IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

UNITED STATES OF AMERICA :

VS : CRIMINAL NUMBER 96-407-1

BYRON MITCHELL :

MEMORANDUM OF LAW IN SUPPORT OF MR. MITCHELL'S MOTION TO EXCLUDE THE GOVERNMENT'S FINGERPRINT IDENTIFICATION EVIDENCE

PRELIMINARY STATEMENT

The government has failed to establish the scientific validity of the fingerprint identification evidence that it seeks to admit at Mr. Mitchell's upcoming trial. Contrary to the government's memorandum, the issue here is not the uniqueness and permanence of entire fingerprint patterns, consisting of hundreds of distinct ridge characteristics. Rather, the question is far more specific: Is there a scientific basis for a fingerprint examiner to make an identification, of absolute certainty, from a small distorted latent fingerprint fragment, revealing only a small number of basic ridge characteristics such as the nine characteristics identified by the FBI examiner at Mr. Mitchell's first trial. There are two fundamental premises that underlie such an identification: First, that two or more people cannot possibly share this number of basic ridge characteristics in common; and second, that fingerprint examiners can reliably assert absolute identity from small latent print fragments despite the unknown degree of distortion and variability from which all latent prints suffer. With the issue properly framed, it is readily evident that the government has failed to demonstrate the various indicia of scientific reliability

set forth by the Supreme Court in Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579, 113 S.Ct. 2786, 125 L. Ed. 2d 469 (1993) and the Third Circuit in United States v. Downing, 753 F.2d 1224, 1237-42 (3d Cir. 1985).

First, there has been no testing of either of the two fundamental premises that underlie the proffered identification. The failure to test these premises has been repeatedly recognized by various scientific commentators and it is demonstrated most clearly, in this case, by the lack of testing that is referred to in the government's memorandum and exhibits.

Second, there is no known error rate for latent fingerprint examiners. The government's claim that the error rate is "zero" is patently frivolous in light of the many examples of real life misidentifications that have occurred. It is also belied by the alarmingly high number of misidentifications that have occurred on latent print examiner proficiency exams.

Third, fingerprint examiners do not possess uniform objective standards to guide them in their comparisons. To the contrary, there is complete disagreement among fingerprint examiners as to how many points of comparison are necessary to make an identification, and many examiners now take the position that there should be no objective standard at all. As the government's own expert, David Ashbaugh, acknowledges, a fingerprint examiner's "opinion of individualization is SUBJECTIVE " David Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology, 99 (Draft 1999) (Gov't Ex. 10) (emphasis in original) [hereinafter Ashbaugh, Basic and Advanced Ridgeology].

Fourth, there is not a general consensus that fingerprint examiners can reliably make identifications on the basis of only nine matching characteristics. Many countries require that

there be at least 12-16 points of comparison before fingerprint evidence is deemed sufficiently reliable so as to warrant its admission at a criminal trial.

Fifth, the professional literature of the fingerprint community confirms the scientific bankruptcy of the field. As the government's expert acknowledges, "it is difficult to comprehend a complete scientific review of friction ridge identification has not taken place during the last one hundred years[;] a situation seems to have developed where this science grew through default." Ashbaugh, Basic and Advanced Ridgeology, supra, at 3 (Gov't Ex. 10). Sixth, latent fingerprint identifications are analogous to other techniques, such as handwriting analysis and hair fiber comparisons, that federal courts, in the wake of Daubert, have found to be scientifically unreliable. See Williamson v. Reynolds, 904 F. Supp. 1529, 1558 (E. D. Okla. 1995); United States v. Starzecpyzel, 880 F. Supp. 1027, 1037 (S.D.N.Y. 1995).

Seventh, latent fingerprint identifications do not have any non-judicial applications. The use of fingerprints has been under the "control of the police community rather than the scientific community" and latent prints are used by law enforcement solely as a "tool for solving crime." Ashbaugh, Basic and Advanced Ridgeology, supra, at 3 (Gov't Ex. 10).

In addition to these various Daubert and Downing factors, the lack of scientific reliability of the government's fingerprint evidence has been most dramatically demonstrated by a test that the government performed specifically for purposes of this litigation. In an apparent effort to demonstrate that different fingerprint examiners will, at least, be able to reach the same conclusion when they are presented with the same data, the government provided the two latent prints at issue in this case, along with Mr. Mitchell's inked prints, to 53 different law

enforcement agencies. Contrary to the government's expectations, however, 23% of the responding agencies found that there was an insufficient basis to make an identification with respect to one of the two latents and 17% found an insufficient basis as to the other. The government's experiment thus perfectly illustrates how subjective latent print identifications really are and how unreliable their results can be.

Finally, the unreliability of latent fingerprint identifications has already been judicially recognized. In the only known fingerprint case in which a federal trial court has performed the type of analysis that is now mandated by Daubert, the district court excluded the government's fingerprint identification evidence, finding that there was no scientific basis for the latent print examiner's opinion of identification. United States v. Parks (C.D. Cal. 1991) (No. CR-91-358-JSL) (Ex. 48). The district court in Parks reached its determination after hearing from three different fingerprint experts produced by the government in an effort to have the evidence admitted. In excluding the evidence, the district court recognized, among other things, the lack of testing that has been done in the field, the failure of latent fingerprint examiners to employ uniform objective standards, and the minimal training that latent print examiners typically receive.

Accordingly, for all of the foregoing reasons, Mr. Mitchell requests that this Court preclude the government from introducing its fingerprint identification evidence at his upcoming trial. In the event, however, that the Court allows the government to admit the fingerprint evidence, Mr. Mitchell respectfully requests the opportunity, consistent with the Third Circuit's decision in United States v. Velasquez, 64 F.3d 844 (3d Cir. 1995), to introduce expert witness

testimony regarding the deficiencies of the government's evidence.

1. Fingerprint Fundamentals Which the Government Neglected to Mention In ItsMemorandum

An average human fingerprint contains between 75 and 175 ridge characteristics. An Analysis of Standards in Fingerprint Identification, FBI L. Enforcement Bull., June 1972, at 1 (Ex. 1) [hereinafter FBI, Fingerprint Identification]. These ridge characteristics generally consist of a few different types, although there is no standard agreement among fingerprint examiners as to either the precise number or nomenclature of the different characteristics. James F. Cowger, Friction Ridge Skin: Comparison and Identification of Fingerprints at 143 (1983) ("The terms used to define and describe these characteristics vary markedly among writers in the field and differ even among examiners depending upon the organization in which they were trained."). The ridge characteristics most commonly referred to are: 1) islands, also referred to as dots, which are single independent ridge units; 2) short ridges, in which both ends of the ridge are readily observable; 3) ridge endings, where a ridge comes to an abrupt end; 4) bifurcations, in which the ridge forks into two; 5) enclosures, which are formed by two bifurcations that face each other; 6) spurs, where the ridge divides and one branch comes to an end; and 7) cross-overs, in which a short ridge crosses from one ridge to the next. John Berry, The History and Development of Fingerprinting, in Advances in Fingerprint Technology at 2 (Henry C. Lee & R. E. Gaensslen eds., 1994); Ashbaugh, Basic and Advanced Ridgeology, supra, at 94, 95 (Gov't Ex. 10) (illustrations of these various characteristics are provided as Defense Exhibit 2).

While some occasional research has been done with respect to the relative frequencies

with which these and other characteristics occur, no weighted measures of the characteristics have ever been adopted by fingerprint examiners on the basis of these studies. Research, moreover, has shown that different fingerprint examiners hold widely varying opinions regarding which characteristics appear most commonly. James W. Osterburg, An Inquiry Into the Nature of Proof, 9 J. of Forensic Sci. 413, 425 (1964) (Ex. 3) ("Clearly subjective evaluation of the significance to be attached to a fingerprint characteristic is suspect.").

All prints, both inked and latent, are subject to various types of distortions and artifacts. David Ashbaugh, The Premises of Friction Ridge Identification, Clarity, and the Identification Process, 44 J. of Forensic Identification 499, 513 (1994) (Ex. 4) [hereinafter Ashbaugh, Premises]. The most common type being pressure distortion which occurs when the print is being deposited. Id. Other types of distortion can be caused by the shape of the surface on which the print has been deposited and by the mediums used to develop and lift the print. Ashbaugh, Basic and Advanced Ridgeology, supra, (Gov't Ex. 10 at 94-95). Significantly, distortion can cause a ridge characteristic to appear as something other than what it really is. Id. at 82; David A. Stoney & John I. Thornton, A Critical Analysis of Quantitative Fingerprint Individuality Models, 31 J. of Forensic Sci. 1187, 1193 (1986) (Ex. 5). For example, powder used to lift a latent print may cause a ridge ending to appear as a bifurcation. Ashbaugh, Basic and Advanced Ridgeology, supra, (Gov't Ex. 10 at 82). There have been no studies done to determine the frequency with which such distortions occur.

Latent print examiners make identifications when they find a certain number of ridge characteristics to be in common, both in terms of type and location, on the two prints that they

are comparing.[1] FBI, Fingerprint Identification, supra (Ex. 1). As discussed further below, there is considerable disagreement among latent print examiners as to how many common characteristics should be found before an identification is made. Many examiners currently believe that there should be no minimum standard whatsoever and that the determination of whether there is a sufficient basis for an identification should be left entirely to the subjective judgment of the individual examiner.

It has been well documented that different people can share a limited number of fingerprint ridge characteristics in common. Exhibit 6, for example, is an article that discusses fingerprints from two different people that contain seven matching ridge characteristics. Likewise, Exhibit 7 is a textbook reference to fingerprints from different individuals that have ten characteristics in common. There have been no scientific studies performed that can reasonably serve to predict the probability of such events occurring.

Lacking any such probability studies, latent print examiners do not offer opinions of identification in terms of probability. Indeed, latent print examiners are actually prohibited from doing so by the rules of their primary professional association, the International Association of Identification (IAI) (Ex. 8). Instead, latent print examiners make the claim of "absolute certainty" for their identifications. Examiners provide an opinion that the latent print at issue

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[1] Some latent print examiners look for additional identifying features, beyond the basic ridge characteristics set out above, such as small edges on the ridges and the relative location of sweat pores. However, because "prints of friction skin are rarely well recorded . . . comparison of pore or edges is only rarely practical." Cowger, supra, at 143. As discussed below, the identification at issue in this case concerns only basic ridge characteristics.

was made by a particular finger to the exclusion of all other fingerprints in the world. Such assertions of absolute certainty, however, are inherently unscientific. Here is what one of the government's own experts has had to say on this issue:

> Imposing deductive conclusions of absolute certainty upon the results of an essentially inductive process is a futile attempt to force the square peg into the round hole. This categorical requirement of absolute certainty has no particular scientific principle but has evolved from a practice shaped more from allegiance to dogma than a foundation in science. Once begun, the assumption of absolute certainty as the only possible conclusion has been maintained by a system of societal indoctrination, not reason, and has achieved such a ritualistic sanctity that even mild suggestions that its premise should be re-examined are instantly regarded as acts of blasphemy. Whatever this may be, it is not science.

David Grieve, Possession of Truth, 46 J. of Forensic Identification 521, 527-28 (1996) (Ex. 9).

2. The Fingerprint Identification at Issue in the Case at Bar: How Many Points of Similarity Are There?

The government contended at Mr. Mitchell's first trial that two latent fingerprints lifted from the robbers' getaway car matched inked prints that were taken of Mr. Mitchell's left and right thumbs. The government's fingerprint expert at trial, FBI agent Dwayne Johnson, identified what he believed to be nine points of similarity between one of the two latents and the inked print of Mr. Mitchell's right thumb. A photographic copy of the charts that agent Johnson used to illustrate these common points is provided as Exhibit 10. As to the other latent print, Agent Johnson provided no explanation whatsoever to support his opinion that it had been made by Mr. Mitchell's left thumb.

Agent Johnson conceded during his testimony that he had never heard of a fingerprint

examiner making an identification on the basis of less than seven points of similarity and that he himself had never done so. (Ex. 11 at 1, 2). Johnson also conceded that the latent prints at issue were somewhat "eroded" and that the conclusion that he had reached was "subjective." (Ex. 11 at 3-5). A cursory examination of Exhibit 10 will readily reveal just how debatable some of the points identified by Johnson actually are. Indeed, as discussed further below, there has been considerable disagreement among the law enforcement fingerprint examiners who have subsequently examined these prints, at the government's request, as to just how many points of comparison can reasonably be seen and as to whether there is a sufficient basis to make an identification.

Moreover, even assuming arguendo, that Agent Johnson correctly identified each of the common ridge characteristics, these characteristics are hardly unique to Mr. Mitchell. As Johnson explained during his testimony, points 1, 2, 4, 5, 6 are basic bifurcations and point number 3 is a simple ridge ending. (Ex. 11 at 6-9).[2] Johnson, however, did not advise the jury that bifurcations and ridge endings are basic ridge characteristics that virtually every human being in the world possesses.

Johnson also failed to explain that the opposing bifurcations indicated at points 5 and 6 actually constitute a single characteristic, namely an enclosure. The same is true for points 7 and 8. The International Association of Identification, the leading professional association for fingerprint examiners, has declared in an official report that an enclosure should be counted as a

[2] While Johnson neglected to explain points 7-9 to the jury, these points are also basic ridge endings and bifurcations.

single point rather than as two separate bifurcations. Robert Olsen, Friction Ridge Characteristics and Points of Identity: An Unresolved Dichotomy of Terms, 41 J. of Forensic Identification 195 (1991) (Ex. 12). Accordingly, what agent Johnson has counted as nine characteristics is in reality only seven.

3. The Legal Standard to be Applied

In Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S. Ct. 2786 (1993), the Supreme Court held that federal trial courts, when faced with a proffer of expert scientific testimony, must determine at the outset whether the "reasoning or methodology underlying the testimony is scientifically valid . . . ." Id. at 592-93, 113 S. Ct. at 2796. As the Court recognized, in a case involving scientific evidence, evidentiary reliability will be based upon scientific validity. Id. at 590 n.9, 113 S. Ct. at 2795 n.9. This standard applies both to "novel scientific techniques" and to "well established propositions." Id. at 592 n.11, 113 S. Ct. at 2796 n.11.

The Daubert Court suggested five factors that trial courts may consider in determining whether proffered expert testimony is scientifically valid. The first factor is whether the "theory or technique . . . can be (and has been) tested." Id. at 593, 113 S. Ct. at 2796. As the Court recognized, empirical testing is the primary criteria of science:

> Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry. The statements constituting a scientific explanation must be capable of empirical test. The criterion of the scientific status of a theory is its falsifibility, or testability.

Id. at 593, 113 S. Ct. at 2796-97 (internal quotations and citations omitted).

A second closely related factor that the Daubert Court suggested should "ordinarily" be considered is the "known or potential rate of error" of the particular technique. Id. at 594, 113 S. Ct. at 2797. In this regard, the Court cited the Seventh Circuit's decision in United States v. Smith, 869 F.2d 348, 353-354 (7th Cir. 1989), in which the Seventh Circuit surveyed studies concerning the error rate of spectograghic voice identification techniques. Id.

A third factor pointed to by the Court is the "existence and maintenance of standards controlling the technique's operation." Id. As an example, the Supreme Court cited the Second Circuit's opinion in United States v. Williams, 583 F.2d 1194, 1198 (2d Cir. 1978), in which the Second Circuit observed that the "International Association of Voice Identification . . . requires that ten matches be found before a positive identification can be made." Id.

Fourth, the Daubert Court held that "general acceptance can . . . have a bearing on the inquiry." Id. "A reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community." Id. (quoting United States v. Downing, 753 F.2d 1224, 1242 (3d Cir. 1985)). As the Court recognized, "widespread acceptance can be an important factor in ruling particular evidence admissible and a 'known technique which has been able to attract only minimal support within the community' . . . may properly be viewed with skepticism." Id. (quoting Downing, 753 F.2d at 1238)).

Finally, the Daubert Court recognized that an additional factor which may be considered "is whether the theory or technique has been subjected to peer review and publication." Id. at

593, 113 S. Ct. at 2797. As the Court recognized, "submission to the scrutiny of the scientific community is a component of 'good science,' in part because it increases the likelihood that substantive flaws in methodology will be detected." Id. Accordingly, "[t]he fact of publication (or lack thereof) in a peer reviewed journal . . . [is] a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised." Id. at 594, 113 S. Ct. at 2797.[3]

In providing the above factors, the Supreme Court emphasized that the inquiry under Federal Rule of Evidence 702 is a "flexible one"and that, as such, additional factors may be considered. Id. Several such additional factors have been suggested by the Third Circuit:

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[3] The government makes substantial reference in its memorandum to the Supreme Court's recent decision in Kumho Tire Co. v. Carmichael, 119 S. Ct. 1167 (1999). Kumho, however, is essentially irrelevant to this case. The issue presented in Kumho was whether the factors provided by the Daubert Court may be applied in evaluating proffered expert testimony based not only upon "scientific" knowledge, but on "technical" and "other specialized" knowledge as well. See Fed. R. Evid. 702. The Court held that the Daubert factors may properly be considered as applying to all expert testimony. Kumho, 119 S. Ct. at 1171. The reason why Kumho is largely irrelevant to this case is that the government is not contending that its fingerprint identification evidence is based on anything other than "scientific knowledge." Thus, there has never been any disagreement between the parties that the Daubert factors are properly applicable here.

> (1) the relationship of the technique to methods which have been established to be reliable;
> (2) the qualifications of the expert witness testifying based on the methodology;
> (3) the non judicial uses to which the method has been put

United States v. Downing, 753 F.2d 1224, 1238-39 (3d Cir. 1985); see also In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 742 n.8 (3d Cir. 1994).

As demonstrated below, the government's proposed fingerprint identification evidence fails with respect to each and every factor that has been identified by the Supreme Court and the Third Circuit.[4]

4. The Government Has Failed to Satisfy the Daubert and Downing Factors

A. The Failure to Test the Fundamental Hypothesis Upon Which Latent Print Identifications Are Based

The proffered fingerprint identification evidence in this case fails the most basic criteria of science: The premises underlying the identification have not been tested to determine if they can be falsified. As discussed above, there are two fundamental premises to a latent print identification of the type at issue here: First, that it is impossible for two or more people to have

[4]The only factor that the defense will not discuss at this juncture is the qualifications of the expert witness testifying based on the methodology. The reason for this is that the government has not yet identified what opinions any of its experts will actually be offering. Counsel requests the opportunity to supplement this brief regarding this issue after the Daubert hearing.

prints showing a limited number of ridge characteristics in common such as the seven/nine characteristics identified by the FBI fingerprint examiner in the case at bar, and second, that latent fingerprint examiners can reliably make identifications from small distorted latent fingerprint fragments that reveal only a limited number of basic ridge characteristics.

That these premises have not been empirically validated has, in the wake of Daubert, been repeatedly recognized by forensic science experts. See Michael J. Saks, Merlin and Solomon: Lessons from the Law's Formative Encounters With Forensic Identification Science, 49 Hastings L.J. 1069, 1105-06 (1998) (Ex. 13) ("Although in principle fingerprint identification depends upon an objective, probabilistic inquiry, its practitioners use no probability models and have no probability data to use[;] they rely on intuitions and assumptions that have not been tested rigorously . . . .); Margaret A. Berger, Procedural Paradigms For Applying the Daubert Test, 78 Minn. L. Rev. 1345, 1353 (1994) (Ex. 14) ("Considerable forensic evidence [such as fingerprinting] made its way into the courtroom without empirical validation of the underlying theory and/or its particular application.").

The lack of testing has also been recognized by those within the fingerprint community. David Stoney, a leading scholar and fingerprint practitioner, has written:

> [T]here is no justification [for fingerprint identifications] based on conventional science: no theoretical model, statistics or an empirical validation process.
>
> Efforts to assess the individuality of DNA blood typing make an excellent contrast. There has been intense debate over which statistical models are to be applied, and how one should quantify increasingly rare events. To many, the absence of adequate statistical modeling, or the controversy regarding calculations brings

> the admissibility of the evidence into question. Woe to fingerprint practice were such criteria applied! As noted earlier, about a dozen models for quantification of fingerprint individuality have been proposed. None of these even approaches theoretical adequacy, however, and none has been subjected to empirical validation. . . . . Indeed, inasmuch as a statistical method would suggest qualified (non-absolute) opinions, the models are rejected on principle by the fingerprint profession.
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> ****
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> Much of the discussion of fingerprint practice in this and preceding sections may lead the critical reader to the question "Is there any scientific basis for an absolute identification?" It is important to realize that an absolute identification is an opinion, rather than a conclusion based on scientific research. The functionally equivalent scientific conclusion (as seen in some DNA evidence) would be based on calculations showing that the probability of two different patterns being indistinguishably alike is so small that it asymptotes with zero . . . . The scientific conclusion, however, must be based on tested probability models. These simply do not exist for fingerprint pattern comparisons.

David Stoney, Fingerprint Identification, in Modern Scientific Evidence: The Law and Science of Expert Testimony § 21-2.3.1, at 72 (David L. Faigman et al. eds., West 1997) (Ex. 15).

The lack of testing in the fingerprint field also is reflected in an official report that the International Association for Identification ("IAI") issued in 1973. The IAI had three years earlier formed a "Standardization Committee" for the purpose of determining "the minimum number of friction ridge characteristics which must be present in two impressions in order to establish positive identification." International Association for Identification, IAI Standardization Committee Report 1 (1973) (Ex. 16 at 1). After three years of examining the issue, however, the Committee was unable to provide a minimum number. Instead, the IAI issued a Report declaring that "no valid basis exists for requiring a predetermined minimum

number of friction ridge characteristics which must be present in two impressions in order to establish positive identification." Id. at 2. Of course, the reason that the IAI did not have a "valid" basis to set a minimum number was that no scientific testing as to this issue had ever been performed. See Stoney, supra, (Ex. 15 at 71) ("Indeed, the absence of valid scientific criteria for establishing a minimum number of minutiae has been the main reason that professionals have avoided accepting one."). The IAI effectively conceded as much when it strongly recommended in the Report that "a federally funded in depth study should be conducted, in order to establish comprehensive statistics concerning the frequency, type and location of ridge characteristics in a significantly large database of fingerprint impressions. (Ex. 16 at 2.) To date, however, no such research has been conducted.

Perhaps the strongest proof regarding the lack of empirical testing comes directly from the government's submission to this Court. Despite having had months to prepare this submission, and despite having consulted with numerous fingerprint "experts" from around the world, the government is unable to point to any relevant scientific testing concerning either of the two fundamental premises upon which the fingerprint identification in this case is based. Instead, the government refers only to certain embryology studies that have traced the fetal development of fingerprints and to certain "twin" studies which have demonstrated that twins possess different fingerprints. Government's Combined Report To The Court And Motions In Limine Concerning Fingerprint Evidence (hereinafter Gov't Mem.) at 15-16, 18-19. These studies, however, demonstrate, at most, that fingerprints are subject to random development in the embryo and that the individual ridge characteristics are not genetically controlled; they do not address the

fundamental premises at issue here -- the likelihood that prints from different people may show a limited number of ridge characteristics in common, and the ability of latent print examiners to make accurate identifications from small distorted latent fingerprint fragments.

The government also points in its memorandum to certain theoretical statistical claims that have been made with respect to the probability of two different people having entire fingerprint patterns in common. (See Gov't Mem. at 21.) (citing Francis Galton, Fingerprints 110 (1892) and Bert Wentworth, Personal Identification 318-20 (1932)). These theoretical models, however, have been severely criticized and, more importantly, they have never been empirically tested. See Stoney, supra, (Ex. 15 at 72) ("As noted earlier, about a dozen models for quantification of fingerprint individuality have been proposed[;] none of these even approaches theoretical adequacy, however, and none has been subjected to empirical validation."). See also Stoney & Thorton, supra (Ex. 5). Accordingly, the "models [referred to by the government] occupy no role in the . . . professional practice of fingerprint examination" Stoney, Fingerprint Identification, supra, § 21-2.3.1 at 72 (Ex. 15) ("Indeed, inasmuch as a statistical method would suggest qualified (non-absolute) opinions, the models are rejected on principle by the fingerprint profession.").[5]

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[5] The inadequacies of the models referred to by the government are readily evident. For example Mr. Wentworth states:

> There is, however, in all of these problems involving chance, an important factor which in our present lack of precise knowledge we have to assume; and that is the exact, or even approximate, percentage of occurrences of the different details. . . . . We find in the fingerprint in question a fork, opening downward. . . . . We have no definite data for knowing the percentage of occurrence of

> this detail . . . but the variability of the ridges and their detail is so great that we may be warranted in asserting that it is small.

Wentworth, supra, (Gov't Ex. 13 at 318).

That the theoretical statistical models referred to by the government provide no scientific basis for latent finger print identifications can also be seen from the writing of the government's own expert David Ashbaugh. In his new (unpublished) book on the subject of fingerprints, Mr. Ashbaugh does not even refer to any of these theoretical models, though one of Mr. Ashbaugh's stated goals in writing the book is to "address the scientific . . . basis of the identification process." Ashbaugh, Basic and Advanced Ridgeology, supra (Gov't Ex. 10 at 7).[6] Moreover, Mr. Ashbaugh acknowledges that there is currently no basis to provide opinions of probability with respect to fingerprints. Id. at 100 ("Extensive study is necessary before this type of probability opinion could be expressed with some degree of confidence and consistency . . . .").

[6]Mr. Ashbaugh, like the government, points to the embryology studies as providing a scientific basis for fingerprint identifications. Ashbaugh, Basic and Advanced Ridgeology, supra (Gov't Ex. 10 at 27-42). Like the government, though, Mr. Ashbaugh fails to explain how these studies relate to the fundamental premises that underlie latent fingerprint identifications.

The lack of empirical testing that has been done in the field of fingerprints is devastating to the government's claim that latent fingerprint identifications are scientifically based. See Daubert, 509 U.S. at 593, 113 S.Ct. at 2796 ("Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry.") (internal quotations and citations omitted). The lack of testing, moreover, deprives latent fingerprint comparisons from having true evidentiary significance. Because of the lack of testing, a latent fingerprint examiner can, at best, correctly determine that a certain number of ridge characteristics are in common in the two prints under comparison; the examiner, however, has no basis to opine what the probability is, given the existence of these matching characteristics, that the two prints were actually made by the same finger. Instead, as discussed further below, the latent print examiner can provide only a subjective opinion that there is a sufficient basis to make a positive identification. The necessity of being able to provide statistically sound probabilities has been recognized in the analogous area of DNA. See People v. Wallace, 14 Cal. App. 4th 651, 661 n.3 (1993) (stating that without valid statistics DNA evidence is "meaningless"); People v. Barney, 8 Cal. App. 4th 798, 802 (1992) ("The statistical calculation step is the pivotal element of DNA analysis, for the evidence means nothing without a determination of the statistical significance of a match of DNA patterns."); People v. Axell, 235 Cal. App. 3d 836, 866 (1991) ("We find that . . . a match between two DNA samples means little without data on probability. . .").[7]

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[7]As the British physicist William Thomson, Lord Kelvin, observed in 1883:

> When you can measure what you are speaking about, and express it

B. The First Premise Of The Government's Fingerprint Identification Evidence Not Only Has Not Been Tested, It Has Been Proven False

The first major premise of the government's fingerprint identification evidence -- that it is impossible for fingerprints from two or more people to have as many as seven or nine basic ridge characteristics in common -- has not only not been scientifically tested, it has been proven false by anecdotal evidence. As noted above, Exhibit 7 is a textbook reference to prints that were taken from two different people that have ten ridge characteristics in common. Likewise, Exhibit 6 is a journal article by two Isreali fingerprint examiners discussing their discovery of prints that have seven points of similarity. The authors of this journal article, entitled "What Is The Minimum Standard Of Characteristics For Fingerprint Identification," recognized the significance of their finding both with respect to the possibility of erroneous identifications and the need for a minimum identification standard:

> There is no doubt that this finding demands from us exceptional caution when determining a positive identification which is based on such a small number of characteristics. In addition, this type of phenomenon must be taken into consideration when determining criteria for the identification of fingerprints.

> in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science.

(quoted in United States v. Starzecpyzel, 880 F. Supp. 1027 (S.D.N.Y. 1995)).

(Ex. 6 at 3.)

Unfortunately, however, findings such as this one have not been taken into consideration in determining criteria for the identification of fingerprints. As discussed further below, there is currently no minimum standard for latent fingerprint identifications in this country, and, as can be seen from the testimony of the FBI examiner in this case, many examiners will make identifications on as few as seven points of comparison. The potential for error is thus significant, especially given that distortion can cause ridge characteristics from two different prints to appear the same, when in reality they are not. See supra, at p.5. Indeed, as the government's own expert, Pat Wertheim, recognized in his response to the above quoted journal article, "many people may make an erroneous identification in a case such as the one [the authors] present." Pat A. Wertheim, Letter to the Editor, 23 Fingerprint Whorld 63 (April 1997) (Ex. 17).

C. The Testing Conducted by the Government for the Purposes of This Litigation Fails To Demonstrate Scientific Reliability

Recognizing the lack of testing and scientific research that has been done by the fingerprint community during the last 100 years, the government has desperately attempted over the past few months to make up for this deficiency. The government's rushed efforts, however, have been far from successful.

As discussed above, one test the government conducted was to send the two latent prints at issue in this case, along with Mr. Mitchell's inked prints, to 53 different law enforcement agencies. The government requested that the agencies select "court qualified" examiners to

compare the prints and to determine whether any identifications could be made. (Gov't Ex. 6-3; also provided as Defense Exhibit 18)). This experiment is, in fact, relevant to the second fundamental premise at issue in this case -- whether latent print examiners can reliably make identifications from small latent print fragments -- as it indicates whether different examiners can, at least, be expected to reach the same conclusions when they are presented with the same data.

The results of this test, however, constitute an unmitigated disaster from the government's perspective, as can be seen from the fact that the test is nowhere mentioned in the government's memorandum to this Court. While the results of the test can be found in Government Exhibit 6-4 (also included as Defense Exhibit 18), this exhibit does not reveal that the prints utilized in the test are the very prints at issue in this case. The reason for this omission is clear. Of the 35 agencies that responded to the government's request, eight (23%) reported that no identification could be made with respect to one of the two latents and six (17%) reported that no identification could be made as to the other.[8] The test thus dramatically reveals how subjective latent print comparisons actually are and how unreliable their results can be.

The government can hardly contend in this regard that the participating agencies did not appreciate the extreme importance of the comparisons that they were being asked to perform. The government's cover letter to the agencies provided:

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[8] Government Exhibit 6-4 only tabulates responses from 34 different state agencies. However, the government has provided to the defense a 35th response from the state of Maine. Thus, while Maine is listed in exhibit 6-4 as having not provided a response, in actuality, the Maine fingerprint expert did not find a sufficient basis to make an identification with respect to either latent print. The response from Maine is provided as Defense Exhibit 19.

> The FBI needs your immediate help! The FBI laboratory is preparing for a Daubert hearing on the scientific basis for fingerprints as a means of identification. The Laboratory's Forensic Analysis Section Latent Print Unit, is coordinating this matter and supporting the Assistant United States Attorney in collecting data needed to establish this scientific basis and its universal acceptance.
>
> ***
>
> The time sensitive nature of these requests cannot be expressed strongly enough, nor can the importance of your cooperation. The potential impact of the Federal court not being convinced of the scientific basis for fingerprints providing individuality has far-reaching and potentially negative ramifications to everyone in law enforcement. The FBI wishes to present the strongest data available in an effort to insure success in this legal mater and your cooperation is a key component in achieving this result.

(Ex. 20.)

The government also cannot attribute the results of this test to the fact that the fingerprint comparisons were performed by inexperienced examiners. Consistent with the urgency of the government's cover letter, each of the state law enforcement agencies that did not find a sufficient basis to make an identification selected extremely experienced examiners to make the comparisons. As set forth in Defense Exhibit 21, the range of experience for this group of examiners is between 10 and 30 years, with the average amount of experience being 20 years. In addition, virtually all of these examiners are board certified members of the IAI, the highest distinction that a latent print examiner can achieve. Id. Accordingly, that this particular group of examiners did not find a sufficient basis to make an identification on either one or both of the latent prints at issue in this case is devastating to the government's claim of scientific reliability.

Apparently recognizing just what this test really means to its case against Mr. Mitchell, the government has now taken the remarkable step of attempting to eradicate the test results. The government has asked each of the agencies that did not make an identification to retake the test, but this time the government has provided the agencies with the answers that the government believes to be correct. Along with a new response form, the government has sent each of these agencies enlargements of the prints at issue displaying what the government apparently believes are the common characteristics. The government's cover letter to the state agencies provides in pertinent part:

> Survey B results indicate that your agency responded with the answer "No" with respect to one or both of the latent prints. For your convenience, I have included with this letter another set of the original photographs submitted to you with another blank survey form and a set of enlarged photographs of each latent print and an enlargement of areas from two of the fingerprints contained on the fingerprint card. These enlargements are contained within a clear plastic sleeve that is marked with red dots depicting specific fingerprint characteristics.
>
> Please test your prior conclusions against these enlarged photographs with the marked characteristics. Please indicate the results on the enclosed survey form and return to me by June 11, 1999. You only need to complete the bottom portion, the third part, of the survey form. Any written narrative description or response should be attached to the survey form.
>
> I anticipate that this data must be made available to the defense counsel and the court prior to the Daubert Hearing proceedings. Therefore, please insure that your handling of this matter is done within the June 11, 1999 deadline. The Daubert Hearing is scheduled for July 7, 1999, and the trial is scheduled for September 13, 1999.

(Ex. 22).

It is hardly surprising, given the magnitude of what is at stake here, that all of the state agencies at issue, with the exception of one, Missouri, have responded to the government's tactics by recanting and by filling out the new response forms so as to indicate that positive identifications have now been made. The government, in turn, has revised its report of the test, Government Exhibit 6-4, so as to indicate that, except for Missouri, only positive identifications were returned by the participating agencies. (The government's newly revised exhibit 6-4 is provided as Defense Exhibit 23). This revised exhibit, moreover, provides no indication that these state agencies ever returned anything other than positive identifications. By letter to this Court dated June 17, 1999, the government then provided this revised exhibit to this Court, instructing the Court to "substitute[]" the exhibit for the one the government previously provided in its exhibit book. (The Government's letter of June 17 is provided as Defense Exhibit 24). In this fashion, the government has attempted, like a magician, to make the original results of its experiment vanish into thin air.

The government's considerable efforts in this regard, however, have only succeeded in highlighting the importance of the original test. The study as originally conducted by the government was a relatively fair experiment as to whether different examiners would at least be able to reach the same conclusion when given the same prints to compare, and the test had special significance here given the government's decision to use the very prints at issue in this case. The original unbiased results of the test speak volumes for themselves. That the government has subsequently been able to convince more than 20% of the participating examiners to change their

answers only serves to demonstrate the desperate straits that the government now finds itself in and the lengths to which the government will go in order to have its fingerprint evidence admitted in this case. As a noted fingerprint examiner has aptly recognized, an examiner's conclusion that a latent print is unidentifiable must be considered "irrevocable," as nothing is more "pitiful" than an examiner's subsequent attempt to change that conclusion:

> Of course, the crucial aspect is the initial determination to render the latents as unsuitable for identification purposes...this must be a ruthless decision, and it must be irrevocable. There is no more pitiful sight in fingerprint work than to see an expert who has decided that a mark is useless, then seeking to resuscitate the latent to compare with a firm suspect.

John Berry, Useless Information, 8 Fingerprint Whorld 43 (Oct. 1982) (Ex.25).

In addition to the above discussed test, the government has also conducted experiments on its automated fingerprint identification system ("AFIS"). On the basis of these tests, the government is now making certain statistical claims with respect to the probability of two people having identical fingerprints or identical "minutia subsets" of fingerprints. (Gov't Mem at 23). The utter fallacy of these statistical claims will become clear at the upcoming Daubert hearing, as will the serious methodological flaws that undermine these experiments.

Moeover, given that these tests have been conducted solely for purposes of this litigation, and have not been published or subjected to peer review, they do not constitute the type of data or facts that an expert in the fingerprint field would reasonably rely upon, and, as such, the tests should not even be considered by this Court. See Fed. R. Evid. 703; United States v. Tran Trong Cuong, 18 F.3d 1132, 1143 (4th Cir. 1994) ("reports specifically prepared for purposes of

litigation are not by definition of a type reasonably relied upon by experts in the particular field."); Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 831 (D.C. Cir. 1988) (doctor's testimony held inadmissable because, among other things, the calculations that he relied upon had not been "published . . . nor offered . . . for peer review."); Perry v. United States, 755 F.2d 888, 892 (11th Cir. 1985) (expert's testimony rejected where the study upon which the expert relied had not been published or subjected to peer review).

The government submits that these cases are all irrelevant because they concerned the admissibility of scientific evidence at trial, and because Federal Rule of Evidence 703, upon which the courts relied, does not apply to pretrial Daubert hearings. Government's Response To the Defendant's Motion For A Two Month Continuance Of The Daubert Hearing at 3. This argument, however, misses the mark. While the government is correct that the Federal Rules of Evidence do not apply at a pretrial Daubert hearing, the government fails to recognize that the very purpose of such a hearing is to determine the scientific reliability, or lack thereof, of expert testimony that has been proffered for trial. Under the government's reasoning, a court could properly make the requisite reliability assessment on the basis of a novel experiment that no expert in the field would reasonably rely upon because it has neither been published nor reviewed by peers. Although such reliance by a court would not be precluded by the Federal Rules of Evidence, it would nevertheless plainly run afoul of the court's gatekeeping responsibilities as set forth by the Supreme Court in Daubert.

Moreover, there is a particularly good reason why in the instant case the government's AFIS experiments should be published and subjected to peer review before they are given

consideration by a court of law. The government here has attempted to utilize AFIS as it has never been utilized before. No previous attempts have ever been made to determine fingerprint probabilities from an AFIS system. To the contrary, such systems have been designed for an entirely different purpose -- to generate a number of fingerprint candidates which a human fingerprint examiner can then manually compare with the latent print under consideration. The extreme complexity of what the government has attempted to do here can readily be seen from the brief test report that the government has provided to the Court. The following is an excerpt from the description of the first experiment.

> Each comparison was performed by two totally different software packages, developed in two different countries by two different contractors using independent teams of fingerprint and software experts. The results of both comparisons were mathematically "fused" using software developed by a third contractor.
>
> ***
>
> The two "matcher" programs calculate a measure of similarity between the minutia patterns of two fingerprints. In both cases, the scores of an identical mate fingerprint is normalized to 1.0 (or 100%). The statistical fusion program combines the two scores by analyzing the most similar 500 (out of 50,000) minutiae patterns. The fusion operation discards 49,500 very dissimilar minutia patters before calculating the fusion statistics. As in the case of the "matcher" programs, the fused similarity measure calculated by the fusion program is normalized to 1.0 (or 100%).

(Gov't Ex. 6-8).

Obviously, there are many valid questions regarding the software systems and methodology that the "teams of fingerprint and software experts" utilized to conduct these extremely complicated and novel experiments. As courts have recognized, however, the proper forum for such questioning, at least as an initial matter, is through publication and peer review,

not the courtroom. See United States v. Brown, 557 F.2d 541, 556 (D.C. Cir. 1977) (holding that novel hair analysis technique should not have been admitted and stating that "[a] courtroom is not a research laboratory."); Richardson, 857 F.2d at 831. Peer review is especially important here given that the government has refused to even provide the defense with access to the software packages that were used to run the experiments.

Finally, the government's novel AFIS experiments also need to be subjected to peer review and publication before they are accepted in a court of law because the statistical conclusions that the government has generated defy reality. The government, for example, asserts, on the basis of its AFIS experiments, that the probability of two people even having four identical ridge characteristics in common "is less than one chance in 10 to the 27th power . . ." (Gov't Mem at 23.) Yet as discussed above, the fingerprint literature contains examples of people having seven and ten ridge characteristics in common. Moreover, as one fingerprint expert has recently acknowledged in explaining why an identification would never be made on the basis of four or five matching points, a "million people" could possess those four or five points of similarity. Commonwealth v. Daidone, 684 A.2d 179, 188 (Pa. Super. 1996) Accordingly, there is clearly something amiss with respect to the government's novel efforts to create statistical probabilities from its AFIS system.

In sum, the AFIS testing that the government has conducted for purposes of this litigation would not reasonably be relied upon by an expert in the fingerprint field and it should therefore not be relied upon by this Court.

. D. There is No Established Error Rate for Latent Print Comparisons, But It Is

Clear That Errors Do Occur

Given the lack of empirical validation studies that have been performed, it is not surprising that there is no established error rate for latent print comparisons. Nevertheless, the government, without the benefit of any citation, brazenly submits that the error rate is "zero" (Gov't Mem. at 19). This claim, however, simply ignores the many documented cases of erroneous fingerprint identifications. One such case is reported in State v. Caldwell, 322 N.W.2d 574 (Minn. 1982); see also James E. Starrs, A Miscue in Fingerprint Identification: Causes and Concerns, 12 J. of Police Sci. & Admin. 287 (1984) (Ex. 26). The prosecution's fingerprint expert in Caldwell, a board certified member of the IAI, with more than 14 years of experience, testified that a particular latent print at issue in the case had been made by the defendant's right thumb. Starrs, supra, at 288. The examiner based his opinion on 11 points of similarity that he had charted. Id. A second fingerprint expert, also a board certified member of the IAI, confirmed the first examiner's finding, after being consulted by the defense. Id. Following the defendant's conviction for murder, however, it was definitively established that both of these certified fingerprint experts had erred. Caldwell, 322 N.W. 2d at 585. The defendant's conviction was accordingly reversed. Id.

Another erroneous fingerprint identification recently occurred in England. See Stephen Gray, Yard in Fingerprint Blunder, Times (London), April 1997, at 6. (Ex. 27). In that case, two latent prints that had been recovered from a burglary crime scene were each found to have at least sixteen points in common with two of the defendant's inked prints. These identifications, pursuant to standard Scotland Yard procedures, had been triple checked prior to the defendant's

arrest. After the defendant had spent several months in jail, however, the identifications were found to be erroneous. [9]

Accordingly, it is beyond dispute that erroneous identifications do occur. The government's own experts have acknowledged as much. See David L. Grieve, Reflections on Quality Standards, 16 Fingerprint Whorld 108, 110 (April 1990) (Ex. 29) ("It is true that some overly zealous North American examiners have given testimony concerning false identifications when they believed the identifications were valid."). What remains unknown, however, is the rate at which misidentifications take place. As commentators have recognized, "it is difficult to glean information about cases of error because they rarely produce a public record, and the relevant organizations and agencies tend not to discuss them publicly." Simon A. Cole, Witnessing Identification: Latent Fingerprinting Evidence and Expert Knowledge, 28 Social Studies in Science 687, 701 (Oct.-Dec. 1998) (Ex. 30). Moreover, as discussed above, there have been no controlled studies conducted so as to determine an error rate for latent print examiners.

Just how prevalent the problem of false identifications may actually be, however, can be

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[9] For other documented cases of false identifications, see James E. Starrs, More Saltimbancos on the Loose? -- Fingerprint Experts Caught in a Whorl of Error, 12 Sci. Sleuthing Newsl. 1 (Winter 1998) (detailing several erroneous identifications discovered in North Carolina and Arizona); see also Dale Clegg, A Standard Comparison, 24 Fingerprint Whorld 99, 101 (July 1998) (Ex. 28) ("I am personally aware of wrong identifications having occurred under both 'non numeric' and '16 point' approaches to fingerprint identification.").

seen, at least to some extent, from the astonishingly poor performance of latent print examiners on crime lab accreditation proficiency exams. On these exams, latent print examiners are typically provided with several latent prints along with a number of "ten print" inked impressions to compare them with. Commencing in 1995, the provider of the test, Collaborative Testing Service, began to include, as part of the test, one or two "elimination" latent prints made by an individual whose inked impressions had not been furnished.

The results of the 1995 exam were, in the words of the government's own expert, David Grieve, both "alarming" and "chilling." Grieve, Possession of Truth, supra, at 524 (Ex. 9). Of the 156 examiners who participated, only 68 (44%) were able to both correctly identify the five latent print impressions that were supposed to be identified, and correctly note the two elimination latent prints that were not to be identified. Even more significantly, 34 of these examiners (22%) made erroneous identifications on one or more of the questioned prints for a total of 48 misidentifications. Id. Erroneous identifications occurred on all seven latent prints that were provided, including 13 errors made on the five latent prints that could be correctly identified to the supplied suspects. Id. In addition, one of the two elimination latents was misidentified 29 times. Id.

These shockingly poor results, moreover, could not be blamed on the test. The 1995 proficiency exam was recognized as being "a more than satisfactory representation of real casework conditions." Grieve, Possession of Truth, supra, at 524 (Ex. 9). The test was designed assembled and reviewed by representatives of the International Association of Identification. Id. As Mr. Grieve correctly observed, a "proficiency test composed of seven

latents and four suspects was considered neither overly demanding or unrealistic." Id.

Accordingly, the dreadful results are a matter of significant concern. As Mr. Grieve has written:

> Reaction to the results of the CTS 1995 Latent Print Proficiency Test within the forensic science community has ranged from shock to disbelief. Errors of this magnitude within a discipline singularly admired and respected for its touted absolute certainty as an identification process have produced chilling and mind-numbing realities. Thirty-four participants, an incredible 22% of those involved, substituted presumed but false certainty for truth. By any measure, this represents a profile of practice that is unacceptable and thus demands positive action by the entire community.

Grieve, Possession of Truth, supra, at 524-25 (Ex. 9 at 524-25).

Despite Mr. Grieve's call for "positive action," the poor results have continued unabated on the more recent proficiency exams. On the 1998 test, for example, only 58% of the participants were able to correctly identify all of the latents and to recognize the two elimination latents as being unidentifiable. Collaborative Testing Services, Inc., Report No. 9808, Forensic Testing Program: Latent Prints Examination 2 (1998) (Ex. 31). Even more disturbing was the fact that 21 erroneous identifications were made by 14 different participants. Id.[10]

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[10]On the 1997 exam, 16 false identifications were made by 13 participants. Collaborative Testing Services, Inc., Report No. 9708, Forensic Testing Program: Latent Prints Examination 2 (1997) (Ex. 32). Six misidentifications were made on the 1996 exam. Collaborative Testing Services, Inc., Report No. 9608, Forensic Testing Program: Latent Prints Examination 2 (1996) (Ex. 33).

Having failed to address any of these proficiency tests in advancing its claim of a zero error rate, the government now takes the remarkable position that "practitioner error is not relevant to the validity of the science and methodology under Daubert . . . ." Government's Response to the Defendant's Motion to Compel the Government to Produce Written Summaries for All the Experts That It Intends to Call at the Daubert Hearing at 3 n.3. The government, however, fails to explain why practitioner error is irrelevant under Daubert. Nor does the government explain how an error rate for a particular technique may be assessed other than through its real-life practitioners. Not surprisingly, courts have, in fact, looked at studies of examiner error rate in determining whether proffered "scientific" evidence is reliable. See, e.g., United States v. Smith, 869 F.2d 348, 353-54 (7th Cir. 1989) (studies of "actual cases examined by trained voice examiners" considered by court in deciding admissibility). The Seventh Circuit's decision in Smith was, as noted above, cited with approval by the Supreme Court in Daubert. See Daubert, 509 U.S. at 594, 113 S. Ct. at 2797. See also Saks, supra, at 1090 (Ex. 13) ("Even if forensic metaphysicians were right, that no two of anything are alike, for fact finders in earthly cases, the problem is to assess the risk of error whatever its source, be that in the basic theory or in the error rates associated with human examiners or their apparatus."). Accordingly, the government's argument that practitioner error rates are irrelevant is without merit.

In sum, the government's claim of a zero error rate is plainly at odds with reality. While no controlled studies have been done to determine an error rate, it would appear from the proficiency testing done in the field that the rate is in fact substantial. In this regard, it must be remembered that it is the government's burden to establish the scientific reliability of the expert

evidence that it seeks to admit. Kannankeril v. Terminex Int'l, Inc., 128 F.2d 802, 806 (3d Cir. 1997) (proponent of expert testimony required to demonstrate by preponderance of evidence that expert's opinion was based on methods and procedures of science). With respect to the error rate factor, the government plainly has not met that burden. See United States v. Starzecpyzel, 880 F. Supp. 1027, 1037 (S.D.N.Y. 1995) ("Certainly, an unknown error rate does not necessarily imply a large error rate[;] [h]owever, if testing is possible, it must be conducted if forensic document examination is to carry the imprimatur of 'science.'").

E. There Are No Objective Standards to Govern Latent Fingerprint Comparisons

Latent fingerprint examiners in the United States are currently operating in the absence of any uniform objective standards. The absence of standards is most glaring with respect to the ultimate question of all fingerprint comparisons: What constitutes a sufficient basis to make a positive identification? As discussed above, the official position of the IAI, since 1973, is that no minimum number of corresponding points of identification are required for an identification. Instead, the determination of whether there is a sufficient basis for an identification is left entirely to the subjective judgment of the particular examiner. Indeed, the government's own expert, David Ashbaugh, has candidly acknowledged that a fingerprint examiner's opinion of individuality is "very subjective." Ashbaugh, Premises, supra, at 511 (Ex. 4).

While the official position of the IAI, as supported by Mr. Ashbaugh, is that there is no

basis for a minimum point requirement, many fingerprint examiners in the United States continue to employ either their own informal point standards or those that have been set by the agencies that they work for. Simon Cole, What Counts For Identity? The Historical Origins Of The Methodology Of Latent Fingerprint Identification, 12 Sci. In Context 1, 3-4 (Spring 1999) (Ex. 34) [hereinafter Cole, What Counts For Identity?]. This variability of standards is evidenced by a survey which the defense has conducted of the state law enforcement examiners who were unable to make a positive identification in this case. As set forth in Exhibit 21, six out of the eight examiners who responded to this survey reported identification standards ranging from 6 - 10 points. Only two of the examiners claimed to not apply any point standard at all.[11]

In addition, while there is no uniform identification standard in the United States, "many" other countries have, in fact, set such standards based on a minimum number of points of comparison. Ashbaugh, Basic and Advanced Ridgeology, supra, at 98 (Gov't Ex. 10). England, for example, has a minimum standard of 16 matching ridge characteristics, Italy, 17, and France and Australia, 12. Christophe Champod, Numerical Standards and "Probable" Identifications, 45 J. of Forensic Identification 136, 138 (1995) (Ex. 35). The primary purpose of establishing such standards is to try to insure against erroneous identifications. K. Luff, The 16-Point Standard, 16 Fingerprint Whorld 73 (Jan. 1990) (Ex. 36).

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[11] Prior to the IAI's 1973 proclamation, the informal standard most commonly employed in the United States was 12. See FBI, Fingerprint Identification, supra, at 6 (Ex. 1 at 6).

As commentators have recognized, the question of whether there should be a minimum point standard for latent print identifications has bitterly divided the fingerprint community. See Cole, What Counts For Identity, supra, at 1 (Ex. 34). While latent print examiners have somehow managed to maintain a united front in the courtroom, they have been at odds in the technical literature. Id. at 6. Mr. Ashbaugh, for example, has written that "it is unacceptable to use the simplistic point philosophy in modern day forensic science." Ashbaugh, Premises, supra, at 513 (Ex. at 4).[12] As Mr. Ashbaugh has correctly recognized, the selection of any particular point standard is based, not on scientifically conducted probability studies, but "through what can best be described as an 'educated conjecture'." (Gov't Ex.10 at 2); see also Ashbaugh, Premises, supra, at 512 (Ex. at 4) (stating that "superficial and unsubstantiated quips became the methodology of the point system").

The problem for the government, however, is that while Mr. Ashbaugh is correct that the point system, as employed by fingerprint examiners over the past hundred years, is scientifically invalid, neither Mr. Ashbaugh, nor any other member of the fingerprinting community, has advanced a scientifically sound alternative. Here, for example, is Mr. Ashbaugh's explanation as to how a latent print examiner, in the absence of a minimum point standard, is supposed to know when a sufficient basis exists to make an identification:

> A frequently asked question is how much is enough? The opinion of individualization or identification is subjective. It is an opinion formed by the friction ridge, based on the friction ridge formations

[12]Of course, the identification in the instant case was made by the FBI examiner on just such a simplistic counting of points.

> found in agreement during comparison. The validity of the opinion is coupled with an ability to defend that position, and both are founded in one's personal knowledge ability and experience
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> ***
>
> How much is enough? Finding adequate friction ridge formations in sequence, that one knows are specific details of the friction skin, and in the opinion of the friction ridge identification specialist there are sufficient uniqueness within those details to eliminate all other possible donors in the world, is considered enough. At that point individualization has occurred and the print has been identified. The identification was established by the agreement of friction ridge formations, in sequence, having sufficient uniqueness to individualize.

Ashbaugh, Basic and Advanced Ridgeology, supra, at 70 (Gov't Ex. 10 at 70).

The utter meaninglessness of this explanation speaks for itself. Mr. Ashbaugh's prior writings on this subject provide little in the way of additional insight. He has stated, for example, that while "in some instances we may form an opinion on eight ridge characteristics [,] [i]n other instances we may require twelve or more to form the same opinion." David Ashbaugh, The Key to Fingerprint Identification, 10 Fingerprint Whorld 93, 93 (April 1985) (Ex. 37 at 93). Mr. Ashbaugh's explanation for this sliding scale is that some ridge characteristics are more unique than others. Id. at 94, 95. But, as discussed above, no weighted measures of the different characteristics have ever been adopted by the fingerprint community. Accordingly, as Mr. Ashbaugh has recognized, the particular examiner's determination of whether eight or twelve matching characteristics is sufficient in a particular case is entirely "SUBJECTIVE." (Gov't Ex. 10 at 99) (emphasis in original).

The lack of uniform standards for latent print comparisons extends well beyond the question of what ultimate standard should apply for a positive identification. Objective

standards are lacking throughout the entire comparison process. Take for example, the simple issue of how points of similarity should be counted. When examiners find themselves struggling to reach a certain point criteria, they often engage in a practice known as "pushing the mark." Clegg, supra, at 99 (Ex. 28). Pursuant to this practice, a single characteristic, such as a short ridge, is counted not as one point, but rather as two separate ridge endings. Id. Or, as seen in this case, a single enclosure is counted as two bifurcations. See supra, at p.8. While, as discussed above, the IAI has declared that points should not be counted in this fashion, it is nevertheless commonly done, as can be seen by the work of the FBI examiner in the case at bar. The obvious danger of this practice, as one examiner has candidly recognized, is its "potential to generate error . . . ." Clegg, supra, at 101 (Ex. 28 at 101).

The lack of objective standards in fingerprint comparisons can also be seen with respect to the so called "one dissimilarity rule." See John I. Thornton, The One-Dissimilarity Doctrine in Fingerprint Identification, 306 Int'l Crim. Police Rev. 89 (March 1977) (Ex. 38). Pursuant to this doctrine, if two fingerprints contain a single genuine dissimilarity then the prints cannot be attributed to the same finger or individual. Id. This doctrine is well recognized in the fingerprint community and has been endorsed in the writings of the government's own experts. David Ashbaugh, Defined Pattern, Overall Pattern and Unique Pattern, 42 J. of Forensic Identification 505, 510 (1992) (Ex. 39) [hereinafter Ashbaugh, Defined Pattern]. The doctrine, however, is effectively ignored in practice. As Dr. Thornton has recognized, once a fingerprint examiner finds what he or she believes is a sufficient number of matching characteristics to make an identification, the examiner will then explain away any observed dissimilarity as being a product

of distortion or artifact:

> Faced with an instance of many matching characteristics and one point of disagreement, the tendency on the part of the examiner is to rationalize away the dissimilarity on the basis of improper inking, uneven pressure resulting in the compression of a ridge, a dirty finger, a disease state, scarring, or super-imposition of the impression. How can he do otherwise? If he admits that he does not know the cause of the disagreement then he must immediately conclude that the impressions are not of the same digit in order to accommodate the one-dissimilarity doctrine. The fault here is that the nature of the impression may not suggest which of these factors, if any, is at play. The expert is then in an embarrassing position of having to speculate as to what caused the dissimilarity, and often the speculation is without any particular foundation.
>
> The practical implication of this is that the one-dissimilarity doctrine will have to be ignored. It is, in fact, ignored anyway by virtue of the fact that fingerprint examiners will not refrain from effecting an identification when numerous matching characteristics are observed despite a point of disagreement. Actually, the one-dissimilarity doctrine has been treated rather shabbily. The fingerprint examiner adheres to it only until faced with an aberration, then discards it and conjures up some fanciful explanation for the dissimilarity.

Thornton, supra, at 91.

The absence of real standards in the fingerprint field also can be seen with respect to the issue of verification. Independent verification is considered an essential part of the identification process. But, in real practice, fingerprint agencies sometimes "waive the verification requirement." William Leo, Identification Standards - The Quest for Excellence, Cal. Identification Dig. (December 1995) (Ex. 40). Moreover, as revealed by one of the government's experts in this case, some examiners will simply go from one supervisor to another until a desired verification is obtained. Pat Wertheim, The Ability Equation, 46 J. of Forensic Identification

149, 153 (1996) (Ex. 41). Mr. Wertheim candidly recounts in this article his experience of shopping for a supervisor so as to obtain the positive verification that he believed was warranted. Id.

Finally, the lack of standards in the fingerprint community extends to the training and experience requirements for latent print examiners. To put it simply, no such requirements currently exist. See Leo, supra (Ex. 40) (recognizing need for "minimum training and experience standards" for latent print examiners). As one of the government's experts has recognized, "people are being hired directly into latent print units without so much as having looked at a single fingerprint image." Wertheim, supra, at 152 (Ex. 41 at 152). Once hired, the training that examiners receive is typically minimal. Consider what government expert David Grieve has said on the subject of training:

> The harsh reality is that latent print training as a structured, organized course of study is scarce. Traditionally, fingerprint training has centered around a type of apprenticeship, tutelage, or on-the-job training, in its best form, and essentially a type of self study, in its worst. Many training programs are the "look and learn" variety, and aside from some basic classroom instruction in pattern interpretation and classification methods, are often impromptu sessions dictated more by the schedule and duties of the trainer than the needs of the student. Such apprenticeship is most often expressed in terms of duration, not in specific goals and objectives, and often end with a subjective assessment that the trainer is ready.

David L. Grieve, The Identification Process: The Quest For Quality, 40 J. of Forensic Identification 109, 110-111 (1990) (Ex. 42).

As Mr. Grieve has recognized, the direct result of this poor training is deficient examiners.

"The quality of work produced is directly proportional to the quality of training received." Id. See also David L. Grieve, The Identification Process: Traditions in Training, 40 J. of Forensic Identification 195, 196 (1990) (Ex. 43) (that there are "examiners performing identification functions who are not qualified and proficient . . . unfortunately has been too well established"); Robert D. Olsen, Cult of the Mediocre, 8 Fingerprint Whorld 51 (Oct. 1982) (Ex. 44) ("There is a definite need for us to strengthen our professional standards and rise above the cult of the mediocre.").

Moreover, the lack of training and standards has not only resulted in a plethora of deficient examiners, but dishonest ones as well. The government's expert, Pat Wertheim, estimates that there have been "hundreds or even thousands" of cases of forged and fabricated latent prints. Pat Wertheim, Detection of Forged and Fabricated Latent Prints, 44 J. of Forensic Identification 653, 675 (1994) (Ex. 45) ("A disturbing percentage of experienced examiners polled by the author described personal exposure to at least one of these cases during their careers.").

In sum, latent print examiners operate without the benefit of any objective standards to guide them in their comparisons. There also are no objective standards or minimum qualifications with respect to their hiring and training. Accordingly, another indicia of good science is critically lacking in this case.

F. There Is No General Consensus That Fingerprint Examiners Can Reliably Make Identifications on the Basis of Nine Matching Ridge Characteristics

The government submits that there is a general consensus that fingerprints are unique and permanent. (Gov't Mem. at 20, 21.) Again, however, the government fails to understand the real

issue in this case. The relevant question is not whether entire fingerprints are unique and permanent, but whether there is a general consensus that fingerprint examiners can make reliable identifications on the basis of only a limited number of basic ridge characteristics, such as the seven/nine that have been identified by the FBI examiner in the case at bar. The answer to that question is plainly no. As discussed above, many countries require that there be at least 12 - 17 matching ridge characteristics before fingerprint evidence is deemed sufficiently reliable so as to warrant its admission at a criminal trial.

Moreover, in this country, no relevant scientific community, beyond fingerprint examiners themselves, generally accept that latent fingerprint identifications are reliable. As courts have recognized, in defining a relevant scientific community, it is necessary to look beyond the practitioners of the technique that is under assessment. Williamson v. Reynolds, 904 F.Supp. 1529, 1558 (E.D. Okl. 1995) ("Not even the 'general acceptance' standard is met, since any 'general acceptance' seems to be among hair experts who are generally technicians testifying for the prosecution, not scientists who can objectively evaluate such evidence."); United States v. Starzecpyzel, 880 F. Supp. 1027, 1038 (S.D.N.Y. 1995) ("[Forensic Document Examiners] certainly find general acceptance within their own community, but this community is devoid of financially disinterested parties, such as academics."). Contrary to the government's general acceptance argument, mainstream scientists have essentially ignored the question of whether individuals can be reliably identified through latent fingerprint impressions. Saks, supra, at 1081 (Ex. 13). And as discussed above, the forensic science experts that have examined the issue, have found the fingerprint field to be scientifically deficient. See Saks, supra, at 1106 (Ex. 13) ("A

vote to admit fingerprints is a rejection of conventional science as a criterion for admission."); David L. Faigman et al., Modern Scientific Evidence: The Law and Science of Expert Testimony §21-1.0, at 55 (West 1997) (Ex. 15) ("[B]y conventional scientific standards, any serious search for evidence of the validity of fingerprint identification is likely to be disappointing."); Stoney, Fingerprint Identification, supra, §21-2.3.1, at 72 (Ex. 15) ("[T]here is no justification [for fingerprint identifications] based on conventional science: no theoretical model, statistics or an empirical validation process."). Accordingly, the factor of general acceptance also cuts in favor of Mr. Mitchell's motion to exclude the government's fingerprint evidence.

G. The Fingerprint Literature Confirms the Scientific Bankruptcy of the Field

The fundamental premises underlying latent print identifications have not been critically examined in the technical literature of the fingerprint community. As government expert David Ashbaugh has stated "it is difficult to comprehend that a complete scientific review of friction ridge identification has not taken place at sometime during the last one hundred years[;] [a] situation seems to have developed where this science grew through default." (Gov't Ex. 10 at 3.)

The truth of Mr. Ashbaugh's comments can be seen by an examination of the publications that the government has listed on the reference sheet that it has provided to the Court as an exhibit. (Gov't Ex. 7.) While some of the titles listed might convey the impression of science, a review of their actual contents will readily reveal otherwise. Take for example the FBI publication "The Science of Fingerprints." Only three pages of this 211 page text even concern the subject of latent fingerprint comparisons. (These pages are provided at Exhibit 46). The rest of the text is primarily concerned with classifying ten print patterns, recording ten print patterns

and the lifting of latent prints. As to the three pages that concern latent fingerprint comparisons, there is no discussion whatsoever as to the fundamental premises that underlie latent print identifications or even how such comparisons should be conducted. As Mr. Ashbaugh has correctly recognized that there is a "lack of published material about the identification process." Ashbaugh, Defined Pattern, supra, at 508 (Ex. 39).

Even when the premises of latent print identifications have been considered in the technical literature, they have not been critically examined. A perfect example is the article Nature Never Repeats Itself, written by Alan McRoberts (referenced at page 5 of Government Exhibit 7-1 and provided in full as Defense Exhibit 47). In this article, Mr. McRoberts cites with approval the following statement which was originally made by Wilder and Wentworth in their 1916 text, Personal Identification:

> Finally, there is never the slightest doubt of the impossibility of the duplication of a fingerprint, or even of the small part of one, on the part of anyone who has carefully studied the subject at first hand, whether finger-print expert or anatomist: the only doubters are those who have never taken the trouble to look for themselves, and who argue from the basis of their own prejudices and preconceived opinions.

(Ex. 47 at 1).

It is probably statements such as these that have led government expert David Ashbaugh to bemoan the "failure of the identification community to challenge or hold meaningful debate." Ashbaugh, Basic and Advanced Ridgeology, supra, at 3 (Gov't Ex. 10). As Mr. Ashbaugh explains:

> In the past the friction ridge identifications science has been akin to

> a divine following. Challenges were considered heresy and challengers frequently were accused of chipping at the foundation of the science unnecessarily. This cultish demeanor was fostered by a general deficiency of scientific knowledge, understanding and self confidence within the ranks of identification specialists. A pervading fear developed in which any negative aspect voiced, which did not support the concept of an exact and infallible science, could lead to its destruction and the credibility of those supporting it.

(Id.).

In sum, the literature of latent fingerprint examiners "fails to meet the expectations of the Daubert Court -- that a competitive, unbiased community of practitioners and academics would generate increasingly valid science." United States v. Starzecpyzel, 880 F. Supp. 1027, 1037 (S.D.N.Y. 1995).

H. Latent Fingerprint Identifications Are Analogous to Other Techniques That Courts Have Found Scientifically Unreliable

Latent fingerprint comparisons are analogous to two other long standing forensic identification techniques that, in the wake of Daubert, have been found scientifically deficient; these techniques are hair comparisons and handwriting analysis. See Williamson v. Reynolds, 940 F.Supp. 1529, 1554-59 (E.D. Okla. 1995); United States v. Starzecpyzel, 880 F. Supp. 1027, 1028-50 (S.D.N.Y. 1995).[13]

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[13] In United States v. Velasquez, 64 F.3d 844, 850-51 (3d Cir. 1995), the Third Circuit

stated in dictum that the government's handwriting expert satisfied the requirements of Daubert. The issue on appeal in Velasquez was not the admissibility of the government's evidence, but whether the district court should have allowed the defense to present an expert with respect to the limitations of handwriting analysis. As discussed further below, the Third Circuit held that it was reversible error not to allow testimony by the defense expert. Id. at 852.

Like latent fingerprint identifications, the fundamental premises of handwriting analysis are that no two people write alike and that forensic document examiners can reliably determine authorship of a particular document by comparing the document with known samples. Starzecpyzel, 880 F. Supp. at 1031. As with fingerprints, however, these premises have not been tested. Id. at 1037. Nor has an error rate for forensic document examiners been established. Id. As the court in Starzecpyzel recognized, while "an unknown rate does not necessarily imply a large error rate . . . . if testing is possible, it must be conducted if forensic document examination is to carry the imprimatur of 'science.'" Id. The parallel between the handwriting and fingerprint fields extends to the issue of objective standards. As in the fingerprint field, forensic document examiners do not have any numerical standards to govern their analysis. Id. at 1032. And, like the fingerprint community, forensic document examiners have not subjected themselves to "critical self-examination" in their literature. Id. at 1037. For these various reasons, the district court in Starzecpyzel concluded that "forensic document examination . . . cannot after Daubert, be regarded as 'scientific . . . knowledge.'" Id.[14]

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[14] Despite reaching this conclusion, the district court in Starzecpyzel ultimately allowed the handwriting evidence to be admitted under Federal Rule of Evidence 702 as "specialized knowledge" rather than as "scientific knowledge." (The court provided the jury with a lengthy instruction explicitly telling them that the evidence was not scientific in nature). Id. at 1050-51.

In so holding, the court reasoned that the Daubert factors are inapplicable to experts who are not testifying on the basis of scientific knowledge. Id. at 1029. This aspect of the court's decision, however, was ultimately shown to be erroneous by the Supreme Court's subsequent decision in Kumho Tire Co. v. Carmichael, 119 S. Ct. 1167 (1999).

Hair analysis also is analogous to latent fingerprint comparisons. Like latent print examiners, hair analysts look for a number of matching characteristics in doing hair comparisons. Williamson v. Reynolds, 904 F. Supp. at 1553 ("Hett testified that there are approximately 25 characteristics used in hair comparisons."). Hair analysts then state whether the hair found at the crime scene is consistent microscopically with the hair of the defendant.[15] Id. As with fingerprints, there has been a "scarcity of scientific studies regarding the reliability of hair comparison testing." Id. at 1556. And, like fingerprints, "there is no research to indicate with any certainty the probabilities that two different hair samples are from the same individual." Id. at 1558. Accordingly, as with fingerprints, the "evaluation of hair evidence remains subjective, the weight the examiner gives to the presence or absence of a particular characteristic depends upon the examiner's subjective opinion." Id. at 1556. Given these various considerations, the district court in Williamson concluded that "expert hair comparison testimony [does not] meet any of the requirements of Daubert" and that the state trial court thus erred in admitting it. Id. at 1558.

I. Latent Fingerprint Comparisons Have Not Been Put to Any Non-Judicial Applications

There have been no non-judicial applications of latent fingerprint comparisons. As government expert David Ashbaugh has recognized, the use of fingerprints has been "under the

[15] Unlike latent print examiners, hair analysts candidly concede that they cannot make absolute identifications. Williamson, 904 F. Supp. at 1554, 1555.

control of the police community rather than the scientific community" and latent prints are used by law enforcement solely as a "tool for solving crime." Ashbaugh, Basic and Advanced Ridgeology, supra, at 3 (Gov't Ex. 10). Thus, this factor also favors Mr. Mitchell's motion to preclude.

In sum, having considered the various indicators of scientific reliability set forth by the Supreme Court in Daubert and the Third Circuit in Downing, it is clear that latent fingerprint comparisons do not constitute scientifically reliable evidence. Indeed, the picture that has emerged from this analysis is a disturbing one. It is a picture of poorly trained law enforcement fingerprint examiners making extremely subjective determinations in the absence of any uniform standards and in the absence of any testing to validate the fundamental premises upon which the technique rests. It should therefore hardly be surprising that forensic science commentators have concluded that a "vote for science is a vote to exclude fingerprint expert opinions." Saks, supra, at 1106 (Ex. 13).

5. A Federal Court Has Rejected Fingerprint Identification Evidence Because of its Scientific Unreliability

The government submits in its memorandum that fingerprint evidence has never been rejected by a United States trial court. (Gov't Mem. at 13). The government is mistaken. In the only known instance in which a federal trial court has performed the type of analysis that is now mandated by Daubert, the district court excluded the government's fingerprint identification evidence, finding that there was no scientific basis for the latent print examiner's opinion of identification. United States v. Parks (C.D. Cal. 1991) (No. CR-91-358-JSL). (The relevant

transcript pages of Parks are provided as Exhibit 48).[16] The district court in Parks reached this determination after hearing from three different fingerprint experts produced by the government in an effort to have the evidence admitted. The testimony of these three experts, however, confirms virtually every argument that has been advanced above.

The first fingerprint expert to testify in Parks was a Los Angeles Police Department latent fingerprint examiner, Diana Castro. (Ex. 48 at 469 -557). Ms. Castro testified that she identified three different fingerprints at the crime scene as having between 10 and 12 points of similarity with the known prints of the defendant. What particularly concerned the court about these identifications was Ms. Castro's testimony that her minimum standard for an identification is only eight points of similarity. (Ex. 48 at 538). Ms. Castro acknowledged that her standard is on the "low side" and that other examiners require ten or twelve points or even more. (Ex. 48 at 539). Ms. Castro further acknowledged that there has never been any empirical studies done to determine if two people might have the same fingerprints. (Ex. 48 at 541).

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[16] The government concedes that in all of the cases where fingerprint evidence has been permitted, no court has ever conducted the type of analysis that is required by Daubert. (Gov't Mem. at 13 n.9.) Indeed, as commentators have recognized, the early American cases establishing the admissibility of fingerprint identifications involved virtually no scrutiny of the evidence whatsoever. See David L. Faigman et al., Modern Scientific Evidence: The Law and Science of Expert Testimony § 21-1.0, at 52 (Ex. 15) ("These cases, germinal not only for fingerprint identification but for the many other forensic individualization techniques invested virtually no effort assessing the merits of the proffered scientific evidence, but merely cited treatises on criminal investigation, or general approval of science, or, . . . other cases admitting [such evidence]."); Saks, supra, at 1103 (Ex. 13) ("What is disappointing about the fingerprint admissibility cases is that these courts made virtually no serious substantive inquiry into the body of knowledge on which they had the responsibility to pass judgment. Later cases had the illusory luxury of precedent, reasoning in effect: 'Courts in other states are letting in fingerprint evidence, so we can too.'").

The district court in Parks found Ms. Castro's testimony disturbing because all the latent print examiners that had previously testified before the court had testified to higher minimum point thresholds. In this regard, the court stated:

> This business of having a sliding scale – and this is a very high risk business, because I've had a lot of fingerprinting testimony, and it's been from the same group of people by and large, and my impression, correct me if you can – that it slides up and down, that if you have only 10 points, you're comfortable with 8, if you have 12, you're comfortable with 10, if you have 50, you're comfortable with 20.
>
> ***
>
> I've had them say that when they had 20 and 25, and say, "I wouldn't be comfortable with less than 10," and they've thrown out some that were less than 10. Whether they were less than 8, I don't know.
>
> Suddenly I find that you come – being I think probably the most junior that's ever testified before me that I've ever permitted to testify as an expert – you are comfortable with fewer than anybody that has ever testified before me before.
>
> And as it happens, you also have fewer than anybody that's ever testified before me; that makes me very uncomfortable.

(Ex. 48 at 551-553).

The district court then questioned the government as to what the fingerprint treatises state with respect to a minimum point standard. (Ex. 48 at 555). The court was incredulous over Ms. Castro's testimony that no studies had been performed. If there are no studies the court stated, "then this is not a science and there are no experts in it." (Ex. 48 at 556).

In response to the court's concerns, the government called Ms. Castro's supervisor, Darnell Carter, to testify regarding the "standard in the industry." (Ex. 48 at 556). Mr. Carter's testimony, however, only succeeded in further revealing the unreliability of the evidence. Mr.

Carter disclosed to the court that while the Los Angeles Police Department has a 10 point standard, which can slide down to 8 with a supervisor's approval, the Los Angeles Sheriff's Department employs a 12 or 15 point rule and that "if there was a survey taken, you would probably get a different number from every department that has a fingerprint section as to their lowest number for a comparison." (Ex. 48 at 559-61).[17] Mr. Carter further revealed, in a response to a direct question from the court, that there is no "literature" regarding this issue and that he is unaware why there is no uniform rule. (Ex. 48 at 561).

After hearing Mr. Carter's testimony, the district court was only more convinced that the fingerprint evidence should be excluded. To try to "resuscitate" the evidence, the government called yet a third fingerprint expert, Steven Kasarsky, a board certified member of the IAI and an employee of the United States Postal Inspection Service. (Ex. 48 at 567-68, 596). The court specifically questioned Mr. Kasarsky as to where the "science" is to support fingerprint identifications. (Ex. 48 at 576-92.) Mr. Kasarsky, however, could not provide a satisfactory response.

Like Mr. Carter and Ms. Castro, Mr. Kasarsky testified that "everyone in our field basically has independent standards." (Ex. 48 at 584). Mr. Kasarsky also acknowledged that misidentifications in the field had occurred, (Ex. 48 at 568-569), and, in response to a question

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[17] Mr. Carter further testified in this regard that he had attended the FBI Academy for training and that the lowest number that anyone from the FBI had "gone to court on has been seven." (Ex. 48 at 561).

from the court, he admitted that no published studies regarding false identification had ever been done. Mr. Kasarsky further admitted that he knew of instances where prints from two different people have had ten matching characteristics and that he personally compared prints from different individuals possessing six points of similarity. (Ex. 48 at 599, 600). While Mr. Kasarsky testified that he was able to observe a dissimilarity between these prints which convinced him that they had been made by two different people, he admitted that on other occasions a dissimilarity might go unseen given the partial nature of most latent prints. (Ex. 48 at 600, 602). Accordingly, Mr. Kasarsky conceded that latent print examiners are in "dangerous territory" when making identifications on the basis of only eight points of similarity:

> The Court: Unless you have a very clear full print, you can't rule out a dissimilarity someplace on it that you didn't have, and if you have only five or six, or seven or eight, you're in dangerous territory.
> The Witness: Yes, Your Honor, because if you can't see the area that might have the dissimilarity, one can only guess.

(Ex. 48 at 602) (emphasis added).

After hearing Mr. Kasarsky's testimony, the district court ruled that he would not admit the government's fingerprint evidence. Here is some of what the district court had to say regarding the scientific bankruptcy of the field:

> You don't have any standards. As far as I can tell, you have no standard. It's just an ipse dixit. "This is unique, this is very unusual?" "How do you know it's unusual?" Because I never saw it before." Where is the standard, where is the study, where is the statistical base that been studied?
>
> ****
>
> I have discovered . . . that there are very limited objective standards, and that the training in this area, if it exists, other than

> "I've done this for a long time and I'm teaching you what I know," is almost nonexistent.
>
> People that have done it teach each other. So far as I've heard from you, and so far I've heard from anybody, those kinds of studies that would turn this into a bona fide science simply haven't been done.
>
> The information is there, it could be done, but it hasn't been done. There has been no study about how far qualified experts with existing prints could look at them and make a mistake on which kinds of things. That's something that can be done. Those prints exist. It wouldn't be hard for those studies to be made.
>
> This thing could be turned into a science, but it isn't now, not from what you've said, and not from what she said, and not from what her supervisor said.
>
> ****
>
> Now I have heard a lot of conversation about what it takes to become an expert in this field, and I will say, based on what I've heard today, the expertise is as fragile as any group that I've ever heard hold themselves out as experts.
>
> The basis for calling themselves experts seems to me to be very fragile. The basic premise that they don't need expertise, that fingerprints don't change, doctors told them that.
>
> The other premise that they are unique is, I think, a matter of genetics, and also a matter not of fingerprint specialists. Those are givens in the expertise.
>
> The expertise that they have said that they possess, to say this is unique, I can't find, as I said, a common thread of analysis. It may be there, but I haven't heard it.

(Ex. 48 at 587, 591-92, 606-07).

Unites States v. Parks thus stands as a compelling precedent for the instant motion. Having conducted a searching inquiry for the "science" of fingerprints, the district court in Parks properly determined that no such science exists and that the government's fingerprint evidence did not possess sufficient reliability to warrant admission. Mr. Mitchell respectfully submits that this Court should reach the same determination here.

6. The Government's Fingerprint Identification Evidence Should Also Be Excluded Under Fed. R. Evid. 403.

In addition to the fact that the government's fingerprint identification evidence does not possess sufficient scientific reliability so as to warrant admission under Federal Rule of Evidence 702, the evidence is also properly excludable pursuant to Federal Rule of Evidence 403. Rule 403 provides for the exclusion of relevant evidence "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues or misleading the jury . . . ."

As federal courts have recognized, Rule 403 plays an important role with respect to expert witness testimony, because when it comes to experts, especially "scientific experts," jurors may be awed by an "'aura of special reliability and trustworthiness' which may cause undue prejudice, confuse the issues or mislead the jury." Williamson v. Reynolds, 904 F. Supp. at 1557 (quoting United States v. Amaral, 488 F.2d 1148, 1152 (9th Cir. 1973). See Daubert, 509 U.S. at 595, 113 S. Ct. at 2798 ("[E]xpert evidence can be both powerful and quite misleading because of the difficulty of evaluating it."); United States v. Starzecpyzel, 880 F. Supp. at 1048 ("With regard to scientific experts, a major rationale for Frye, and now Daubert, is that scientific testimony may carry an 'aura of infallibility.'" (quoting 1 Charles T. McCormick et al., McCormick on Evidence § 203, at 608-09 (3d ed. 1984)); see also John W. Strong, Language and Logic in Expert Testimony: Limiting Expert Testimony by Restrictions of Function, Reliability and Form, 71 Or. L. Rev. 349, 361 (1992) ("There is virtual unanimity among courts and commentators that evidence perceived by jurors to be 'scientific' in nature will

have particularly persuasive effect.”).

The risk of undue prejudice and confusion is especially great when it comes to latent fingerprint identifications. With fingerprint evidence having been uncritically accepted by the American legal system for the past 80 years, see supra at n.17, the general public has come to firmly believe that fingerprint identifications are scientifically based and that they are invariably accurate. In a study that was recently conducted concerning jurors’ attitudes toward fingerprint evidence, 93% of the 978 jurors questioned expressed the view that fingerprint identification is a science, and 85% ranked fingerprints as the most reliable means of identifying a person. Charles Illsley, Juries Fingerprints and the Expert Fingerprint Witness 16, presented at The International Symposium on Latent Prints (FBI Academy, Quantico, VA, July, 1987) (Ex. 49). As demonstrated above, however, these commonly held views are completely unwarranted. Latent fingerprint identifications are not scientifically supported and there are substantial questions regarding their reliability. Thus, while the probative value of the government’s fingerprint evidence is, in reality, low, the danger of undue prejudice is extremely high, since there is a substantial danger that the jury will give the evidence considerably more weight than it deserves. The government’s fingerprint evidence, therefore, is properly excludable not only under Federal Rule of Evidence 702, but under Rule 403 as well. See Williamson v. Reynolds, 904 F. Supp. at 1558 (finding that the probative value of hair comparison evidence was substantially outweighed by its prejudicial effect).

7. If The Court Allows The Government To Present Its Fingerprint Identification Evidence, Mr. Mitchell Should Be Permitted To Call Expert Witnesses To Testify To The Limitations Of The Government’s Evidence.

In the event this Court decides to admit the government's fingerprint evidence, Mr. Mitchell should be permitted to introduce expert witness testimony regarding the limitations of that evidence. The Third Circuit's decision in United States v. Velasquez, 64 F.3d 844 (3d Cir. 1995), is directly on point. In Velasquez, the Third Circuit held that it was reversible error for the trial court not to allow the defense to call an expert witness who would have testified about the limitations of the government's handwriting evidence.

As the Third Circuit recognized in Velasquez, the same Daubert factors that "inform the court's legal decision to admit evidence under Rule 702 may also influence the fact finder's determination as to what weight such evidence, once admitted, should receive." Id. at 848. Similar to the case at bar, the defense expert in Velasquez was prepared to testify that "handwriting analysis is not a valid field of scientific expertise because it lacks standards to guide experts in the match or non-match of particular handwriting characteristics." Id. at 846. The Third Circuit recognized that the defense expert's "testimony as a critic of handwriting analysis would have assisted the jury in evaluating the government's expert witness." Id. at 848.

The government in Velasquez, as it does here, challenged the qualifications of the defendant's expert on the ground that he was not trained as a handwriting analyst. The defense expert in Velasquez was a Seton Hall University Law School Professor who for several years had conducted self-directed research on the field of handwriting analysis. Id. at 847 n.4. The Third Circuit rejected the government's argument that the witness was not sufficiently qualified. Consistent with its previous holdings, the Court held that the qualifications requirement of Rule

702 "has been liberally construed," and that it has "'eschewed imposing overly rigorous requirements of expertise.'" Id. at 849 (quoting In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 741 (3d Cir. 1994)). Moreover, the Court found that "the mere fact that the [witness] is not an expert in conducting handwriting analysis . . . does not mean that he is not qualified to offer expert testimony criticizing the standards in the field." Id. at 851.

In light of Velasquez, it is difficult to understand how the government can possibly contend that the defense should not, at the very least, be permitted to call expert witnesses to testify regarding the myriad of problems with fingerprint analysis which have been detailed above. The government submits that, in contrast to handwriting evidence, "it is well established that fingerprints are unique to an individual and permanent." (Gov't Mem. at 12.) Again, however, the government simply misses the point. The question is not the uniqueness and permanence of entire fingerprint patterns, but the scientific reliability of a fingerprint identification that is being made from a small distorted latent fingerprint fragment. Expert testimony regarding the lack of objective standards for such identifications, the lack of empirical testing that has been conducted, the failure to establish an error rate, and the other Daubert and Downing factors discussed above, will properly assist the jury in determining what weight the government's fingerprint evidence should receive. Velasquez, 64 F.3d at 848.

Unable to really distinguish this case from Velasquez, the government resorts to a full blown attack on the defendant's proffered expert, Professor James E. Starrs. This attack,

however, is as unwarranted as it is unprofessional.[18] Professor Starrs is a Professor of Forensic Sciences at The George Washington University, the Columbian School of Arts & Sciences, and a Professor of Law at The George Washington University Law School. He has held these positions for the past 19 years. Among his many notable honors and achievements, Professor Starrs is a Distinguished Fellow of the American Academy of Forensic Sciences. Professor Starrs has published more than 75 articles in the forensic science area and he is a co-author of the leading text in the field: Scientific Evidence in Civil and Criminal Cases (4th ed. 1995). (A copy of Professor Starrs's curriculum vitae is provided as Exhibit 50).

The government's principal problem with Professor Starrs is that he is not a trained fingerprint analyst. (Gov't Mem. at 30) ("He has no reported training in the fingerprint field, including comparison analysis."). But consistent with the Third Circuit's decision in Velasquez, the mere fact that Professor Starrs is not an expert in conducting fingerprint comparisons does not mean that "he is not qualified to offer expert testimony criticizing the standards in the field." Velasquez, 64 F.3d at 851. Indeed, as the government's own expert, David Grieve, has recognized, the government's argument -- that only a fingerprint examiner can properly evaluate the fingerprint profession -- is akin to arguing that "only a chicken can tell the difference between

[18] There simply is no reason for the government to criticize Mr. Starrs personally for being an "immodest man . . ." (Gov't Mem. at 30 n.21), or for the government to demean Professor Starrs's achievement of being cited by the Supreme Court in Daubert by suggesting that this was due solely to "his ability to turn a colorful phrase." (Id. at 32).

an egg that is fresh or one that is rotten." David L. Grieve, Tilting at Treadmills, 46 J. of Forensic Identification 144, 146 (1996) (Ex. 51).

Like the Seton Hall Professor at issue in Velasquez, Professor Starrs is well qualified to offer expert testimony criticizing the lack of standards and empirical testing in the fingerprint field. Similar to the defense expert in Velasquez, Professor Starrs has made the fingerprint field one of his principal areas of study and research. Professor Starrs has written several critical articles of the field[19] and the text that he has co-authored contains a 54 page chapter on the subject of fingerprint identifications. While the government attempts to minimize the importance of this text on the ground that it is not a "technical treatise" (Gov't Mem. at 33), the government's own expert, David Ashbaugh, refers to it in his bibliography, and quotes from it in his new book. (Gov't Ex. 10 at 59, 147). Accordingly, Professor Starrs, as one of the leading forensic science experts in the country, is, in fact, exceedingly well qualified to testify as to whether latent fingerprint identifications satisfy the criteria of science.

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[19] James E. Starrs, Judicial Control Over Scientific Supermen: Fingerprint Experts and Others Who Exceed the Bounds, to be published in 35-3 Crim. L. Bull. 233 (1999) (Ex. 52); James E. Starrs, Forensic Science on the Ropes, 20 Sci. Sleuthing Rev. 1 (Winter 1996) (Ex. 53); James E. Starrs, More Saltimbancos on the Loose?, 12 Sci. Sleuthing Newsl. 1 (Spring 1988); James E. Starrs, A Miscue in Fingerprinting Identification: Causes and Concerns, 12 J. of Police Sci. & Admin. 287 (Sept. 1984) (Ex. 26); James E. Starrs, To Err is Human, Infallibility is Divine, 7 Sci. Sleuthing Newsl. 1 (January 1983).

The government's argument that Professor Starrs is not qualified because he is not a fingerprint analyst rings especially hollow in light of the fact that the government is planning to call an expert, Dr. Bruce Budowle, who has no fingerprint background whatsoever. The government proffers Dr. Budowle as an expert in "genetics, population genetics, statistics, quality assurance standards and validation of forensic science applications," (Gov't Mem. at 27), and the government states that, on the basis of this varied expertise, Dr. Budowle will provide opinions supporting "uniqueness, the methodology of fingerprint science, and the validation of statistical data." (Id.). Dr. Budowle's vita, however, does not reveal any prior experience, at any level, with fingerprints. (Gov't Ex. 8-6). Accordingly, the government is being less than consistent in arguing that Professor Starrs does not have sufficient fingerprint qualifications to testify in this case.

The government also unfairly ridicules Professor Starrs for being, as the government puts it, an "all purpose expert," because Professor Starrs has previously testified as an expert in the DNA area and in opposition to the proposed exhumation of John Wilkes Booth. (Gov't Mem. at 33 n.27). The government fails to appreciate, however, that the forensic sciences include other areas beyond fingerprints. As a forensic science professor, and one of the leading authorities in the field for the past twenty years, it is hardly surprising that Professor Starrs has areas of interest and expertise other than fingerprints. Moreover, the government is again talking out of both sides of its mouth. Two of the experts that it has given notice of, Dr. Budowle and Dr. Ranijit Chakraborty, have testified as prosecution DNA experts in hundreds of cases; neither

though, has ever before testified as an expert with respect to fingerprints.[20]

Finally, the government attempts to portray Professor Starrs as if he is some sort of lone "eccentric," irresponsibly attacking the venerable "science of fingerprints." (Gov't Mem. at 34) ("[W]e are left only with the argument of Professor Starrs -- as set forth in [his] textbook -- [that] 'in light of . . . Daubert . . . generally accepted techniques like fingerprint identification are now vulnerable to challenge.'" (quoting James Starrs et al., Scientific Evidence in Civil and Criminal Cases, §8.09, at 519 (4th ed. 1995)). As the government well knows, however, Professor Starrs's criticisms of the fingerprint field are, in fact, shared by other forensic science experts and these criticisms have been published and subjected to peer review. See Saks, supra,

[20] The government also mistakenly asserts that Professor Starrs was rejected as a firearms and toolmark examinations expert in United States v. Moore, Criminal No. F.-10928-94. (Gov't Mem. at 33 n.27). Contrary to the government's baseless assertion, Professor Starrs was not rejected as an expert in the Moore case. As set forth in the Declaration that Professor Starrs provided in Moore, Professor Starrs was prepared to provide his opinion that a particular comparison technique had not reached a level of acceptance in the scientific community sufficient for admission under the old Frye standard. (Gov't Ex. 9-2 at 8 ¶18). As the declaration makes clear, Professor Starrs was plainly qualified to offer such an opinion from the research and work that he had performed in the area. The issue, however, did not end up being litigated after the defense counsel that retained Professor Starrs withdrew from the case.

at 1106 (Ex. 13) ("When and if a court agrees to revisit the admissibility of fingerprint identification evidence under Daubert, the Daubert approach -- that courts may admit scientific evidence only if it meets contemporary standards of what meets science -- is likely to meet its most demanding test: A vote to admit fingerprints is a rejection of conventional science as the criterion for admission[;][a] vote for science is a vote to exclude fingerprint expert opinions."); David L. Faingman et al., Modern Scientifc Evidence: The Law and Science of Expert Testimony, §21-1.0, at 54 (Ex. 15) ("[B]y conventional scientific standards, any serious search for evidence of the validity of fingerprint identifications is likely to be disappointing."); Stoney, Fingerprint Identification, supra §21-2.1.2, at 67 ("From a statistical viewpoint, the scientific foundation for fingerprint individuality is incredibly weak.").

In sum, Professor Starrs easily meets the "liberal" qualifications standard of Rule 702. Velasquez, 64 F.3d at 848-52. In the event that this Court allows the government to introduce its fingerprint identification evidence, the defense should be permitted to call Professor Starrs as an expert witness to testify with respect to the limitations of the government's evidence.

CONCLUSION

For all of the foregoing reasons, the government's fingerprint identification evidence should be precluded. In the alternative, the defense should be permitted to present expert witness evidence regarding the limitations of the government's evidence.

Respectfully submitted,

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