

Distribution of papillary Patterns on the middle and proximal Phalanges of Brahmins of Rajasthan

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Dermatoglyphics as a science has from time to time attracted the attention of Anthropologists. Not only has it received the efforts of Anthropologists but has immensely helped the personnel dealing with forensic sciences. Dermatoglyphicists have devoted much of their efforts and energy in standardising the criteria for racial classification of the mankind inhabiting this globe of the earth. Though most of the scientists have studied the apical phalanges of the fingers, little or no attention has been given to the middle and proximal phalanges. Crime scenes form a part of interesting study, in which not only finger, and palmar-prints are dealt with, but the prints of the rest of the phalanges as well. It has been observed that these phalanges show definite patterns which can be classified under definite categories. The first study on these lines was conducted by Mrs. Maria Ploetz - Radmann (1937) on Germans. Soon the work of W. W. King (1940) followed on Chinese. The present paper is an attempt to probe into the intricacies of the patterns as observed on the phalanges of Brahmins of Rajasthan.

Introduction

During the month of January 1960 the author visited the town of Konkroli situated at the distance of 40 miles from Udiapur. The present analysis is from the collection of the data of bilateral dermatoglyphics of the middle and proximal phalanges of Brahmin series. The data were collected from the Boys middle school.

The Brahmins of Rajasthan in their physical features conform to the prevalent Mediterranean type, i. e. mean stature, long face and prominent nose. They are dolichocephalic and are of light to light-brown complexion. As such they form a very rigid group and have tried to maintain their purity and marry only among themselves, thus forming an endogamous group.

The present paper contains the data on 60 males. Every individual is represented by the prints of all ten fingers. The methods employed in the analysis of the patterns are conventionally accepted as described by Ploetz-Radmann (*Die Hautleisten-muster der unteren beiden Fingerglieder der menschlichen Hand. Zeitschrift für Morphologie und Anthropologie, 1937, Vol. 36, pp. 281-310*).

Terminology

A. BASIC PATTERNS

I. Straight (St)

1. Radial Straight (rSt)
2. Ulnar Straight (uSt)
3. Quer Straight (qSt)

II. Hook (H)

4. Distal radial Hook (drH)
5. Distal ulnar Hook (duH)
6. Proximal radial Hook (prH)
7. Proximal ulnar Hook (puH)

III. Wave (W)

8. Distal Wave (DW)
9. Proximal Wave (pW)

IV. Arch (Ar)

10. Distal Arch (dAr)
11. Proximal Arch (pAr)

B. COMPOSITE-PATTERNS

V. Angle (An)

12. Distal radial Angle (drAn)
12. Distal ulnar Angle (duAn)
14. Proximal radial angle (prAn)
15. Proximal ulnar Angle (puAn)

VI. Arch Angle (ArAn)

16. Distal radial Arch Angle (drArAn)
17. Distal Ulnar Arch Angle (duArAn)
18. Proximal radial Arch (prArAn)
19. Proximal ulnar Arch Angle (puArAn)

VII. Double Angle (DAn)

20. Radial Double Angle (rDAn)
21. Ulnar Double Angle (UDAn)

VIII. Double Arch Angle (DArAn)

22. Radial Double Arch Angle (rDArAn)
23. Ulnar Double Arch Angle (uDArAn)

IX. 24. Double Arch (DAr)

X. Enclosure (En)

25. Radial Enclosure (rEn)
26. Ulnar Enclosure (uEn)
27. Quer Enclosure (qEn)

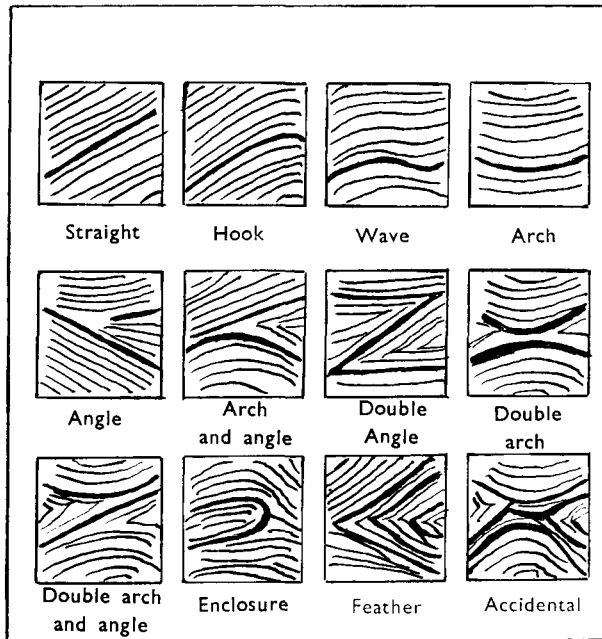
XI. 28. Feather (F)

XII. 29. Accidentals (Acc).

Analysis

This paper aims to study the racial variability and bilateral dimorphism as regards the patterns on the middle and proximal phalanges are concerned. The Brahmin series exhibit the presence of all the patterns except Accidentals. For convenience the apical phalange is given No. 3, while the middle one is assigned No. 2 and the proximal No. 1.

Patterns on middle and proximal phalanges



Sub-types

| | | | | |
|-----------------------|-----|-----|-----|-----|
| Straight | 1. | 2. | 3. | |
| Hook | 4. | 5. | 6. | 7. |
| Wave | 8. | 9. | | |
| Arch | 10. | 11. | | |
| Angle | 12. | 13. | 14. | 15. |
| Arch and angle | 16. | 17. | 18. | 19. |
| Double Angle | 20. | 21. | | |
| Double arch and angle | 22. | 23. | | |
| Double arch | 24. | | | |
| Enclosure | 25. | 26. | 27. | |

Tab. 1. Distribution of various patterns on the middle & proximal phalanges of Brahmin series (males 60)

| Pattern | | I | | II | | III | | IV | | V | | Total | % | |
|---------|---|----|----|----|----|-----|----|----|----|----|----|-------|-----|-------|
| | | R | L | R | L | R | L | R | L | R | L | | | |
| rSt | 2 | 12 | — | 44 | 21 | 6 | — | 11 | 4 | — | — | 98 | 131 | 12.13 |
| | 1 | — | 4 | 17 | 7 | 4 | 1 | — | — | — | — | 33 | | |
| uSt | 2 | — | — | — | 1 | — | 5 | 2 | 6 | 17 | 39 | 70 | 118 | 10.92 |
| | 1 | — | — | — | — | 1 | 8 | 1 | 1 | 9 | 28 | 48 | | |
| qSt | 2 | — | — | 2 | 6 | 1 | 2 | 1 | 1 | 1 | 1 | 15 | 21 | 1.94 |
| | 1 | — | 2 | — | 2 | 1 | 1 | — | — | — | — | 6 | | |
| drH | 2 | 46 | — | 7 | 6 | 2 | — | 3 | — | — | — | 64 | 167 | 15.46 |
| | 1 | — | 46 | 23 | 14 | 16 | 4 | — | — | — | — | 103 | | |
| duH | 2 | — | — | — | — | — | — | 1 | 6 | 30 | 14 | 51 | 204 | 18.88 |
| | 1 | — | — | — | — | 3 | 4 | 32 | 33 | 50 | 31 | 153 | | |
| prH | 2 | — | — | 4 | 6 | 7 | 4 | 1 | 1 | — | — | 23 | 28 | 2.59 |
| | 1 | — | — | 3 | — | 2 | — | — | — | — | — | 5 | | |
| puH | 2 | — | — | — | — | — | — | 1 | 1 | — | — | 2 | 2 | 0.18 |
| | 1 | — | — | — | — | — | — | — | — | — | — | — | | |
| dW | 2 | — | — | — | — | — | 1 | 1 | — | — | — | 2 | 3 | 0.27 |
| | 1 | — | — | — | — | — | — | 1 | — | — | — | 1 | | |
| pW | 2 | — | — | — | — | — | — | 1 | 3 | — | — | 4 | 29 | 2.68 |
| | 1 | — | — | 4 | — | 3 | 1 | 6 | 11 | — | — | 25 | | |
| dAr | 2 | — | — | 2 | 6 | 1 | 2 | 7 | 8 | 4 | 3 | 33 | 66 | 6.11 |
| | 1 | — | 7 | — | 2 | 3 | 6 | 6 | 8 | — | 1 | 33 | | |
| pAr | 2 | — | — | — | — | 24 | 21 | 10 | 7 | — | — | 62 | 72 | 6.66 |
| | 1 | — | — | 1 | — | 4 | 4 | 1 | — | — | — | 10 | | |
| drArAn | 2 | 2 | — | 1 | 10 | 12 | 4 | 2 | 2 | — | — | 33 | 38 | 3.51 |
| | 1 | — | 1 | 3 | 1 | — | — | — | — | — | — | 5 | | |
| duArAn | 2 | — | — | — | — | 1 | 15 | 9 | 14 | 4 | 3 | 45 | 48 | 4.44 |
| | 1 | — | — | — | — | — | — | 1 | 1 | — | — | 2 | | |
| prArAn | 2 | — | — | — | 1 | 3 | 2 | 7 | 4 | — | — | 17 | 18 | 1.66 |
| | 1 | — | — | — | — | 1 | — | — | — | — | — | 1 | | |

Kumbnani H.: Distribution of papillary Patterns, etc.

Tab. 1 (cont.)

| Pattern | | I | | II | | III | | IV | | V | | Total | % | | |
|---------|---|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|-------|------|
| | | R | L | R | L | R | L | R | L | R | L | | | | |
| puArAn | 2 | — | — | — | I | I | I | — | I | I | — | 5 | 7 | 0.64 | |
| | I | — | — | I | — | — | I | — | — | — | — | 2 | | | |
| drAn | 2 | — | — | — | — | — | — | — | — | — | — | — | 3 | 3 | 0.29 |
| | I | — | — | — | I | — | 2 | — | — | — | — | 3 | | | |
| duAn | 2 | — | — | — | — | — | — | I | 2 | 2 | — | 5 | 5 | 0.46 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| prAn | 2 | — | — | — | — | — | — | I | — | — | — | I | I | 0.02 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| puAn | 2 | — | — | — | — | — | — | — | — | I | — | I | I | 0.02 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| rDArAn | 2 | — | — | — | — | — | — | — | — | — | — | — | — | 0.00 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| uDArAn | 2 | — | — | — | — | — | 2 | — | — | — | — | 2 | 2 | 0.18 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| DAr | 2 | — | — | — | — | — | — | — | — | — | — | — | — | 0.00 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| rDAn | 2 | — | — | — | — | — | — | — | — | — | — | — | — | 0.00 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| uDAn | 2 | — | — | — | — | — | — | — | — | — | — | — | — | 0.00 | |
| | I | — | — | — | — | — | — | — | — | — | — | — | | | |
| rEn | 2 | — | — | — | 2 | — | — | I | — | — | — | 3 | 81 | 7.50 | |
| | I | — | — | 8 | 31 | 17 | 18 | 3 | I | — | — | 78 | | | |
| uEn | 2 | — | — | — | — | I | — | — | — | — | — | I | 15 | 1.39 | |
| | I | — | — | — | — | I | I | 7 | 4 | I | — | 14 | | | |
| qEn | 2 | — | — | — | — | I | — | — | — | — | — | I | 18 | 1.66 | |
| | I | — | — | — | 2 | 4 | 8 | 2 | I | — | — | 17 | | | |
| F | 2 | — | — | — | — | I | — | — | — | — | — | I | 2 | 0.18 | |
| | I | — | — | — | — | — | I | — | — | — | — | I | | | |
| | | 60 | 60 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 1080 | 1080 | 99.97 | |

Table 1 lists the percentile frequencies of various sub-patterns, as found in the Brahmin series. The table being self explanatory — the reference of predominant patterns is made. The sub-pattern distal ulnar Hook (duH) predominates and exhibits the percentile frequency of 18.88. Next in order comes distal radial Hook (drH) 15.46%. Radial straight (rSt) are 12.13% while ulnar Straight (uSt) show the frequency of 10.92%. Radial Enclosure (rEn), though common, shows the lesser frequency of 7.50%, as compared to the above mentioned patterns.

Tab. 2. Percentile frequencies of general patterns on middle and proximal phalanges of Brahmin series (60)

| Pattern | R. | L. | R. & L. |
|---------|--------|--------|---------|
| St | 24.073 | 25.924 | 24.999 |
| H | 42.777 | 31.481 | 37.128 |
| W | 2.962 | 2.962 | 2.962 |
| Ar | 11.666 | 13.889 | 12.777 |
| ArAn | 9.072 | 11.480 | 10.276 |
| An | 0.925 | 0.925 | 0.924 |
| DArAn | 0.000 | 0.370 | 0.185 |
| DAn | 0.000 | 0.000 | 0.000 |
| DAR | 0.000 | 0.000 | 0.000 |
| En | 8.332 | 12.777 | 10.554 |
| F | 0.185 | 0.185 | 0.185 |
| Total | 99.992 | 99.993 | 99.986 |

Table 2 lists the percentile frequencies of various patterns on the middle and proximal phalanges of all the digits. Among all the patterns the Hooks predominate showing the percentile frequency of 37.128, but considering both the hands separately the right shows the maximum, 42.777 as compared to 31.481 in the left. Next to Hook comes the pattern Straight, exhibiting the frequency of 24.999% in both the hands combined. It predominates in lefts, being 25.924% as compared to 24.073%. The pattern Arch is 12.777% in both the hands. It shows the highest value, in the left hand (13.889%) as compared to 11.666% in the right. Enclosures exhibit the frequency of 10.554% in both hands, showing the highest value in the lefts (12.777%), as compared to 8.332% in the rights. Arch angle is 10.276%, and is higher in the lefts (11.480%), as compared to 9.072% in the rights. The rest of the patterns are of rare occurrence as it is evident from the above table.

Tab. 3. Different frequencies of the various pattern combinations on the middle and proximal phalanges in Brahmins (males 60)

| Right | | | | Left | | | |
|--------|-----|-----|--------|------|-----|--------|----------|
| II | III | IV | V | II | III | IV | V |
| rSt | rSt | rSt | uSt | rSt | uSt | rSt | uSt |
| 16 | 5 | 3 | 5 | 3 | 2 | 2 | 23 |
| rSt | rSt | duH | uSt | rSt | uSt | duH | uSt |
| rSt | rSt | rSt | uSt | rSt | uSt | rSt | uSt |
| 16 | 6 | 3 | 12 | 6 | 1 | 1 | 17 |
| drH | drH | dW | duH | drH | duH | pW | duH |
| rSt | rSt | rSt | qSt | rSt | uSt | rSt | qSt |
| 2 | 2 | 4 | 1 | 1 | 1 | 2 | 1 |
| prH | prH | rEn | duH | drAn | pW | uEn | dAr |
| rSt | rSt | rSt | duH | rSt | uSt | uSt | duH |
| 1 | 4 | 2 | 3 | 11 | 1 | 4 | 3 |
| pW | rEn | uEn | uSt | rEn | rEn | duH | uSt |
| rSt | rSt | rSt | duH | uSt | qSt | uSt | duH |
| 1 | 1 | 4 | 27 | 1 | 1 | 1 | 10 |
| drArAn | qEn | qEn | duH | dAr | qSt | duArAn | duH |
| rSt | drH | drH | dAr | qSt | qSt | qSt | dAr |
| 7 | 2 | 1 | 4 | 1 | 1 | 1 | 1 |
| rEn | drH | duH | duH | rSt | rEn | duH | uSt |
| qSt | drH | drH | duArAn | qSt | prH | duH | dAr |
| 1 | 1 | 1 | 3 | 1 | 1 | 4 | 2 |
| drH | qSt | dAr | duH | drH | drH | duH | duH |
| qSt | drH | drH | duArAn | qSt | prH | duH | duArAn |
| 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| pW | pW | uEn | uEn | qSt | rEn | pW | uSt |
| drH | prH | puH | puArAn | qSt | prH | duH | duArAn |
| 5 | 3 | 1 | 1 | 2 | 1 | 1 | 2 |
| drH | drH | uEn | duH | qEn | uEn | uEn | duH |
| drH | prH | dW | duAn | drH | prH | prH | 60 Total |
| 1 | 2 | 2 | 1 | 1 | 1 | 1 | |
| pW | prH | duH | uSt | drH | qEn | dAr | |

Tab. 3 (cont.)

| Right | | | | Left | | | |
|-------------|----------|----------|-----------|-------------|-------------|----------|---|
| II | III | IV | V | II | III | IV | V |
| drH 1 | prH 1 | dW 1 | duAn 1 | drH 5 | dW 1 | puH 1 | |
| drArAn | pAr | uEn | duH | duH | puArAn | dAr | |
| prH 1 | prH 1 | dAr 1 | puAn 1 | prH 1 | drArAn 1 | pW 1 | |
| drH | prArAn | qSt | duH | rSt | drH | duH | |
| prH 1 | prH 1 | dAr 1 | 60 Total | prH 1 | drArAn 1 | pW 1 | |
| prH | rEn | duH | | duArAn | dAr | puH | |
| prH 1 | pAr 2 | dAr 2 | | prH 4 | drArAn 1 | pW 1 | |
| pAr | rSt | uEn | | rEn | rEn | pW | |
| prH 1 | pAr 1 | dAr 1 | | dAr 3 | drArAn 1 | pAr 5 | |
| drArAn | drH | qEn | drH | drH | qEn | duH | |
| dAr 1 | pAr 1 | pAr 1 | | dAr 3 | duArAn 6 | pAr 2 | |
| pW | pAr | qSt | | rEn | uSt | pW | |
| dAr 1 | pAr 1 | pAr 3 | | drArAn 2 | duArAn 1 | pAr 1 | |
| puArAn | pW | duH | | rSt | duH | qEn | |
| drArAn 2 | pAr 5 | pAr 1 | | drArAn 3 | duArAn 3 | dAr 2 | |
| rSt | rEn | pAr | | drH | dAr | duH | |
| 60 Total | pAr 1 | pAr 1 | | drArAn 5 | duArAn 3 | dAr 1 | |
| | uEn | rSt | | rEn | rEn | pW | |
| | pAr 1 | pAr 1 | | prArAn 1 | duArAn 1 | dAr 3 | |
| | qEn | dW | | rEn | qEn | dAr | |

Tab. 3 (cont.)

| Right | | | | Left | | | |
|-------|-------------|-------------|---|-------------|-------------|-------------|---|
| II | III | IV | V | II | III | IV | V |
| | dAr 1 | pAr 2 | | puArAn 1 | duArAn 1 | dAr 1 | |
| | dAr | rEn | | rEn | F | uEn | |
| | drArAn 3 | pAr 1 | | rEn 1 | puArAn 1 | drArAn 1 | |
| | rSt | qEn | | dAr | drAn | pW | |
| | drArAn 3 | drArAn 1 | | rEn 1 | prArAn 2 | duArAn 1 | |
| | drH | rSt | | rEn | qEn | uSt | |
| | drArAn 1 | drArAn 1 | | 60 Total | uDArAn 1 | duArAn 8 | |
| | duH | duH | | | duH | duH | |
| | drArAn 1 | drArAn 1 | | | uDArAn 1 | duArAn 1 | |
| | pAr | uEn | | | dAr | pW | |
| | drArAn 4 | duArAn 5 | | | dAr 1 | duArAn 3 | |
| | rEn | duH | | | rEn | dAr | |
| | duArAn 1 | duArAn 1 | | | pAr 1 | duArAn 1 | |
| | uSt | uEn | | | rSt | rEn | |
| | prArAn 1 | duArAn 1 | | | pAr 2 | prArAn 3 | |
| | drH | qEn | | | dtH | duH | |
| | puArAn 1 | prArAn 1 | | | pAr 1 | prArAn 1 | |
| | qEn | rSt | | | duH | pW | |
| | uEn 1 | prArAn 2 | | | pAr 1 | puArAn 1 | |
| | rEn | duH | | | dAr | dW | |

Tab. 3 (cont.)

| | Right | | | | Left | | | |
|------------------------|-------|----------|----------|----|------|----------|----------|---|
| | II | III | IV | V | II | III | IV | V |
| | | F | prArAn | | | pAr | duAn | |
| | | 1 | 1 | | | 4 | 2 | |
| | | drH | dW | | | pAr | duH | |
| | | 60 Total | prArAn | | | pAr | 60 Total | |
| | | | 2 | | | 1 | | |
| | | | dAr | | | drAn | | |
| | | | prArAn | | | pAr | | |
| | | | 1 | | | 9 | | |
| | | | pAr | | | rEn | | |
| | | | prArAn | | | pAr | | |
| | | | 2 | | | 3 | | |
| | | | uEn | | | qEn | | |
| | | | duAn | | | qEn | | |
| | | | 1 | | | 1 | | |
| | | | duH | | | rEn | | |
| | | | prAn | | | 60 Total | | |
| | | | 1 | | | | | |
| | | | duH | | | | | |
| | | | rEn | | | | | |
| | | | 1 | | | | | |
| | | | pAr | | | | | |
| | | | 60 Total | | | | | |
| Number of combinations | 18 | 31 | 37 | 12 | 23 | 35 | 31 | 9 |

Table 3 lists the frequencies (in absolute figures) of the various combinations, as found on the middle and proximal phalanges on males in the Brahmin series. The total number at various combinations is 18, as found on the second digit of the right hand and the combinations that preponderate on this finger are 16 rSt/rSt, 16 rSt/drH, 7 rSt/rEn and 5 drH/drH. The third digit exhibits 31 different combinations which definitely leads us to surmise of less symmetry of the patterns on this finger. The most common combinations are 5 rSt/rSt, 6 rSt/drH, 4 rSt/rEn, 5 pAr/rEn. The fourth digit of this hand shows 37 various combinations indicating there by the least degree of symmetry on the middle and proximal phalanges. The most common combinations are 4 rSt/rEn, 4 rSt/qEn and 5 duArAn/drH. 12 different types of combinations

are noticed on the fifth digit of the right hand. This finger exhibits the highest degree of symmetry between the two phalanges. The most common combinations are 5 uSt/uSt, 12 uSt/duH, 27 duH/duH and 4 dAr/duH.

Tab. 4. Right-Left symmetrical combination on the finger phalanges of homologous Right-Left fingers in Brahmin series

| N. | II | III | IV | V |
|----|-----------------|-----------------|-----------------|-----------------|
| | R 2/1 L 2/1 | R 2/1 L 2/1 | R 2/1 L 2/1 | R 2/1 L 2/1 |
| 1 | rSt/rSt 3 | pAr/rEn 5 | rSt/duH 2 | uSt/uSt 5 |
| 2 | rSt/rSt 6 | pAr/rEn 1 | rSt/duH 2 | uSt/uSt 12 |
| 3 | rSt/drH 7 | pAr/qEn 1 | rSt/uEn 1 | uSt/duH 3 |
| 4 | rSt/rEn 1 | drArAn/drH 1 | dAr/duH 1 | duH/uSt 10 |
| 5 | qSt/drH 1 | drArAn/dAr 1 | dAr/uEn 3 | duH/duH 2 |
| 6 | drH/drH 1 | drArAn/rEn 1 | pAr/duH 1 | dAr/duH 2 |
| 7 | drH/drH 1 | drArAn/rEn 1 | pAr/duH 1 | dAr/duH 2 |
| 8 | drArAn/rSt 1 | drArAn/uSt 1 | pAr/qEn 1 | duArAn/duH 2 |
| 9 | drArAn/rSt 1 | drArAn/uSt 1 | pAr/qEn 1 | duArAn/duH 2 |
| | | | duArAn/duH 5 | |
| | | | duArAn/duH 2 | |
| | | | puArAn/duH 2 | |
| | | | puArAn/duH 2 | |
| | | | duAn/duH 1 | |
| | | | duAn/duH 1 | |

Similarly on the second digit of the left hand 23 different combinations are noticed. The common types of combinations are 6 rSt/drH, 11 rSt/rEn, 5 drH/rEn, 4 prH/rEn and 5 drArAn/rEn. 35 different combinations are noticed on the third digit and the most common are 6 duArAn/uSt, 4 pAr/pAr and 9 pAr/rEn. The fourth finger has 31 different combinations and the most frequent are 4 uSt/duH, 4 duH/duH, 5 pAr/duH and 8 duArAn/duH. The fifth finger perhaps exhibits the least number of combinations, i. e. 9 and the most frequent combinations are 23 uSt/uSt, 17 uSt/duH and 10 duH/duH.

Comparing the rights and lefts it is observed that fingers II & III of the lefts (radial fingers) show a higher number of combinations as compared to the rights, thus leading towards the surmise of an asymmetry of a greater degree. Whereas fingers IV & V (ulnar fingers) show more symmetry on the rights than on the lefts.

Table 4 relates the right-left symmetrical combinations on finger phalanges of homologous right-left fingers. On the second digit the total number of combinations

Tab. 5. The percentile frequencies of main patterns as found on Germans, Chinese & Brahmins

| Pattern | Germans (200) | | Chinese (100) | Brahmins (60) |
|---------|---------------|--------|---------------|---------------|
| | ♂ | ♀ | ♂ | ♀ |
| St | 34.89 | 39.65 | 16.72 | 24.999 |
| H | 21.43 | 20.76 | 33.82 | 37.128 |
| W | 3.96 | 3.82 | 1.07 | 2.962 |
| Ar | 17.30 | 18.02 | 13.49 | 12.777 |
| ArAn | 4.52 | 4.86 | 10.17 | 10.276 |
| An | 9.04 | 7.37 | 6.60 | 0.924 |
| DArAn | 2.52 | 1.36 | 4.10 | 0.185 |
| DAn | 2.00 | 0.99 | 0.22 | 0.000 |
| DAr | 0.32 | 0.27 | 3.00 | 0.000 |
| rEn | 5.08 | 2.35 | 8.89 | 10.554 |
| F. | 0.28 | 0.27 | 0.05 | 0.185 |
| Acc | 0.84 | 0.18 | 1.28 | 0.000 |
| ? | 0.00 | 0.00 | 0.33 | 0.000 |
| Total | 100.18 | 100.10 | 99.94 | 99.986 |

is 6; the most common combinations are 6 $\frac{rSt/drH}{rSt/drH}$ and 7 $\frac{rSt/rEn}{rSt/rEn}$. Six different combinations are found on the third digit and the most frequent combinations 5 $\frac{pAr/rEn}{pAr/rEn}$, 9 different combinations are noticed on the fourth digit and the most

common is $5 \frac{duArAn/duH}{duArAn/duH}$. Lastly, 6 different combinations are observed on the fifth digit and the most common are:

$$5 \frac{uSt/uSt}{uSt/uSt}, 12 \frac{uSt/duH}{uSt/duH} \text{ and } 10 \frac{duH/duH}{duH/duH}$$

Racial differences

Table 5 shows the percentile frequencies of the various main patterns of Germans (by Radmann), Chinese (by King) and Brahmins of Rajasthan (by author). The order of preponderance of the patterns in Germans is St, H & Ar; while Chinese exhibit it to be H, St & Ar. Brahmins in this respect conform to Chinese, i. e. H, St & Ar. The table is self explanatory, and the most frequent patterns are compared here. The pattern Straight (St) in Germans exhibits the higher frequency as compared to those of Chinese and Brahmins. Hooks are less frequent in Germans while Chinese and Brahmins resemble very much in their frequency of this pattern. Arches are exhibited more in the German series than in those of Chinese and Brahmins, but Chinese and Brahmins resemble more to each other. The overall resemblance between Chinese and Brahmins is higher, as compared to Germans. The percentage frequencies of Angle (An) and Double Arch Angle (DArAn) far exceed in Germans and Chinese as compared to the Brahmins. Germans occupy the lowest position in terms of the frequency of Enclosures, and Brahmins are on the top, exhibiting the highest frequency, while Chinese are intermediate.

Summary

After a careful study and analysis of the various patterns observed on the middle and proximal phalanges on 600 fingers the Author comes to the following tentative conclusions.

1. As it is evident from table I, fingers II, III, IV show a great variability of patterns and among them III and IV have as many patterns as 20 each, while the least degree of variability is observed on thumb, the first finger, which shows only 5 types of patterns. The fifth finger shows 10 different types of patterns. The above number is obtained while counting the pattern present on right and left hands.

2. Among the main types, the pattern Hook predominate exhibiting the percentile frequency of 37.128. Patterns Straight are second in order of preponderance showing the percentile frequency of 24.999. Arches are definitely higher (12.777%) as compared to Enclosures which are 10.554%.

3. The patterns Hook and Straights are more common on fingers I and V, while Arches, Arch Angle and Enclosures are monopoly of digits, II, III and IV.

4. In general it is observed that digits I, II, III bear the patterns which open more frequently on the radial side whereas digits IV and V show the patterns opening on the ulnar side — a natural mechanism which helps a lot in grasping.

5. Comparing the different right-left symmetrical combinations on the finger phalanges of homologous right-left fingers it is observed that digits II, III, and V exhibit a lower number of symmetrical combinations as compared to digit IV, indicating thereby more symmetry in digits I, II, V as compared to digit IV.

6. Comparing the percentile frequencies of various main patterns it can be surmised with certainty that in most of the pattern frequencies Brahmins resemble more to Chinese than to Germans. However, further investigations on these research lines and on many other groups, will not only add to our knowledge but will also help in the race stratification.

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RIASSUNTO

Dopo un attento studio ed analisi dei diversi disegni osservati sulle falangi media e prossimale di 600 dita, l'A. tira le seguenti conclusioni provvisorie:

1. Come risulta evidente dalla tab. 1, le dita II, III e IV presentano una grande variabilità di disegni e, fra di esse, le dita III e IV hanno 20 disegni ognuna, mentre il minor grado di variabilità lo si riscontra per il pollice, che ha solo 5 tipi di disegni. Il quinto dito presenta dieci diversi tipi di disegni. Questi dati sono

comuni per le dita della mano destra e di quella sinistra.

2. Fra i principali tipi, il disegno ritorto (hook) predomina, con una frequenza del 37,128%, mentre il disegno diritto (straight) è al secondo posto, con una frequenza di 24,999%. La frequenza degli archi (12,777%) è chiaramente superiore a quella delle inclusioni (10,554%).

3. I disegni ritorto e diritto sono più frequenti sulle dita I e V, mentre gli archi, gli

angoli di arco e le inclusioni sono esclusivi delle dita II, III e IV.

4. In genere, si nota che le dita I, II, III presentano disegni che si aprono più frequentemente dal lato radiale, mentre le dita IV e V presentano disegni che si aprono più frequentemente dal lato ulnare — un meccanismo naturale di molto aiuto per la prensilità.

5. Raffrontando le diverse combinazioni simmetriche sinistro-destre sulle falangi di dita omologhe sinistro-destre, si nota che le dita II, III e V presentano un minor numero di combina-

zioni simmetriche rispetto al dito IV, stando così ad indicare una maggiore simmetria nelle prime.

6. Raffrontando le frequenze percentuali di diversi disegni principali, si può affermare con certezza che nella maggior parte delle frequenze i Bramini somigliano più ai Cinesi che ai Tedeschi. Comunque, ulteriori ricerche sull'argomento non solo aumenteranno le nostre conoscenze, ma saranno anche utili per la stratificazione razziale.

RÉSUMÉ

Ayant attentivement étudié et analysé les différents dessins observés sur les phalanges moyenne et proximale de 600 doigts l'A. tire les suivantes conclusions tentatives:

1. Comme le tableau 1 le démontre, les doigts II, III e IV présentent une grande variabilité de dessins: les doigts III et IV en ont 20 chacun, tandis que le pouce n'en a que 5. Le cinquième doigt présente 10 divers types de dessins. Ces données sont communes aux deux mains.

2. Parmi les types principaux le dessin crochu (hook) est le plus fréquent (37,128%) tandis que le dessin droit (straight) est au deuxième rang, avec une fréquence de 24,999%. La fréquence des arcs (12,777%) est plus élevée de celle des inclusions (10,554%).

3. Les dessins crochu et droit sont plus fréquents sur les doigts I et V, tandis que les arcs, les angles d'arc et les inclusions ne sont présents que sur les doigts II, III et IV.

4. En général l'on remarque que les doigts I, II et III présentent des dessins s'ouvrant plus fréquemment du côté radial, tandis que les doigts IV et V présentent des dessins s'ouvrant plus fréquemment du côté ulnaire — un mécanisme naturel très utile pour la préhension.

5. En comparant les diverses combinaisons symétriques gauche-droites sur les phalanges des doigts homologues gauche-droites, l'on remarque que les doigts II, III et V présentent un nombre de combinaisons symétriques plus petit du doigt IV, ce qui indique une plus grande symétrie chez les premiers.

6. En comparant les fréquences en pourcentage des divers dessins principaux, l'on peut affirmer que dans la plupart des fréquences les Brahmins ressemblent plus aux Chinois qu'aux Allemands. De toutes façons d'autres recherches sur ce sujet ne pourront qu'augmenter nos connaissances et, en même temps, être utiles aussi pour la stratification raciale.

ZUSAMMENFASSUNG

Nach aufmerksamer Untersuchung und Analyse der verschiedenen auf den Mittel- und Proximalgliedern von 600 Fingern beobachteten Zeichnungen, kommt Verf. zu folgenden Schlüssen:

1. Wie aus Tab. 1 hervorgeht, weisen der II., III. und IV. Finger grosse Verschiedenheit in den Zeichnungen auf: der III. und IV. Finger haben je 20 Zeichnungen. Am geringsten sind die Verschiedenheiten des Daumens, der nur 5 Zeichnungstypen aufweist. Am fünften Finger zeigen sich zehn verschiedenen Zeichnungstypen. Diese Beobachtungen gelten sowohl für die rechte als für die linke Hand.

2. Unter den hauptsächlichsten Zeichnungstypen prädominiert die Hakenzeichnung (hook), deren Frequenz 37,128% beträgt. An zweiter Stelle folgt die gerade Zeichnung (straight) mit einer Frequenz von 24,999%. Das Vorkommen von Bögen ist mit 12,777% deutlich häufiger als das der Schleifen (10,554%).

3. Krumme und gerade Zeichnungen sind häufiger am I. und V. Finger, während man Bögen,

Bögenecken und Schleifen ausschliesslich am II., III. und IV. Finger findet.

4. Im allgemeinen ist zu bemerken, dass die Zeichnungen des I., II. und III. Fingers sich nach der Ulnarseite zu öffnen: ein natürlicher Mechanismus, der das Greifen sehr erleichtert.

5. Bei einem Vergleich der verschiedenen symmetrischen links-rechts-Kombinationen an den gleichseitigen linken oder rechten Fingergliedern ist zu beobachten, dass die Zahl der symmetrischen Kombinationen des II., III. und V. Fingers im Verhältnis zum IV. Finger geringer ist; d.h. dass die Symmetrien bei ersteren grösser ist.

6. Ein Vergleich der prozentuellen Häufigkeit der verschiedenen hauptsächlichsten Zeichnungen gestattet es, mit Sicherheit zu behaupten, dass die Brahmanen darin mehr den Chinesen als den Deutschen ähneln. Auf alle Fälle werden weitere diesbezügliche Untersuchungen nicht nur unsere Kenntnisse erweitern, sondern auch für eine Rassenschichtung nützlich sein.