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a finger-print forgery, and to plant it properly at the scene of an actual or pretended crime, will minimize to a very considerable extent the probability of the perpetration of such frauds. Moreover, far simpler methods have been devised by the human mind for "convicting the innocent."

COUNTERFEIT FINGER-PRINTS

HAROLD CUMMINS†

This paper deals with the question of whether finger-prints may be successfully counterfeited, in the sense that a manufactured or false impression is confused with a direct imprint of the actual digit. The question has been submitted to a test, the results of which are here reported and discussed.

It is desirable to frame a definition of what constitutes a counterfeit finger-print. The only genuine finger-tip *pattern* obviously is that of the skin clothing the digit, but we are accustomed to consider prints rather than digits, hence the distinction is to be drawn between counterfeit and original *prints*.

1. An original print is one impressed by the digit itself.
2. Any reproduction of an original print (by photographic or other processes) may be termed a *copy*.
3. Copies made for such familiar uses as the manifolding of finger-print records, illustrations in books, journals and circulars are not justly termed counterfeits, since both the intention of fraud and circumstances making deception possible are lacking. But when a copy is prepared with the motive of deception (or as in the test to be reported, with a view to determining whether deception is possible) the finger-print may be designated a counterfeit or forgery.¹

Offering as it does an attractive source of material for the mystery story, both in print and on the screen, the subject of finger-print counterfeiting is brought repeatedly before the public. The plot of counterfeit prints may be handled in a most plausible manner,²

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¹In connection with "lifted" prints see: (Kytka) New York Tribune, Sept. 15, 1913; (Amis) San Francisco Chronicle, April 15, 1923; Industrial Worker, Seattle, April 18, 1923.

²A representative example of this plot is "The Red Thumb Mark" by R. A. Freeman (1924). It is interesting to note that Dr. Robert Heindl, the distinguished German authority on identification, cites (in his "Daktyloskopie," 1927)

and the non-technical person naturally queries: "Are the experts really justified in their insistence that a finger-print forgery would not escape detection?" If he turns to publications which deal with the problem,³ he will likely be led to a conclusion formulated somewhat as follows: While it appears quite possible that a counterfeit print may be indistinguishable from an original impression of the same digit, more clean-cut evidence is to be desired, as well as complete freeing of the question from personalities, charges and recriminations. It is such an approach which the writer seeks now to present.

The Test

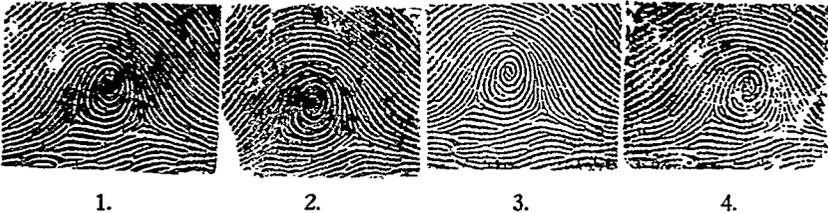
It may be pertinent first to explain how the matter of finger-print counterfeiting aroused my active interest. Early in 1933 the writer was engaged in an investigation of purported "ghost" prints, impressed in a plastic material.⁴ Apart from the identification involved, the study included trials of various methods of manufacture of counterfeit prints in this plastic (dental impression compound), counterfeit in that imprints were made from dies, or casts, instead of actual digits. These counterfeit three-dimensional impressions proved to show no signs distinguishing them from original imprints, the result suggesting a trial at forging the ordinary flat print, which is the object of more general interest in identification. It should be emphasized that the manufacture of counterfeits from flat prints was but a technically crude experiment, accomplished in one evening and without any effort to perfect the results; this fact is important, not only because repetition and improved technique might well yield prints of finer quality but especially in view of the showing in the diagnoses of prints made so casually.

Freeman's book in a discussion of forgery, and even outlines in detail the method therein described.

³deRechter, "Des Fausses empreintes digitales," *Arch. internat. de med. leg.* Bruxelles, 1912, III, 215-219; Schneickert, H., "Gefälschte Fingerabdrücke," *Gross-Heindl, Arch. f. Krim.*, Leipzig, 1912, L, 241; Goddefroy, E., "Peut-on produire de fausses empreintes digitales?" *Arch. d'anthrop. crim.* Lyon et Paris, 1913, XXVIII, 207-211; Carlson, M., "Finger-Prints Can Be Forged," 25 *Va. Law Reg.* 765-68 (1920); Carlson, M., "Dangers of Finger-Print Identification," 9 *Va. L. Rev. (N. S.)* 163 (1923); *Finger-Print Magazine*, Chicago, April, 1920, p. 14—*Cf.* *New York Globe*, Jan. 19, 1920; *Finger-Print Magazine*, Chicago, Dec., 1920, p. 8; *ibid.*, Oct. 1920, p. 8; *ibid.*, Mar., 1923, p. 7; Melcher, "The Skin Game," 13 *J. Crim. Law* 587 (1923); Singleton, Wilfriel. *Chicago Herald and Examiner*, July 7, 1924; Wehde, A., and Beffel, J. N., "Finger-Prints Can Be Forged," (1924); Beffel, J. N., "Finger-Prints," 4 *The American Mercury*, No. 14 (Feb., 1925); Case note on "Evidentiary Value of Finger-Prints," 80 *Pa. L. Rev.* 887 (1932); Lee, C. D., "Further Discussion of the Evidentiary Value of Finger-Prints," 81 *Pa. L. Rev.* 320 (1933).

⁴22 *Proc. Am. Soc. Psych. Research* (1933); 22 *Bull. Boston Soc. Psych. Research* (1934).

The cooperation of eight finger-print experts,⁵ all having long experience and high standing, was enlisted and these workers very kindly agreed to report their independent diagnoses of genuine and counterfeit prints submitted to them. A card was prepared bearing a row of four prints of the same digit (a right index finger), two of them being genuine and two counterfeit, this card being then examined by the eight workers successively. The experts were advised that both varieties were represented on the card, but not how many of each; the request was simply to diagnose the origins of the four prints, these being numbered in sequence for individual reference. The original test card is here reproduced.



The test prints ($\times 1\frac{1}{3}$). Numbers 1 and 3 are the genuine examples, 2 and 4 counterfeit. The zinc cut naturally has limitations in reproducing the appearance of the actual prints.

The diagnoses are listed in the accompanying table. It will be noted that of the thirty-two diagnoses twenty are correct, eleven are

A table listing diagnoses by eight finger-print experts of the genuine and counterfeit prints. The plus sign (+) indicates a correct diagnosis, the minus sign (—) an incorrect one.

Expert	Genuine		Counterfeit	
	1	3	2	4
A	+?	+	+	+
B	—	+	+	+
C	+	+	+	+
D	—	—	—	—
E	+	+	+	+
F	—	—	—	—
G	—	+	+	+
H	+	+	+	—

⁵The writer gratefully acknowledges the assistance furnished by these eight experts. Not being permitted to list all their names, I am particularly indebted to the three (Mairs, Lewis, Miss Sullender—all members of New York staffs) who have extended such permission, since some readers might justly question the status of such a test in the absence of any identification of the personnel. [Editor's Note: The prints in question were submitted by the editor to six qualified individuals, one of whom is in charge of a police finger-print bureau, and the percentage of accuracy approximates that obtained by Dr. Cummins.]

erroneous and one is reported doubtfully. To put the results in another way, three of the eight experts correctly diagnosed all the prints (though in one instance an actually correct identification of a genuine print is marked by the expert as questionable), while five of the observers make one or more errors. Curiously enough, there are more errors in calling genuine prints counterfeit than in the opposite direction. Errors of the former category would suggest that the results of the test, introducing a point of view in which every print is suspect, are all the more indicative of uncertainty in diagnosis.

These findings obviously indicate that counterfeit and genuine prints are not infallibly distinguished, but the conditions of the experiment should be reviewed in considering its bearing on the practical aspect of counterfeit prints. Counterfeiting, as a fraudulent operation, would consist in the "planting" of a counterfeit print so as to involve the person whose imprint is forged. Methods of obtaining original prints without the knowledge of the individual are discussed by Wehde and Beffel,⁶ so, assuming that a "plant" may be actually accomplished, or on occasion claimed,⁷ the chief question is: Does the present test indicate that there is an acceptable basis for expert testimony for or against the genuineness of a finger print?

The test does not furnish an exact parallel to the circumstances of a finger-print determination in actual practice. (1) Here the experts are informed at the outset that the problem involves discrimination between genuine and counterfeit prints, while in routine work a chance print might be analyzed without attention to possibilities of counterfeiting. (2) The prints submitted for the test are rolled ink impressions, made deliberately with the intention of producing clean-cut records; in practice a chance print, whether latent or impressed in blood, paint or the like, may be often blurred or otherwise technically inferior to the more carefully executed examples employed in the test. The two foregoing points appear to supply the experts an advantage which would be lacking in practice, both in the positive foreknowledge of counterfeiting and the provision of counterfeit prints exceeding the quality of the average chance print. On the other hand, the experiment is lacking in one item which would be available in a case under investigation, *known genuine prints* to serve as a standard for comparison. It is of course impossible to estimate how the results might have been altered by supplying such prints, but if their

⁶*Op. cit. supra* note 3.

⁷Carlson states that finger-prints in the Arbuckle case were pronounced forgeries by an expert testifying for the defense. See note 3.

absence proved a handicap in the test the favoring circumstances just noted at least partially compensate.

Some of the experts concerned in the test have the opinion that they were reduced to mere guessing, in the absence of known genuine prints. If this is true the correct "guesses," based as they are on only four prints, have little meaning as evidence that earmarks are identified in the counterfeits. This, after all, was the design of the test, to determine whether the counterfeits are recognizable through inherent signs of their artificial nature.

The Method

Various processes might be employed in manufacturing counterfeit finger-prints, and certain methods are already described (e. g., Wehde and Beffel). An appreciation of the simplicity and crudeness of the writer's one experiment, in which the prints here dealt with were produced, will be gained from the following digest of its steps.

1. Zinc cut from genuine print, executed by a commercial engraver at the exact size of the original.

2. Embossing from this cut in a sheet of dental "base plate" wax, to produce a three-dimensional negative of the pattern.

3. Cast from the embossing in a film of gelatine, which is applied to a gelatine dummy finger-tip having a consistency approximating that of the flesh.

4. Prints made from dummy.

As stated above, no improvements in method were attempted (though technical refinements of the same general process suggested themselves when the results were examined), the prints initially made being used in the test.

For one who may plan a similar experiment the following revisions of test procedure are suggested.

1. A larger number of test prints should be provided, both the genuine and counterfeit examples having representatives corresponding to the qualities of chance prints ordinarily met with, including imprints in different media and with varying pressures (though not omitting rolled prints).

2. Genuine prints, marked as such, should be submitted with the test examples, these being specially prepared to match the varying impression techniques by which the test prints were made.

3. In soliciting collaborators an effort should be made to include experts whose experience in study of counterfeit prints or whose