*, embracing the similar patterned configurations of delicately ridged skin clothing the entire palmar and plantar surfaces. In passing, attention may be directed to the fact that the dermatoglyphics of palms and soles vary racially as well as the finger-tips; the principle of their analysis in races conforms to that here outlined for finger-prints. The special value of dermatoglyphics as aids in racial analysis lies not alone in their numerous and diverse points of comparison. The features are differentiated in the third and fourth months of fetal life and the configurations remain unmodified except in growth.

A prime requisite for the investigation of racial differences in finger-prints, as for other features, is an adequate sampling of the populations to be compared. The criteria of an adequate sample, additional to the obvious need for accurate classing of the individuals by race, may be listed as follows: (1) There must be in each sample a number of individuals sufficient to yield statistically significant evidences of similarity or difference. Some of the recorded studies are based on police files, and number many thousands of individuals. Other available samples are very much smaller; owing to the difficulty of obtaining prints in the commonly less accessible peoples, advantage is taken of opportunities to add even limited collections of data, which may at least suggest the trends of racial variation. (2) The sexual composition of the group is important, since sex differences are known to exist. (3) In the smaller collections it is desirable to exclude close relatives; the features being heritable, distortions of the typical racial tendencies may arise through the inclusion of individuals having like familial peculiarities.

Having assembled such samples, the chief objects of study in the finger-prints are: (1) Statistical representation of the fundamental varieties of patterns—whorls, ulnar loops, radial loops and arches. (2) The frequencies of various combinations of these pattern varieties composing the ten-digit complement of the individual, and of the five-digit sets of right and left hands separately. (3) The representation on different digits of the pattern types, including comparison of this distribution in right and left hands. (4) Finer characteristics of patterns, both by pattern types and by digits, including especially their form and size (as determined by ridge counting).

The first serious racial study of finger-prints is that of Galton

(1892) who compared the English, Welsh, Basques, Jews and Negroes. He notes:

“It requires considerable patience and caution to arrive at trustworthy conclusions, but it may emphatically be said that there is no *peculiar* pattern which characterises persons of any of the above races. There is no particular pattern that is special to any one of them, which when met with enables us to assert, or even to suspect, the nationality of the person on whom it appeared. The only differences so far observed are statistical, and cannot be determined except through patience and caution, and by discussing large groups.”

Now, some forty years later, the accumulation of finger-print studies has extended the racial representation considerably, both by numbers and diversity of race. But we must still say, with Galton, that the racial differences in the patterns are confined to their statistical occurrences. The findings which lend themselves most readily to brief explanation have to do with the total frequencies of the four pattern types. The accompanying table is compiled as an illustration of results in this connection.

## THE PERCENTAGES OF WHORLS, ULNAR LOOPS, RADIAL LOOPS AND ARCHES IN VARIOUS PEOPLES

Peoples	Number	Whorls	Ulnar Loops	Radial Loops	Arches	Author
Poland	107	24.0	56.0	7.0	12.0	Loth
England	5,000	25.3	65.7	5.7	4.8	Scotland Yard
Norway	24,518	25.7	61.1	5.8	7.4	Bonnevie
Netherlands	2,500	25.9	61.0	5.1	7.9	Dankmeijer
Portugal	10,000	27.0		66.5	6.4	Lopes
Denmark	101,511	29.7	59.3	5.5	5.4	Bugge
Russia	22,000	29.7		63.0	7.3	Semenovsky
Germany	200,000	30.8	59.9	5.1	4.1	Heindl
Hungary	333	32.3	59.1	3.6	5.0	Bonnevie
Italy	1,579	36.5	54.0	4.4	4.7	Falco
Jews (U. S.)	200	42.7	50.0	3.0	4.2	Cummins and Midlo
NORTH AMERICAN INDIANS						
Comanche	67	43.3	48.5	1.9	6.3	Cummins and Goldstein
Arapahoe	50	47.6	44.2	3.6	4.6	Downey
INDIANS OF MEXICO AND CENTRAL AMERICAS <sup>3</sup>						
	533	37.9	54.7	2.9	4.5	Cummins, Leche and Steggerda
SOUTH AMERICA (Chile)						
Province Concepcion	61,545	36.3	54.5	4.4	4.8	Henckel
Province Cautin	246	37.0	50.5	5.5	7.0	Henckel
Aino	55	31.8	61.4	3.8	2.9	Hasebe
Nias	1,300	34.7		62.9	2.4	de Zwaan
Mitwall	138	42.2	50.9	4.2	2.7	Cummins and Shanklin (MS)
Sumatran	500	45.1		53.1	1.7	de Zwaan
Korean	700	45.2	48.7	3.2	2.6	Kubo
Japanese (Sugamo)	1,528	45.2	47.7	4.2	2.6	Furuse
Japanese (Ichigaya)	700	45.2	48.9	3.8	1.8	Kubo
Chinese	308	49.9	45.3	2.7	2.0	Shiino and Mikami
Japanese (Kanazawa)	12,940	50.1	44.9	3.9	1.2	Hirano
Chinese	300	50.7	45.0	2.7	1.4	Kubo
ESKIMOS						
Point Barrow	30	46.3	49.0	2.3	2.3	Cummins
St. Lawrence Island	59	46.8	46.9	1.9	4.4	Cummins and Midlo
Greenland	68	72.2	26.2	0.7	0.8	Abel
AFRICANS						
Hottentot	50	18.6	72.2	4.1	5.1	Fleischhacker
Efe Pygmies	207	19.6	61.3	2.7	16.2	Dankmeijer
Blacks in Jamaica	124	29.0	56.9	2.3	10.8	Davenport and Steggerda
Liberia	65	30.5	62.2	4.3	3.1	Dankmeijer
Sierra Leone	58	38.9	56.3	1.0	3.6	Cummins

Selecting whorls for reference, it will be noted that the Efe Pygmies and Hottentots present the minimum frequency, amounting to only about 19% of all patterns. At the other extreme are Eskimos

<sup>3</sup>Under this heading are combined the figures for several collections of Indians in this territory, separately reported by Cummins, Cummins and Steggerda, and Leche in recent publications (especially No. 7) of the Department of Middle American Research, Tulane University. The percentages here listed are weighted averages of the original frequencies obtained in eight collections of Indians.

and populations of eastern Asia, while between these limits the northern Europeans, southern Europeans and Indians of the western hemisphere form a sequence of increasing whorl frequencies. To simplify the expression of the relative frequencies of patterns types Furuhashi employs a "finger-print index," which is simply a statement of the quotient of the whorl frequency divided by the summated frequencies of ulnar and radial loops (multiplied by 100, to yield a whole number). Dankmeijer suggests the use of the arch-whorl quotient, and selected examples of the two expressions are here listed.

	<i>Whorl/Loop</i>	<i>Arch/Whorl</i>
Chinese .....	106	2.8
Japanese .....	87	5.8
Italian .....	63	12.9
Norwegian .....	38	28.8
Efe Pygmies.....	31	82.7

The foregoing comment should suffice to show that total frequencies of pattern types afford no means of identifying the race of *an individual*. It is only when the results from a *group* are tallied that differences of this class could be observed, for the prints of the individual, irrespective of his race, may range from 0% to 100% whorls.

After having determined that races do vary in their total frequencies of pattern types the next inquiry concerns the frequency of various combinations of these types in the individual ten-digit set. Accordingly a tally is made of the number of finger-print sets composed of ten loops, nine loops and one whorl, eight loops and two whorls, etc., finally reducing the tally to percentages for comparative use. The most expressive way of recording the tally is in the form of the "Bimanuar" devised by Poll. This bimanuar is simply a graphic table orderly divided into the 66 theoretically possible combinations (all of which, as pointed out by Poll, are not actually realized). For graphic accentuation of the results embodied in such a table this "planimanuar" may be converted into the form of a stereogram or constructed as a three-dimensional model. Differences in the combinations of patterns of right and left hands are brought out by composing "unimanuars," each with places for 21 combinations, and Kirchmair recently has elaborated the principle in the construction of an "ambimanuar" and "ambidigitar." All these approaches provide evidences of racial variation, yet the demonstration as before is in statistical terms.