IN THE CIRCUIT COURT, IN AND FOR SEMINOLE COUNTY, FLORIDA
EIGHTEENTH JUDICIAL CIRCUIT

STATE OF FLORIDA

vs.

SHAWN RICHARDSON,
Defendant,

_____/

CASE NO: 11-1858-CFA

EXCERPT OF MOTION IN LIMINE
TESTIMONY OF WILLIAM TOBIN

BEFORE THE HONORABLE

JOHN D. GALLUZZO

JUDGE OF THE COURT

REPORTED BY:

ERIN E. LEBEN, FPR
CHARITI L. COLÓN, FPR
In Courtroom 5A
Criminal Justice Center
101 Bush Boulevard
Sanford, Florida
August 16, 2013

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WHEREUPON:

The following proceedings were had:

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THE COURT: All right. Counsel, are you ready to proceed? Back on the record on the case involving Shawn Emannuel Richardson, 11-81858-CFA. Mr. Chang?

MR. CHANG: Yes, sir. At this time we call Mr. Bill Tobin.

THE COURT: All right. Sir, if you will come forward to the podium. Face the Clerk. Raise your right hand to be sworn.

THE CLERK: Do you solemnly swear or affirm that the testimony you shall give will be the truth, the whole truth, and nothing but the truth, so help you God?

THE WITNESS: I do.

COURT DEPUTY: Thank you. Follow me, please. Watch your step up.

THE COURT: Whenever you're ready, Counsel.

MR. CHANG: Thank you, sir.

WILLIAM TOBIN,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CHANG:

Q Sir, can you introduce yourself to the Court, please?

A My name is William Tobin, T-O-B-I-N.

Q Sir, could you briefly tell us what your educational background and work experience is, very briefly.

A I have a Bachelor of Science Degree in metallurgy from Case Institute of Technology Cleveland, Ohio. I continued my formal education in graduate school at Ohio State University, at George Washington University, and the University of Virginia.

I acquired practical experience from my employments as a research metallurgist with the National Aeronautics and Space Administration with Battelle, B-A-T-T-E-L-L-E, Memorial Institute in Columbus, Ohio, and as a plant metallurgist with Chase Copper -- Chase Brass and Copper and with Monarch Aluminum Company.

I was a special agent with the Federal Bureau of Investigation for twenty-seven years, and of those, twenty-four I was a forensic metallurgist. I've got to think about it. I have numerous.

I visited numerous metal manufacturing and processing plants throughout the United States and -- and Taiwan. And I've been a guest lecturer for virtually all of

the professional metallurgical societies throughout the United States and also in Canada.

I've offered a number of forensic publications, and I've been -- have -- was asked to participate as an editorial reviewer for one of the National Academy of Science's committees. A little more, but that's a good overview.

Q Okay. You mentioned forensic metallurgist. What specialized qualifications do you have that qualifies you as a forensic metallurgist slash materials scientist?

A Well, I just covered some -- many of the highlights. But additionally, while I was a forensic metallurgist, I did conduct toolmark-type examinations, which is the umbrella -- firearms examinations are -- the firearms identification examinations is a subset, but conducted toolmark examinations during my twenty-four years as a forensic metallurgist.

Q Have you ever testified as an expert witness in any courts?

A Yes.

Q Okay. Approximately how many times and in what jurisdictions?

A Excluding my two congressional testimonies, I've had two hundred and forty-seven testimonies in forty-four jurisdictions, I believe.

MR. CHANG: Your Honor, I would -- now that I've gone through his CV, I'd just simply offer that as Defense Exhibit B in evidence for Court to review and consider.

THE COURT: All right.

(Whereupon, Defense Exhibit B was marked for identification.)

BY MR. CHANG:

Q Okay. Mr. Tobin, you were consulted by the Defense in this case as it relates to Mr. Richardson's case. Did we provide materials for you to review as a consultant in this case, sir?

A Yes.

Q Okay. Can you tell the Court what materials you received and your review of them to us?

A Not without my affidavit, I don't --

Q All right. Speaking of the affidavit, sir, you did prepare an affidavit as it relates to this case?

A I did, yes.

Q That affidavit sites as part of it the materials that were provided to review as it relates to this case?

A Yes.

Q All right. Everything in that affidavit, I believe, it's a sixty-eight page affidavit formatted and so on, but everything in that affidavit is true and accurate?

A Yes.

Q Okay. Okay. And you would adopt that affidavit as part of your testimony today?

A Yes.

MR. CHANG: Judge, for the record, I believe we attached that affidavit as part of our motion in limine.

THE COURT: Right.

MR. CHANG: And, you know, it's self explanatory. But it's -- it goes through. And I -- I just want to make it a part of the record. Don't need to belabor it.

THE COURT: All right. Thank you.

MR. CHANG: And the State, for the record, obviously was provided a copy of that affidavit.

BY MR. CHANG:

Q Mr. Tobin, in consulting with us, you prepared a -- a PowerPoint presentation --

A Yes.

Q -- regarding the various Daubert criteria as it relates to the practice of firearms and toolmark examinations and analysis; is that correct?

A In part, yes.

Q Okay. Would that aid and assist you in explaining to the Court your various positions on the practice itself?

A It would, yes.

MR. CHANG: Okay. Judge, for the record if it could be marked as Defense Exhibit A. Copies have been provided by the State.

MR. LEUKEL: Exhibit C.

MR. CHANG: Oh, Exhibit C. Copies have been provided by the State.

THE COURT: All right.

(Whereupon, Defense Exhibit C was marked for identification.)

MR. CHANG: And --

MS. VALENTINI: Your Honor, just want to make an objection for the record that there's no evidence that Mr. Tobin is an expert in firearm or toolmark examination. He may be an expert in metallurgy, but as far as an expert in firearm and toolmark identification, there's been nothing to establish that he's an expert in that particular --

THE COURT: He's an expert in toolmark identification. He's already -- he's already testified to his -- the level that he -- I'm accepting him as an expert in toolmark identification.

MS. VALENTINI: May I have --

THE COURT: As far as firearms go, that may be a different story and you've made your objection for the

record. Proceed, Mr. Chang.

MR. CHANG: Thank you, Your Honor.

BY MR. CHANG:

Q Mr. Tobin, if we can go through these real quick. What I want to do is -- is have you address certain issues in the list of various Daubert factors as it relates to the practice of firearm and toolmark examination and analysis.

So very quickly, some key concepts are listed here on your first PowerPoint presentation. Let's talk about general acceptance of firearms and toolmark analysis. Is -- how is firearms and toolmark and individualization received in the mainstream scientific community? How is that perceived?

A The practice is perceived -- is -- is characterized as a fallacy. It is found to be generally objectionable in large part because of the fact that firearms toolmarks practice is not a science, and there are numerous reasons for that. But it's characterized in the scientific community as a fallacy and characterized as pathological science, which is basically derived from wishful thinking, and one of my colleagues calls it delusional, but wishful thinking or misguided interpretations of various empirical experiments.

Q Okay.

MS. VALENTINI: Your Honor, again, I understand

Your -- Your Honor's position that you've seen him as an expert as far as toolmarks, but he is now speaking of firearm, as well, and he's speaking of the scientific community, and I don't have any idea what he's talking about.

THE COURT: All right. Counsel, approach the bench, please.

(Whereupon, there was a discussion held off the record.)

MR. CHANG: Thank you, Your Honor.

BY MR. CHANG:

Q Mr. Tobin, can you briefly tell us whether you've had any involvement within the firearms industry itself?

A Yes.

Q Okay. What is that experience, sir?

A Well, I have visited several firearms manufacturing operations. I have been a consultant for the ammunition industry, as well.

But again, I don't represent myself as a firearms identification expert, but rather the -- which is a subset, by the way, of toolmarks. Toolmarks identification are much more difficult from a physics and material science standpoint than firearms identification.

I'd be happy to explain that, if necessary. But the bottom line is I have a strong background in the

scientific methodology of such practices, but I don't represent -- it's a pattern matching associations and I don't address issues of whether a match is an actual match or not.

Q As it relates to the firearms identification, that's subset of toolmark identification?

A Yes.

Q Have you ever consulted with individuals working in that field?

A Yes.

Q Okay. In -- in -- in what capacity, sir?

A As a forensic metallurgist at the FBI laboratory would not be uncommon over the years that examiners would come to me and ask me to explain to me why they were seeing what they saw under a comparison microscope or why they were not able to see what they expected to see.

So they would recognize that material science and metallurgy was a critical was -- was the underlying science involved in the tribological interactions -- you have any problem with that? T-R-I-B-O-L-O-G-I-C-A-L -- on the tribological interactions or the tribology involved in various components and forced contact and relative motion with each other. So they would come to me during -- from their examinations when they would run into difficulties or problems and ask for assistance with regard to those issues.

Q Okay. You used the word "tribology." I think you just explained it, but can you, for the Court, explain what tribology is.

A Yes. Tribology is the science and engineering or surfaces in contact and in relative motion with each other, and generally comprises the science of friction, lubrications, and wear.

Q Okay. Talking about in terms of Daubert criteria being relevant in the scientific community, what would be the relevant scientific community in the area of firearms of toolmarks examinations?

A Well, it -- of course, it would include practitioners themselves. But as Professor Imwinkelried and I wrote in one of our papers, it's a mistake to restrict the relevant scientific community to only those practitioners whose incomes derives from the practice. And, in fact, that position has been supported in some cases, namely U.S. v. Porter in 1992.

So that position in -- in which we agree that the relevant scientific community should be those who have a proper scientific or engineering background should include those, and who have a proper understanding of the forensic process.

Q So --

A In other words, to include the mainstream

scientific community, as well as the forensic. Sorry.

Q All right. Ms. Skoglund utilized a term "testability." As a scientist working in the field for a number of years, can you explain what the theory of testability entails? What does that cover?

A Well, that's pretty self explanatory. Can a theory or premise be tested -- is it testable? And that relates to the concept of falsifiability.

For a proper theory to be acceptable in the scientific -- in the mainstream scientific community, a theory must be falsifiable. And what that basically means is that by repeated testing, can the theory or premise be shown to be false or falsified?

For example, in one -- my latest paper, I indicated that the theory that all intergalactic aliens are purple is an interesting proposition, but it's an unacceptable scientific theory because it cannot be falsified. So basically in the field of firearms toolmarks, it is a testable -- the premise underlying -- required underlying premises are testable, but there has been no meaningful or comprehensive testing to support the theory.

Q Okay. Rate of errors. Again, Ms. Skoglund testified about rate of error. And she's testified to essentially a near zero or zero rate of error in the field. How is that viewed in the scientific community?

A The repeated claims of zero to one percent or zero to two percent errors are quite misguided when one researches as we have the underlying proficiency tests and validation studies -- well, I'd say purported validation studies. The problem that we have found is -- well, the bottom line is there has been no comprehensive or meaningful showing acceptable to the mainstream scientific community of error rate for the practice.

The numerous validation studies, as you will hopefully see here, are terribly misguided from a scientist perspective. They don't measure what they believe that they -- they don't capture what they believe they measured.

Q Okay. We talked with her briefly about proficiency tests, and she actually described -- actually described the proficiency testing she -- that she actually takes annually.

A Yes.

Q They're given a limited sample, three known and three unknowns and asked to basically reach a conclusion as to which -- which of the samples were fired from a known sample. Talk to about this proficiency test and -- and how they relate to rates of errors.

A Again, the proficiency tests that we have reviewed, including those of the Collaborative Testing Service, or CTS, are virtually worthless in supporting the

underlying premise of the AFTE Theory of Identification. They're flawed on numerous levels, but the -- probably the -- the most under -- the most basic scientific flaw in proficiency testing is they present to respondents a -- a scenario involving deductive inference processes. As opposed -- they don't mirror real world cases, and I'll explain that in subsequent slides.

Rather, than the inductive logic processes required in real world cases. So that's the most basic flaw, but there are many other flaws, as we probably will see shortly. But the bottom line is there has not been any comprehensive or meaningful studies of error rates in the -- in the general practice as anticipated by the Blackman Court.

Q Okay. As it relates to peer review, let's just talk about peer review with the -- within the toolmark field itself, that narrow field.

A I'm sorry. Is that a question?

Q Is there a peer review within the firearms and toolmarks field?

A There is to a very limited extent. And when we -- we rate or evaluate the various -- in the scientific arena, the various Daubert criteria and compare it, that's the only area that has been -- that we will acknowledge there is some limited peer review.

But there is some serious problems with that type of peer review. It's -- the community of firearms and toolmarks examiners is a very insular community. Up until the recent paradigm shift, and I'll maybe in the last ten years, there was very little, if any extra judicial interest in firearms identification. So practice was never really exposed to the true scientific community or mainstream scientific community until fairly recently.

The problem with the peer review, though, is a major one. And that is it's rife with various forms of bias, observer biases, and conformation biases. But it's a process that's not similar to refereeing as is conducted in the true scientific community. And what it is tantamount is a -- an author will write a paper or do a study, and then not literally, but walk ten feet to a colleague's desk and say, Here, would you peer review my paper for me and then I'll peer review yours next week.

My colleagues, who are rather some well known scholars, have found it virtually impossible to obtain articles presented in the AFTE Journal, and there are reason for that. AFTE, you cannot have access to their journals unless you're a member of AFTE. And then they require that more than fifty percent or fifty-five percent of your income must be derived from performing firearms identification practice. So that's another reason that the publications

have not been exposed or reviewed in the true or mainstream scientific community.

So the bottom line is we give them a half credit for peer reviewing each other's work, but in the mainstream scientific community that is rife with flaws and objections for various reasons, bias being one of them.

Q So to -- to paraphrase, the AFTE Journal, although, might -- might contain research articles or -- or so on through -- by other people in the field, that journal is not general available to the public or to the -- to the general other scientific community outside of AFTE members?

A That's correct. And as Professor Imwinkelried and I pointed out in our paper, the Oklahoma City University Law Review, it's a serious mistake when one is considering peer review processes to not include cross discipline input into the peer review process. And it's a mistake to restrict peer review only to those practitioners.

The ideal in the -- in the scientific community is to have your work, as ours frequently is, validated by a totally different technique or some other scientific perspectives. So that's in an ideal world. That's what the peer review should occur to validate a -- a theory or a premise.

Q What is indexing as it relates to scientific journals?

A Indexing is a process that is used in academic and scholarly communities to -- trying to get a measure -- it's a proxy for the relative importance of a particular Journal. And it's a service offered by Thomsen Reuters, an that's, T-H-O-M-S-E -- yes, E-N. Reuters is, R-E-U-T-E-R-S -- in the web of knowledge, most specifically the institute for scientific information.

And what they do it is they calculate what's known as an impact factor. Those of us in the scientific community have impact factors and journals have factors. And that's how they measure its contribution to the -- the mainstream or true scientific community.

It's -- in short, it's basically how many times your work is cited and is enumerator -- in the denominator -- for a particular Journal it would be of all the articles published in that article. And then the numerator would be how many times your work has been cited. And that's used primarily in the academic and -- and scholarly communities and the scientific community.

Q Is the AFTE Journal indexed?

A No.

Q Let's talk about reliability. How -- why is reliability important in the scientific field, scientific matter?

A Well, that's obviously a -- a huge consideration,

particularly for Daubert. And that -- what that metric is -- represents is how the outcome of an experiment can be continually repeated.

In other words, the results can be -- I -- I've got to be careful because we need to separate it from repeatability and reproducibility. Those are two other scientific issues. But basically, it's how frequently the outcome of an experiment can be replicated.

Q Is there reliability within the field of firearms and toolmarks?

A There may be. But if it is, it would be a type III type error, which means you've got the right answer, but to the wrong reason. The bottom line is that there's been no showing to date of any practice-wide reliability for the underlying premises.

Q Okay. You've mentioned falsifiability. Can you explain what falsifiability is.

A I think I already have. It just basically means can you disprove in hypothesis or -- or a premise -- the standard format in the mainstream scientific community is that you don't actually establish a null hypothesis as what you're trying to prove.

You actually -- what you're trying to prove is typically the alternative hypothesis. So you actually go out of your way to try to falsify or disprove the null

hypothesis. And that has not been done in the community.

Q Okay. As it relates to the firearms and toolmarks, one of the things -- the concept we've talked about is the concept of uniqueness.

Okay. How does that relate to the concept of falsifiability as it relates to Ms. Skoglund's testimony that each firearm -- more specific in this case, each breech face coming off the assembly line is unique and individual? Is that hypothesis falsifiable? Testable?

A Okay. You're actually conflating two issues there. But the problem -- the main problem is the underlying theory cannot be falsified. Uniqueness, as we will shortly see, I believe, is a -- an illogical necessity. When an examiner opines an individualization, it's a logical necessity that the underlying premise is one of individualization -- is one of uniqueness.

The problem with falsifying the AFTE theory, one of numerous problems, I should say. But probably the most basic is that there is no access to ground truth.

There are two required premises, one is uniqueness and one is repeatability. And we -- I believe we'll talk about that shortly. But there has been no -- there's no access to ground truth because it is a purely subjective practice, one hundred percent subjective in opining individualization.

We'll -- I'll discuss that in a little more detail. The breech face issue is another metallurgic issue that's more pragmatic than we can discuss that --

Q Okay. What is the NAS?

A Probably -- probably the nation's most respected voice of the relevant scientific community. That's the National Academy of Sciences.

Q Okay. You have something entitled the NAS report. What is that report?

A Well, the two that would be most relevant to the case at bar would be the 2008 Ballistic Imaging Committee report, and the 2009 Strengthening Forensic Science in the United States, the path forward. That would be the 2009 committee report.

I'm sorry. Do you want me to explain -- the 2008 committee addressed ballistic imaging, and they made some poignant -- some rather significant observations with regard to forensic firearms identification practice and the opinions deriving therefrom.

And then the 2009 committee report rendered or offered opinions about some of the issues that we're dealing with today in the forensic firearms identification arena.

Q And are you familiar with each of those reports, sir?

A I'm sorry?

Q Are you familiar with each of those reports?

A Yes, correct.

Q How so?

A Extensive reviews and research of the -- the issues. And my colleagues with -- with whom I collaborate frequently were members of various committees.

Q Did the NAS reports reach a conclusion as it relates to the practice of forensic sciences. And more specifically, as it relates to the practice of firearm and toolmark examinations and identifications?

A There actually were four or five quite -- quite eye opening opinions. But the bottom line is, and I don't have them memorized, but the bottom line is there is no scientific basis whatsoever that has been demonstrated to support either the process of individualization or the exaggerated claims of individualization.

In other words, it's my opinion that this item was fired in this particular firearm platform or firearm to the exclusion of all others. They'd find that that is without scientific foundation and objectionable scientifically and legally in one of the committees.

Q Mentioned inductive and deductive reasoning.

A Yes.

Q Can you expound on that just a little bit more.

A I'm sorry?

Q Inductive and deductive reasoning analysis.

A Explain that.

Q The logic used within the firearms and toolmark examination field.

A That's a good question. Whenever an examiner -- an experimenter can sample the entire possible sample pool, one can then use appropriate -- scientifically and appropriately a process of deductive logic.

And as I explained in one of my congressional testimonies, the example I use, and I'm told they still use it today is one of -- let's say that one accepts that all Chevy Novas ever made were blue. And -- and at a crime scene, let's say a bombing, investigator recovers a nameplate that says "Chevy Nova." One can properly deduce or use inductive -- or deductive inferential processes that that vehicle was blue.

However, that's -- in the field of firearms/toolmarks that is an inappropriate process because it's not plausible or feasible that all possible samples in the sample pool can be tested. In that scenario and inductive inferential process or inductive logic process must be used.

But when that -- when a respondent or an experimenter is -- or an examiner is testing samples in the inductive empirical process, there is required in the

scientific committee that is inherently a probabilistic process, which means there must be a concomitant expression of scientifically supported expression of certainty and -- to a certain level of confidence. So there must be appended to in opinion some indicia of variability or error rate.

Q And then you next talk about that -- as it relates to inductive science -- unproven -- inductive hypothesis by simple enumeration. Explain what you mean by that.

A Yes. Scientists have known for decades, hundreds of years that it is impossible to prove an inductive hypothesis by simple enumeration or alternatively sample enumeration is the same thing for this case. And what that means is there is no combination of test samples that can actually allow a -- the framer of the hypothesis to prove the hypothesis to be true.

And an example of that was a rather graphic demonstrative in several of my colleagues' papers where they indicate, let's say, for example, that there are 100,000 guns in Seminole or Orange County, whatever. And that of those hundred thousand guns, there are one hundred pairs of guns that are virtually indistinguishable or easily conflated to an examiner.

And let's say now, for example, that a police department one hundred firearms identification experts, and each one of those one hundred examiners conducts ten

pairwise examples every day for the next ten days of his or her career. After 3.65 million comparisons there is still a ninety-three percent chance that none of the hundred pairs were -- relevant pairs were examined. That is a demonstrative example of the folly of trying to, quote, prove an inductive hypothesis by sample enumeration -- or simple enumeration.

That's probably the basic one of fifteen underlying flaws of all of these purported validation studies that we'll discuss shortly.

Q How does -- what role does statistics play in terms of these conclusions that are reached under firearms and toolmarks trade?

A It's critical. It's absolutely necessary. And that's what I was indicating a little bit ago when -- in one -- an experimenter is pursuing an inductive experiment request statistics is absolutely -- is required or at least a probabilistic statement.

Firearms examiners routinely reject that they use statistics in their practice, but they unknowingly do by making claims of individualization. And maybe the briefest sentence to show that is probability is -- probability scale is zero to one.

A probability of zero means it's an impossibility, cannot occur. A probability of one implies a certainty.

When an examiner opines an individualization, they are implying a certainty of one or a dead certainty -- I'm sorry, a -- a probability of one as a certainty, and that is unfounded in today's -- in the state as it already exists today.

Q Okay. In this case, Ms. Skoglund has testified that essentially these cartridge casings were fired from her sample of one. She is making an individualization. Is that scientifically supported, given the fact that she cannot tell the Court the number of, specifically Browning Hi-Power firearms that might have been manufactured? How does that relate to the statistics of individualization?

A Well, opining that cartridge cases were cycled or fired through a particular firearm is an expression of a certainty that is unfounded. In other words, there is no basis whatsoever. It's -- as I've indicated in my latest paper, it's pure speculation. There is no foundation for such a claim. And I would add that the U.S. Department of Justice has now recently adopted our position in that those claims are unfounded.

Q Okay. I believe we'll -- we'll supplement the record if we haven't already done so. But we talked about the characteristics used by firearms and toolmark for comparisons.

A I think we -- Ms. Skoglund has already covered

that area. Basically, it's striations and impressions are the characteristics upon which firearms examiners conduct their examination.

Q Okay. I'm going to touch on this. I was wondering if you could explain for the Court what the difference would be between class, subclass, and individual characteristics?

A Well, again, that's already been covered. But I think the salient point for our purposes here is the existence of subclass characteristics. We have considered that to be -- there's another nine hundred pound gorilla in the room. So I'll say the eight hundred pound gorilla in the room of firearms identification assertions that an examiner is in a position to be able to summarily dismiss characteristics as purportedly individual characteristics when, in fact, as I indicated -- have indicated in the public domain that -- my papers that the overwhelming number of characteristics generally present are, in fact, from the manufacturing process, that they have been mistaken for individual characteristics.

So -- and I would also point out that researching the literature in the domain for the field that the practice did not even acknowledge the existence of subclass characteristics until something like 1989.

So, in other words, examiners for the first sixty

or seventy years would screen or filter the samples by class characteristics. And then once they were satisfied class characteristics were consistent, they then presumed that all the characteristics at that point that they saw were purportedly individual characteristics.

It was only until about 1989 that they finally acknowledged the -- the phenomenon known as subclass carryover. And we still maintain to this day that this is the -- an eight hundred pound gorilla in the room for firearms identification.

Q Hypothetically, if you're shown photographs of -- we've talked about breech face impressions, are you able to distinguish between subclass and individual characteristics?

A Highly likely not, but there are certain traits if they're fairly uniform. And -- and let's say a metallurgist or production metallurgist would know what process was used to form that particular component, then that dramatically increases the basis by which he or she might say that this is from the end mill process in production.

So -- but it -- and it's well known in the -- in the domain literature for firearms/toolmarks that it is incumbent upon the examiner to know the specific manufacturing process it was used for a specific firearm component, and that examiners are -- are really remiss in opining an individualization without knowing what that

process was.

In fact, there are a number of jurisdictions that do not allow their examiners to opine an individualization if a firearm is not recovered, and that's the basis for that restriction. If a weapon hasn't been recovered, then the examiner is in no position to know what specific process was used to fabricate that breech face barrel, extractor, ejector, whatever.

So the salient issue on this slide is the center -- the subclass characteristics that derive from manufacturing. And those would be imparted to some unknown, possibly very large production lot.

And just as an example, I was working the bombing of Judge Robert Vance, the package bombs. I was able to track the shrapnel nails to Taiwan. And six months after the bomb went off, and who knows how long the shrapnel, the eight or ten penny nails were on the shelf before purchase or even in someone's home. But I was able to track down the -- the -- it's called a header bench in Taiwan. So here we're dealing with six plus -- who knows how many months later, there was still a dramatic numbers of subclass characteristics exhibited by the samples.

Q But one aspect, in order to make that determination between subclass and individual characteristics, one would have to know the manufacturing

process involved in creating that particular part?

A At an absolute minimum. But I would even now argue that because of the tribology regimes and their different regimes operated at any one time, this is another reason these purported ten gun validation studies are invalid or flawed is as a plant metallurgist, and I also knew that the lubrication regime may switch from boundary layer to fluid layer to elastohydrodynamic -- you have any problem with that word?

Okay. So even getting ten straight guns, may not be indicative of the eleventh gun or the twentieth gun may or may not show. So these ten guns may well not represent what they believe them to represent.

But the bottom line is on the subclass characteristics, with modern technology dramatically improving the materials used, generally would use tungsten carbide, which is some of the hardest substance known to man near diamond in hardness. They wear so very little as to be a very -- our goal as a production metallurgist was insure production continuity.

We don't want disruptions in production, so we strive to do what we can to increase production lot sizes. And those could be tens and hundreds of thousands if not millions of products, not necessarily guns, but whatever the product may be.

Q So, in other words, at the factory, the machining tool, the super-hard tungsten carbide is being used to -- to basically carve out, if you will, thousands, perhaps tens of thousands of breech faces, one right after the other?

A Yes. And that makes intuitive sense because you don't want the tooling to break down. You -- you -- so therefore, hardness is a pretty good indicator. It's not always dispositive. You want the fabricating tool to be significantly harder than the workpiece.

So -- and this is where the double-edged sword with regard to the second premise of repeatability that they presume in firearms practice, and that is, in other words, bullets fired today are going to be matchable to barrels ten years from now or five years from now. That's another of the double-edged sword on repeatability.

But bottom line is it's -- we all as plant metallurgist strive to keep the disparity between the fabricating tool and the workpieces as -- keep them as far as apart as possible in hardness.

Q Going back to -- to that premise and asking that question of Ms. Skoglund, the manufacturing tool, tungsten carbide, super-hard, under her theory is constantly changing, such that the tool, in this case breech face manufacturer, is unique each and every single one that's produced.

But then that softer metal product, the breech face, despite thousands -- tens of thousands, hundreds of thousands of repeated firings under high pressure ammunition never changes. That's, in essence, her theory. What would your position be on that?

A Well, it would be -- I would also echo my colleague Michael Saks's opinion that that's folklore that's been passed down through its unfounded. Clearly that it's a case of having -- trying to have your cake and eat it too from the repeatability to show that bullets compared at maybe some significant delta -- subsequent difference in time represent a firearm as it did during the -- the commission of the crime. But then to turn around and claim that the fabrication tool is changing so quickly that -- that every firearm coming off is just irrational from a metallurgical standpoint.

MR. CHANG: Excuse me. May I approach, Your Honor?

THE COURT: Sure.

MR. CHANG: May I approach the witness, Judge?

THE COURT: You may.

BY MR. CHANG:

Q Mr. Tobin, I hand you Defense Exhibit A for identification, just a representative sample, came from a slide from Ms. Skoglund's presentation. Using that just as

a hypothetical example, there are a number of horizontal parallel lines depicted in the photograph on the right. Would you agree, sir?

A Yes.

Q Okay. Would you characterize those as impressions imparted to the surface from the, quote, breech face?

A Could you ask the question again, please. Would I --

Q Would you characterize those lines as being representative of impressions from the breech face?

A They're consistent. They could be, yes.

Q Could be. We don't know what firearm or anything. I'm just asking you, are you able as a forensic metallurgist material scientists, would you be able to identify those lines as being individual or subclass characteristics?

A No. Not -- no. I -- and I would say that -- they're -- have a high likelihood of being subclass characteristics. But an examiner remote from the operation is in no position to be able to summarily dismiss the possibility of subclass carryover.

Q Why do you say that there's a high likelihood that those lines would be subclass characteristics created during the manufacturing process?

A Well, typically, use and abuse or incidental marks from service abuse, and that's not meaning intentional. It

just means service -- material deterioration in service is -- relatively, generally non uniform corrosion is typically -- let's say it's an autocatalytic -- autocatalytic process, that's a very non uniform process, as well.

So the service in an incidental abuse tends to be non uniform. The very uniform characteristics carry in particularly spatial relationships and -- and their relationship to each other are more often than not subclass from manufacture.

Q Are you familiar with tools utilized in this particular field? Comparison microscopes?

A Yes.

Q And have you ever used those before, sir?

A Oh, yes.

Q And, very briefly, in what capacity?

A As a forensic metallurgist. I would use it both as shown, for example, in the slide or in some situations I actually attach some interferometry, which is a different -- a more advanced scientific technique. But yes, I would use it both with and without the interferometry.

Q Okay. Let's talk about the AFTE Theory of Identification. As a scientists in the scientific community, you've had an opportunity to review the AFTE Theory of Identification. Can you read that? Do you have a

copy or should I bring one to you?

A No, no, no. I suppose --

MR. CHANG: Could we have a --

THE COURT: I'm showing what you marked as Defendant's Exhibit C.

THE WITNESS: Oh, I'm sorry. I have a copy, Your Honor. That would be -- well, I know it pretty much --

BY MR. CHANG:

Q What I'd like to do is kind of go through their definition of what constitutes sufficient agreement. And we talked about their -- their standards in terms of whether this is an objective or subjective definition. Can we -- can you take us through the AFTE Theory of Identification?

A Oh, yes. Unfortunately, this is a very busy slide, but it actually -- what I've done is highlighted -- and the colors aren't coming as they should have been -- but highlighted these very vague and ambiguous adjectives and nouns that are virtually meaningless in the true or mainstream scientific community.

This is one of numerous reasons why the AFTE theory is not a valid scientific protocol. The word "unique surface," now, the theory, let's look at the first sentence. It enables opinions of common origin to be made when the unique surface contours of toolmark -- two toolmarks are in sufficient agreement.

That alone is flawed on several levels. It contains what are known as fallacies of presumption, which are basically premises that presume -- I'm sorry. Yes. Premises that presume what they purport to prove. And this would be known as a potential petitio principii -- and that's P-E-T-I-T-I-O, then space, P-R-I-N-C-I-P-I-I. And that is assuming the initial claim, the fallacy of presumption by assuming the initial claim.

They're presuming to indicate that the surface contours are unique. That's a presumption. That has never been established.

Then the -- then moving on, what is sufficient agreement? What is sufficient to you would be insufficient to me or to anyone else. They typically tend to hide behind properly trained examiner, but as I point out -- or actually we point out in our latest paper, what's ironic about hiding behind the proper training is that proponents have actually exclude the -- the opinions of mainstream scientists because they're not trained to -- reportedly trained to recognize the very phenomenon that has never been proven to exist, and that's uniqueness. You cannot be trained to recognize uniqueness when you see it. It just doesn't happen.

So moving on here, this -- the entire theory of identification is rife with very subjective, vague, ambiguous terms as -- as -- as can be read. But the very

bottom, what we're indicating here is the frequently invoked training and experience. And as we point out, training and experience is patently unacceptable in the field of science as a basis for a theory or premise.

Q As a scientist working in the forensic metallurgist field, is sufficient agreement sufficient -- sufficient agreement quantifiable? In other words, can you put a percentage on it?

A That's a meaningless phrase in the scientific community. And the answer is, No.

Q Okay. Agreement is significant. Can you quantify "significant" in terms of a percentage, a number?

A Not outside the statistical arena. There is -- is are procedures for characterizing significance. It's called "p-values." But outside the statistical arena, no, not in the context here.

Q Similarly, can you quantify the term "practical impossibility"?

A No.

Q And even within the AFTE Theory of Identification, they do recognize that the interpretation of individualization is subjective?

A That's correct. They do acknowledge that it is subjective. Although, I would add that it's followed by and founded in scientific principles. The problem is no one has

ever explained what those purported scientific principles are. It's a good phrase, but it's so far not been shown to be valid.

Q You have -- in other words here, can you explain -- summarize what the AFTE Theory of Identification is here -- in other words, here. What are they -- what are they asked to do? What are they doing?

A Well, the overall summary is that they comprised one combination of fallacies of presumption. There's false dichotomy involved in it. There is -- there are other fallacies of presumption.

The bottom line is it's a meaningless protocol, if you will. And there is no science that accepts training and experience as a -- you know, basis for a -- a protocol. So this is not an acceptable scientific protocol.

Q Okay. Going back here under the theory of identification, it talks about where it exceeds the best known match or best known non match. Those comparisons really have to deal with the examiner's experience and having seen those matches, correct?

A Yes.

Q Okay. Go to your next slide. In other words, you're told to think back to your best matching non match if he can remember. Would that be a subjective or objective test?

A That's clearly a subjective test and requires what we point out to be superhuman recollections of -- of the most common geometric form and that's lines. And we -- even in the Brandon Mayfield matter blunder, that was -- a field of fingerprints. And there were examiners and that that was a very graphic demonstration of the various biases involved in practices of pattern matching identifications.

Two or three examiners were matching fingerprints in the Brandon Mayfield train bombing. I'm sure we -- everybody remembers it. If not, I'll explain it. And then a fourth examiner whose financial interests were actually contrary to those of the law enforcement community or the prosecutor actually even confirmed that it was, in fact, a match.

Well, it was subsequently found not to be a match. And if an error like that can occur in fingerprints, you have basically seven varied geometric patterns. So if a Brandon Mayfield type error can occur or exist in a field where you have the variety of seven quite different geometric patterns, the -- when we're now boiling down to matching the basically the most elementary geometric patterns, and that's lines, assuredly the vulnerability for error is significantly increased.

Q Okay. I understand that. And I want to, you know, go back to the theory of identification and the

requirement that Ms. Skoglund would have had to basically recollect a prior Browning Hi-Power cartridge impression. In this case she testified she has no recollection of that. But hypothetically, she had a recollection of a Browning Hi-Power.

She's trying to convey that to you another hypothetical firearms and toolmark examiner. If you had never seen a prior Browning Hi-Power impression, you would have no frame of reference in order to make a comparison that she made. Is that a fair assessment of -- of this theory?

A Well, again, we're conflating two issues here. But in her world, yes. That would be significant with regard to firearm components, which I don't -- that is not my domain or turf or comfort zone. However, we're now dealing with pattern recognition and we're now focused in a very subset world. And it almost doesn't matter from a pattern recognition adequacy what's the source of the pattern.

The fact is we're now focused on the geometric form of lines. So I can't really answer that. I -- I can on the firearm components, I would say that's a valid point on the components. But when we're talking about the lines, it almost doesn't matter whether it came from a Glock or a Smith & Wesson or a Sturm Ruger or whatever. We're -- we're

now at the level of five to forty X for magnifications where we're actually looking at the interspatial relationships of the lines.

Q Okay. Talk to me about Courts rejecting or limiting testimonies. Are you familiar with Courts that have, in fact, done so?

A Oh, yeah.

Q Can you explain to this Court why Courts have limited firearms and toolmarks examiners from offering opinions as Ms. Skoglund has in this case?

A Well, there are various reasons. One is they -- Courts that I recall have agreed that this is not a science. In fact, and one comment was, You can call it anything but a science. But generally, in the last trial I just came from in Atlanta, I actually, as I indicated to the Court, the most scientifically defensible opinion that can be rendered based on the state of the art that exists today is that, quote, in my opinion, and as I indicated to the Court, that's the first caveat that needs to be an opinion. And the jury needs to be aware that this is an opinion and it's not the CSI belief that this is gospel from the mount, if you will.

But in my opinion, this particular firearms cannot be eliminated as the source of these characteristics or in the alternative that characteristics exhibited are

consistent with having been fired from this particular firearm. And, in fact -- so that's what the Courts have chosen to do was not necessarily exclude but to limit. And several judges, one world famous is Nancy Gertner who teaches at the same university where I am a guest lecturer, as well, said that she tried her darnedest to -- but she knew that she would be reversed because this has been around for one hundred-plus years. The best she can do is to limit and not allow the examiner to imply to the jury that this is a science or that this is dispositive in any way. In other words, force the jurors to look at the case as whole and all look at all the evidence and not just to take the firearms examiner's testimony as dispositive.

Q Let's talk about some of the aspects of AFTE Theory of Identification. Are there articulated protocols for firearms and toolmark examiners that are affiliated with AFTE? These are an objective particular protocol?

A Well, now, the use of the word "protocol" is deceiving. It depends on who you ask. If you ask examiners in the firearms community, they call that a -- they call their SOPs protocols. But in the scientific community, there -- exists, there is no scientific protocol that allowed opinions of individualization. And that's probably the primary flaw in the practices that there are no protocol, which would consist of -- allows the two most

basic cornerstones of the scientific method, reproducibility and repeatability.

And what is A, parameters of detection to be defined. No protocol allows for that. And then even if one decide -- tries to define what the examiner is specifically looking for, in other words, what parameters of detection should be looked for, their second problem is that there are no rules of application of those parameters to define same -- or to discern same from different. And those are another reason that the AFTE Theory of Identification or any of these laboratory protocols don't constitute scientific protocols is they don't allow for the two most basic requirements of the scientific method, and that's reproducibility and repeatability.

Repeatability is the ability of the same examiner to obtain the results consistent with their earlier trials or -- as far as the outcome of experiment. Reproducibility is the trait that allows other experimenters to reproduce the results of another examiner's experiment.

Q Okay. You heard the testimony of Ms. Skoglund today when I was asking her about the areas that she zoned in on. Would those, quote, areas be repeatable and reproducible from one examiner to another?

A Well, I -- the only way I -- can't answer that. But the only way -- actually, the only way I can answer that

is to say that the field even acknowledges that the practice is subjective. So if you take -- for example, the characteristics or the indicia in the case at bar out to California, it's very possible that an examiner out there would find that it's not a match or not an individualization for several reasons. Not the least of which is the typically predominant out there is a process called CMS, consecutively matching stria, and that's a different criteria than is used on the East coast general.

But the bottom line is that's known in the field that you will get differences of opinion based on different, quote training and experience, and even different geographic regions because of the prevalence of certain weapons and in some regions more concentrated than others.

Q We've -- we've talked a little bit again with Ms. Skoglund and her overall assessment of the matching parallel lines and so on. You have a working hypothesis here. Can you tell the Court about your experiment and what this entails and the significance of that.

A Well, to -- for issues for example of firing pins, extractors, ejectors, there is a very small surface area upon which characteristics can be imparted. In some cases, very tiny, like a firing pin. So the working theory -- the hypothesis that I was working under is in a finite -- I'm sorry. In a very small surface area there is only a finite

number of, in this case, lines that one can impart on that very tiny surface. So -- and in many cases involved where the examiner used three characteristics or four or five to make a -- to claim a match. So my -- what I wanted to see was in a very small space what probability or -- of coincidental or random matches would occur.

So I asked my wife who works at Cracker Barrel, and she's on the retail side of Cracker Barrel. I said, Do me a favor and grab several hundred UPC symbols from different products. Make sure that no two products are represented in the bar code sheet. So she brought those home, and I randomly selected two different product UPCs.

I did ask her, Does Cracker Barrel include any marketing demographic information in the codes? And she assured me they do not. For example, when you buy a product at, let's say, Wal-Mart or Lowe's or something, when you take the product back, sometimes they can tell you that you bought it from that store or another store. But Cracker Barrel does not include that marketing information in their UPCs.

But to be scientifically accurate, what I did when I put them under a microscope, is I actually inverted one of the UPCs to moot out any marketing information that may have been included in case she was wrong. So what we're seeing on the screen here is a split screen image. And I'm

indicating the laser this line that goes straight down.

I've mated two UPCs up against each other in the microscope and decided to see if I could find what the chances of a random or coincidental matches would be. So in this case, realizing that in many cases, they only need three or four marked characteristics or five, I just randomly selected these and this is what I found, one, two, three, four arguably, we'll come back to that in a minute, five, six, arguable, seven arguable, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, and then these others are arguable. I say arguable because now that raises another issue, and that is of line quality.

At what level does an examiner decide for example in the characteristics that I'm looking at here, is this a match or is this a non match? Some examiners would say, No, this it too different than this, so I won't call it a match. Others will say, Yeah. It's a -- a match.

One of the difficulties, and even acknowledged by the National Academy of Science is that the variability from shot to shot is a immense, much more than examiners may acknowledge from the non scientific perspective, because charges in the -- in the cartridges are not uniform and there are various reason -- differences that can cause including thread material weight or bullet weight as you

were asking earlier.

But the bottom line is because of those variances, even items fired from the same firearm will have significant dissimilarities exhibited. So it's questionable -- here's another subjective assessment, is this a match or is this not a match? But the bottom line of all of this is there is a very likely chance of random matches of lines even in -- as is known in the community -- even with non matches -- known non matches.

Q Is there any literature defining either for firearms toolmark examiners or other scientists, are you able to discern between an individual or subclass characteristics?

A No. And that's another salient issue is, given the prevalence of the publications papers in the firearms field through the years why there hasn't been a single one that discusses to examiners how they're supposed to be able to tell the difference between subclass which comes from manufacturing and purportedly individual characteristics.

So that raises the question as I did, I believe either in my affidavit or in one of my papers, how are trainees -- train -- those training examiners behind closed doors, how are they able to communicate that information? And it's not -- there is no literature indicating to examiners how they're supposed to tell the difference

between subclass carryover from manufacturing and individual marks.

Q Talk to you about some of these subclasses, individual signs and problems that we have where bullets and cartridge cases fired from different weapons can and sometimes do have more matching marks than bullets fired from the same weapon explain to me that phenomena?

A Yes. I found that personally during all my years in the toolmarks arena. But some of the studies, and I think the one that comes to mind is Miller and Neal showed that fifty-two percent -- well, that's the -- I'll cover both sides. What experimenters find is that there's commonly or frequently more dissimilar characteristics in known -- in -- in bullets or cartridge cases being fired from a known weapon than there are in cases where they were fired from different weapons or conversely -- and in some studies, for example, I remember one showed twenty-one to twenty-six percent concordance in a particular study.

In other words, characteristics they found to be similar. But that implies that there were nearly eighty percent dissimilar characteristics in fire -- in items known to have been fired from the same firearm. And conversely, they find that -- some find -- and I think I have an example in here -- bullets or cartridge cases fired from different weapons can have a, quote, appalling number of similarities

when they're fired from different firearm platforms. And I have an example of that in this slide.

Q Talk to you about the -- the second portion of that. Federal databases have grown. No non matches appeared. Close to the stop of the catalyst and no matches. What's the source of that statement?

THE COURT: Hold -- hold that thought for a second. We need to switch out court reporters.

(Whereupon, direct examination of Mr. Tobin by Mr. Chang reported by Erin E. Leben resume and were reported by Chariti L. Colón as follows:)

BY MR. CHANG:

Q. Why don't you explain that second statement on that slide where it talked about as federal database have grown no known matches have appeared closer to the top of the candidate list for known matches.

What's the source of that statement?

A. That is the De Kinder study -- and that's D-E-K-I-N-D-E-R -- called the AB 1717 Study. And what they found -- and this is very intuitive. What they found is they would find that bullets or cartridge cases known to have been fired in a certain firearm, those images when the databased is inquired would appear generally in the top ten most likely candidates if there weren't a whole lot of entries in the database.

But what they found as more and more samples were entered into the database, the actual candidacy listing was degraded such that known platform -- known firearms didn't even appear in the top ten or fifteen once many more hundreds or thousands or whatever began to get entered into the database. So, in other words, even though superior to the known platform, the algorithm was finding better matches than the -- or more matches, more characteristics than the queried one, than the known firearm.

Q. So, in essence, this is, basically, the NIBIN database that we talked about with Ms. Skoglund. And, for example, as it relates to this case, the known cartridge that was uploaded on the NIBIN database, presumably since it was fired from that firearm as a test cartridge, should be number one?

A. Yes.

Q. But as the database grew, that number one, the known match, keeps on slipping down further and further down the list?

A. Yes.

Q. So the computer's basically spitting out better matches than the known actual match?

A. Yes. And there could be a number of scientific reasons for that, but yes.

Q. And what is this slide and what does it purport to

show?

A. This is a slide, and I'm indicating with the laser here, there's the split screen image for a comparison of two samples. This was a -- two cartridge cases with breechface marks published. And I have to look that one up. Yes, this is Rivera published that is presented to ask audiences does this look like an identification or an inconclusive or an elimination.

And, in fact, what the author indicates is that these cartridge cases were fired from two completely different firearms. And look at the overwhelming -- one is hard-pressed to find any dissimilarities in this particular -- and this has a substantial number of similarities in here.

And even the National Academy of Sciences has found in the -- other instances of where the characteristics are so similar as to be easily confused with each other. And I think I've referenced one of those in my latest papers as well.

Q. Is this a documented known nonmatch?

A. Yes.

Q. It's not very clear, but can you explain what the second half of that slide is?

A. It's pretty much the same. These are bullets, two bullets that here's the split line, split screen image. And

this is obvious. This is labeled. Those were fired from two different firearms, and it's labeled Barrel Five on the right and Barrel Six on the left. But look at the concordance -- extensive concordance of striations on both of those bullets. Those could be very easily characterized by an examiner as an individualization when, in fact, they were fired from two different weapons.

Q. Again, a documented known nonmatch?

A. Correct.

Q. Can you briefly tell the Court what the effect of technology had on the ability to duplicate, replicate parts such as in this case: Breechfaces?

A. Yes. I think I've already covered it, but, basically, it's that with technology advancing and courts have even recognized -- oops -- courts have even recognized that materials and processes have advanced such that larger and larger production lots are being made through the decades, and, in fact, that -- in other words, we're equating that to subclass characteristics. So that's one consideration.

And as I've pointed out earlier, as a plant metallurgist, we want to try to -- manufacturing occurs, and especially this day and age of CNC control -- computer-numerically-controlled processing, we're trying to control the processes such that the precise -- that the

exact sequence of events under the same pressures and forces and, if we can, tribology regimes occurs over and over and over throughout the process. So that's another facet that the field is -- or some of the authors have recognized.

And these are just various acknowledgments that the tools that are used in my industry to create firearms have become even more and more durable through the decades. And -- so in other words, these are three characteristics showing the consistency and the larger and larger production lots that are possible.

Q. I'd like to talk very briefly about validation studies. I know you authored a paper as it relates to these purported validation studies. Can you very briefly just touch on that? If we haven't already, we'll supplement the Court with that paper. Explain that in more detail.

A. You have or have not?

Q. I believe we have.

MR. CHANG: If we have not, we will, Judge.

BY MR. CHANG:

Q. But if you can just briefly summarize for the Court what these purported validation studies stand for. What's your conclusion based on your research?

A. Well, the overall conclusion is they're virtually worthless. You cannot validate -- in a scientific arena, you cannot validate a subjective practice, you just can't,

for some of the reasons that we've already discussed.

I've already pointed out there are no parameters of detection. It's a subjective process. There are no rules of evaluation. And the ultimate arbiter has to have access to ground truth which doesn't exist. And there is no scientifically acceptable probabilistic model allowing an examiner to say within a reasonable degree of certainty.

Q. And this would be the paper that you -- you authored?

A. I'm sorry. I'm sorry. You wanted the papers. So the first paper that we published actually hasn't come out yet, but it's been on-line since November. We actually analyzed these validation studies that the courts continually get flooded with or presented. And we take two of the most represented of the field.

We've reviewed almost all of the purported validation studies, if not all of them. And we took two as an example, and that was, basically, almost limited by the editors because of size. But -- and then we evaluate the very numerous flaws in these validation studies to include what we're looking here. And we don't -- I don't even have all of them in the slide. But they do not replicate casework. And, again, the -- most of these studies present to the respondent a deductive environment versus an inductive environment.

And the example I use in my latest paper is we're all probably familiar with Octomom. But let's say for the sake argument that one of eight octuplets is cloned and let's say that an examiner is presented with all eight possible sources and asked which of the these eight octuplets were cloned. We don't doubt or -- and I don't doubt that there would be a low, if not zero, rate of error in that environment because that is a deductive inference. The examiner can examine the entire possible sample pool and conclude, therefore, number three was cloned. We don't doubt that there would be a low error -- rate of error in that scenario. But that's not real world scenario.

In the firearms identification practice, it's an inductive fields where the examiner does not have access to the entire field. So let's say in my example scenario that an examiner in the first month is presented with the clone and maybe Octuplet Number Two and then three or four months later the examiner is presented with Octuplet Number Five and so forth. Assuredly, the rate of error would increase in that type of a setting. And then there are numerous others. The sample sizes are, basically, equivalent to grains of sand on the world's beaches.

Q. What are typical sample sizes in these studies that have been presented?

A. Well, ten when they're doing ten guns studies.

But even some -- as we point out, even this one that has impressive numbers of participants -- I think I saw a number 280 or whatever -- those are virtually meaningless because of the numerous flaws that exist in these various studies.

We find that examiners have unlimited time. The samples that are presented are in pristine condition. They don't -- that doesn't necessarily represent casework. In fact, most, if not many, if not most, are preexamined to ensure clarity of characteristics. And that's not -- doesn't occur in the real world.

So we, basically, indicate in our papers that the validation studies are -- and we do indicate that they're virtually irrelevant to any particular case at bar. And largely of the fifteen reasons or however many we have here, in large part because they don't -- they don't capture what they believe they're capturing or measure what they believe they're measuring. But not the least of which is the firearms tested are not those involved in a particular case and there may be different manufacturing processes used in those purported validation studies.

Q. Within the studies that you've reviewed, have you examined rates of errors in these purported studies?

A. Yes.

Q. Can you tell us very briefly about that?

A. We found in just a general overview that the

problem is most of those errors are blown off as one-offs. But what we're finding are rates of error from two point three percent to twenty-eight point two percent in these various studies.

And just say pick one in the middle somewhere, it was not -- it was recently found that the Detroit state crime lab -- I'm sorry, the Detroit -- the crime lab in the city of Detroit was exhibiting a -- I forgot -- ten percent or twenty percent rate of error. In fact, I may have it. Here it is. Ten percent rate of error. And that surely is an understatement, undercharacterization because it was conducted by other firearm examiners. But that was a minimum rate of error found in their operation.

And I think under notable it's interesting that some of the examples we cite, for example, statistically demonstrate the effect of the subjective practice. And in the case of *Trotter v. Missouri* -- I don't know if we still have it here -- but a police officer was killed and it was originally believed that he was shot with his own weapon because his weapon was missing and the slug recovered from his body was a .38, was the same caliber.

An examiner was submitted -- a suspect was arrested sometime later. And then his weapon was submitted to the crime lab. And the examiner test-fired that firearm, compared it to the bullet from the police officer, and

opined an individualization in that case and said that that was the firearm that killed the officer. So that case went to trial and I -- the defendant was found guilty.

At some subsequent time later, the officer's actual service firearm was recovered, was sent in to the laboratory, and from a statistical standpoint -- this is a perfect case of what we call blocking -- the very same examiner was given that firearm. He conducted a set of exams and comparisons and at that time decided that he liked that match better than the one he had already opined earlier at the earlier trial.

And the reason -- so in other words he change his specific source attribution or his opinion based on a match he found that he liked even better. In statistics that's known as blocking a random variable because that eliminates the possibility of a claim of difference of opinion between two different examiners. That's the case where the very same examiner decided that the second firearm was a better match than the first one.

Q. Mr. Tobin, you've had a chance to review the examiner's reports or bench notes and we've discussed the overall characterization of this feel, firearms and toolmark examination. As a scientist, do you have an opinion as to the overall reliability, reputability, testability of the field of firearms and toolmark examination and the ability

to attribute components to a specific firearm?

A. Yes.

Q. Long-winded question.

What is that opinion, sir?

A. It's the overall opinion -- I have a slide indicating the ratings on the various categories. But the overall opinion is that it is unfounded, it is not scientifically -- the practice is not a science, it has -- for numerous reasons, and that opinions of individualization -- I can concur with my colleagues -- is a fallacy and is not supported by mainstream or true science.

Q. This the slide you're referring to?

A. Yes.

Q. We kind of got through that briefly with you.

A. Yes.

Q. Reliable facts or data, you rate that with a zero. And what's your scale?

A. Zero -- well, it's not a continuum. It's zero -- in this case zero, a half, or one.

Q. Okay. Reliable facts or data, does -- is there a database that exists within the field of firearms toolmark examination?

A. No. And, in fact, the statement I would make is there are no meaningful or comprehensive data that would support the theory of identification.

Q. Reliable principles and methods. We talked about the AFTE theory of identification. Is that the principle and method upon which they purport to make these comparisons?

A. Yes.

Q. Is that an objective or subjective --

A. That's --

Q. -- definition?

A. It's subjective.

Q. Witness application of reliable principles and methods. You heard Ms. Skoglund testify. Did she reliably apply the principles and methods as it relates to the facts and the exhibits in this case?

A. Well, by logical necessity, one cannot apply reliable principles when the principles and methods haven't been shown to be reliable. So that gets a zero as well.

Q. Testability?

A. It's a testable practice that has never been meaningful or comprehensively tested in large part because there's no access to ground truth.

Q. Okay. And you gave existence of established error rating zero. Why?

A. There had been no meaningful or comprehensive study establishing a domain-wide practice error rate.

Q. Acceptance in a relevant scientific community?

A. I actually probably should have given this a half, but it's virtually unanimously rejected in the mainstream scientific community of my colleagues and scientists from whom I've discussed it or read their papers or discussed the issues.

Q. Okay. And you gave peer review a point five. Why?

A. I did. And that's even being generous, so maybe that will offset the -- but the bottom line is it's not an established scientifically valid process of peer review because of the inherit biases in an insular review process.

MR. CHANG: Okay. Thank you, sir.

Thank you, Your Honor.

THE COURT: All right. State.

MS. VALENTINI: May I inquire?

THE COURT: Sure.

CROSS-EXAMINATION

BY MS. VALENTINI:

Q. Good afternoon, sir.

A. Good afternoon.

Q. I apologize in advance if I kind of go a little out of order. There's a lot of notes here so I apologize in advance for that.

THE COURT: Will you be using the overhead at all?

MS. VALENTINI: I will not, sir.

THE COURT: Will you need that again?

MR. CHANG: No, sir.

THE COURT: All right. Let's go ahead and turn it off then.

Counsel approach for a minute.

(Whereupon, a bench conference was had.)

THE COURT: Mr. Richardson needs to use the restroom, so we're going to take a five-minute break while we get him out of there for that.

MS. VALENTINI: Yes, sir.

THE COURT: Mr. Richardson, they're sending somebody up here right now. Okay?

You can take a break while the defendant uses the facilities here.

THE WITNESS: Right now?

THE COURT: You can step down.

THE WITNESS: Thank you.

THE COURT: We'll go ahead and take a break now, folks. So five or ten minutes by time we get him out back and in here. So in the meantime while we're doing that break, let me see the attorneys on the Jimmie Lee Blake case, please.

(Whereupon, the Court considered other matters. After which, the proceedings resumed as follows:)

MR. CHANG: Judge, very briefly, Defense is

offering Defense Exhibit C which is the hard copy of the presentation.

THE COURT: Okay.

And come on back up here and have a seat in the witness box.

And, Ms. Valentini, you know what, considering your previous objections, any other objections to admission of this demonstrative evidence?

MS. VALENTINI: I believe ours has been admitted as well.

THE COURT: It was.

MS. VALENTINI: It was? I thought it was. Grace is shaking her head no.

THE COURT: I accepted it and admitted. Well, I didn't necessarily look over at Grace and say put a sticker on it.

MS. VALENTINI: She runs the show sometimes.

THE COURT: I'm going to go ahead and admit Defense Exhibit A now as Defense next. Thank you.

All right. Ms. Valentini, you may proceed.

MS. VALENTINI: Thank you, Your Honor.

CROSS-EXAMINATION (CONT'D)

BY MS. VALENTINI:

Q. Good afternoon, sir.

A. Good afternoon.

Q. Sir, can you tell me how you are currently employed?

A. I'm a metallurgical -- forensic metallurgy and material scientist consultant.

Q. I'm sorry. That door opening and closing, I have a hard time hearing.

A. So do I.

Q. So if you could say it one more time for me.

A. I'm a forensic metallurgist material scientist consultant.

Q. So you make your living as a consultant?

A. Yes.

Q. And you said metallurgist forensic consultant. You are not a firearms toolmark identification consultant?

A. Well, it depends on the issues, yes.

Q. So how often do you testify about what you testified to today?

A. That's a good question. I've testified four times in the last year, and I believe two or three might have been the scientific methodology or lack thereof of firearms identification practice, yes.

Q. Okay. So how much money did you make testifying in regard to firearm and toolmark identification?

A. I don't break it down by that category.

Q. Okay. How much money are you being paid for your

work in this particular case in State of Florida versus Richardson?

THE COURT: Ms. Valentini, I don't care if he's paid a dollar or a million dollars. It doesn't matter. It's not a civil case. It has no impact on me on credibility issues. If you want to bring it out in front of a jury another time, that's fine.

THE WITNESS: It was closer to your first guess, Your Honor.

THE COURT: Go ahead and tell her. Go ahead and tell her. If we're going to sit there, let's go ahead and tell her. If you know, how much are you being paid for this?

THE WITNESS: Oh, I'm sorry. My nominal fee is two ninety-five an hour, but I'm working for two individuals that I think who could sell refrigerators to Eskimos. So the last calculation was sixty-some dollars, but it's declining as we sit here.

BY MS. VALENTINI:

Q. Sir, isn't it true you were paid five thousand dollars for your work in this case?

A. No.

Q. Okay.

A. Not even.

Q. The reason why I ask you that -- the reason I ask

you that question is you had made a comment when Counsel was talking to you on direct with regard to the Association of Firearm and Toolmark Examiners and how those were people that had -- fifty percent of their salary had to be in that area to become members.

Is that what you said?

A. Yes. One of my colleagues either said fifty or fifty-five. I don't remember.

Q. So you have no independent knowledge of that yourself?

A. No, not independent knowledge.

Q. Sir, you used the term right off the get-go, and it kind of gave me some pause, that you were talking about a mainstream scientific community.

What is your definition of the mainstream scientific community?

A. Those would be true scientists who adhere to the scientific method and use scientific protocols in their daily practice.

Q. Well, who are they? Who are they as it relates to firearm and toolmark identification?

A. Well, that's part of the issue as firearms and toolmark identification is not a science. So my colleagues are professors in various sciences and various law, heads of departments in statistics who have studied the field of

firearms identification.

Q. What are their names? Who are they?

A. I mentioned them in my affidavit. I don't memorize them. David Faigman is one, Dr. William C. Thompson is another, Michael Saks is another, Michael Reisinger is another, and Professor Pradip Sheth. I don't memorize my address book.

Q. It's a handful of people?

A. Yes.

Q. So you're describing about ten people that are in this field that don't believe that firearm and toolmark identification is a science?

A. That's correct. Actually, a better way to characterize it is to say that I am unaware of any scientist in a mainstream scientific community or true scientific community who accepts the practice of individualization.

Q. Of these ten people?

A. No. I'm making a statement that even though that I don't remember specifically as I sit here my address book not a single individual with whom I've collaborated or coauthored or discussed these issues accepts the practice of individualization. In fact, some have even written that it's a fallacy.

Q. Sir, isn't it true that the United States Supreme Court says that firearm and toolmark identification is, in

fact, a science and an accepted methodology?

A. Well, that's a two-prong statement so -- and I would refer back to 1923. The DC -- actually, the basis of the Frye standard was that the court acknowledged that the courtroom is not a laboratory. So they attempt -- at the time, they deferred to --

That's where the concept of acceptance in the relevant scientific community arose because they said we are not equipped to assess science as a scientist would so we're going to defer to the relevant scientific -- well, actually, Frye didn't say relevant, didn't say scientific, and didn't say community, but basically said to the field in which it belongs.

Q. Sir, isn't it true in the *United States vs. Hicks* case, United States Supreme Court has accepted under the Daubert standard that firearm and toolmark identification is well-accepted in the scientific community?

A. That may be said, but that doesn't make it so. They're not scientist. And, in fact, there have been numerous cases that don't reflect the opinions of scientist.

Q. Sir --

A. That's a legal opinion.

Q. Sorry. I didn't mean to interrupt you.

Sir, please name one case in the United States of America that has excluded in its entirety testimony with

regard -- and has not accepted testimony with regard to firearm and toolmark identification.

A. Sure. I'm not aware of any. I think St. Gerard may have come close, but I'd have to research that. As I sit here, I'm not aware of any that have totally excluded.

Q. So isn't it true that this field has been well-accepted in the scientific community and has been accepted by every court in the United States and has never been excluded?

A. No, that's not true.

Q. It's never been excluded by any court?

A. No, that's a bifurcated -- that's a compound proposition you're presenting to me. It's never been excluded in the legal arena, but that's a legal opinion. It's not accepted in the scientific community. You actually conflated both of those in the same question.

Q. And you are defining your mainstream scientific community as these ten or so people?

A. No. I'm defining my -- the mainstream scientific community as did *U.S. v. Porter* in 1992.

Q. So it's your subjective opinion that this is not accepted in the scientific community?

A. It's my opinion that it is not accepted in the scientific community. And I'll characterize that by saying I do not know of any distinguished or otherwise scientist

who accepts the process of individualization as it is practiced today.

Q. Is Adina Schwartz one of your colleagues?

A. Yes.

Q. And isn't it true that she has been forbidden from testifying in courts because of her testimony in this theory?

THE COURT: Not this court.

MS. VALENTINI: Not this court. Not this court.

THE COURT: Be careful how we phrase it.

MS. VALENTINI: Yeah. I certainly didn't mean to insinuate that, Your Honor.

BY MS. VALENTINI:

Q. Isn't that true?

A. Well, I would take issue with your strong words "forbidden." She has been rejected in several forums because she's not practiced in the forensic arena. And I think in one case they said she's never fired a firearm. But she's a Ph.D. in philosophy of science, and her principles and her position is quite consistent with that of the -- in the scientific community. But it's correct she has been rejected on a number of occasions.

Q. And speaking of qualifications, sir, you have never worked in any capacity in the area of firearm or toolmark identification, have you?

A. Yes, I have. I've already testified to that.
Q. Okay. Define the toolmark identification arena that you have practiced in.
A. That's the umbrella for firearms identification, but it's basically where two metal are interacting with each other and imparting a characteristics of the tribological transfer, which I did probably -- as I've indicated, probably minimally once a week during my entire career.
Q. You're talking about over at the FBI, correct?
A. Yes. And subsequently, yes.
Q. Sir, have you ever been qualified as a firearms examiner?
A. No.
Q. Have you ever been a firearms examiner?
A. How would you define firearms examiner there?
Q. Have you ever used a comparison microscope to compare shell casings or cartridge casings that have been fired from one firearm or been fired at all?
A. Yes.
Q. Where?
A. In those cases where I was asked to provide assistance to firearms examiners, yes.
Q. Well, the assistance that you were asked to provide, that wasn't as far as analysis. That had to do with metal, did it not?

A. I don't know how you separate -- you're going to have to rephrase the question.

Q. You weren't examining those bullets or shell casings for any of the marks on them, you were examining for maybe the metal at best?

A. Oh, no. All of the above.

Q. Well, that's interesting because, sir, haven't you qualified before that you've never -- you've never done any kind of firearm or toolmark examination?

A. No, not without qualification, no.

Let me help you get to where I think you're going. You asked me if I've ever done those exams. Yes. Was I ever the principal examiner where I issued a report on a claimed match or nonclaimed match in firearms identification? The answer is "no."

Does that save you some time there?

Q. Tell me what you did.

A. Well, it depends on the case.

Q. Give me an example. In your once a week time that you said firearm examiners from the FBI came to you and asked for your opinion, what were they asking your opinion on?

A. They were asking me to assess the tribology of the characteristics that were exhibited, what they could be from, how they might have been generated, or why they were

not behaving in a manner that they thought they should be or vice versa, why they weren't seeing what they expected to see on the screen.

Q. All related to the metal?

A. I don't know how to separate. It's all metal. The metal substrate and it's metal behavior and material flow that creates these various indicia for examination.

Q. So you're not a qualified bullet lead examiner?

A. What do you mean by -- I don't know what you mean by "qualified." I did not hang a shingle out. I didn't do bullet lead examinations as the examiners in the -- that particular unit did, no.

Q. You're not a certified firearms examiner?

A. That's correct.

Q. You've never undergone any firearm training by any firearm practitioners?

A. Well, that's not true.

Q. What firearm training have you gone through?

A. We had to qualify every three months in my career. So we had received firearm training every four months for --

Q. I'm sorry. I'm not --

A. -- sorry -- every three months.

Q. -- talking about firearms training. I'm mean firearms toolmark examination training. I'm sorry.

A. Okay. That's a different issue then.

Q. I'm sorry.
A. That's correct.
Q. I'm sorry. I didn't mean -- my notes. Sorry about that.
Have you ever gone through any blind testing regarding identifying shell casings being linked to a particular firearm?
A. Nope.
Q. Have you ever had any kind of proficiency testing with regard to firearm or toolmark identification?
A. No.
Q. And you certainly don't hold yourself out to be an expert at all in firearm identification, do you?
A. That's correct.
Q. And the consultation that you mentioned with firearm analysts at the FBI, that was regarding why metal was behaving a certain way; isn't that true?
A. Well, that's what firearms identification examiners do is examine the reaction -- the results of stress -- applications of stress during the cycling of a firearm. So that's what I would do when they asked me to help them.
Q. You've never made any shell casing comparisons while you were with the FBI or otherwise?
A. That's not true either.

Q. Okay. Tell me about any shell casing comparisons that you've made when you were at the FBI.

A. Well, it's the same issues that we're talking about. Would these be -- would these be comparable? For example, sometimes the -- what's critical is the alloy particularly, let's say, in the primer cup.

And when I was consulting for the ammunition industry, I would examine hundreds or thousands of cartridges in tortious cases. So I can't -- you're putting -- trying to cubbyhole and put blankets, and I'm trying to be -- cooperate, but I can't agree to all of your generalizations, so.

Q. You didn't do comparisons? That was my question. If I didn't say that, I apologize. But I'm pretty sure I said you've never made shell casing comparisons.

A. That's not true either because they would actually show me a test-fire and maybe a question sample. So I can't say that I've not done that either.

Q. What training have you had that has dealt specifically with the discipline of firearms and toolmark identification?

A. How would you define firearms identification?

Q. Sir, did you hear -- Mr. Tobin, you sat through, you testified about toolmark -- firearm and toolmark identification yourself.

A. Well, here's the problem I'm having is and I've indicated it in my affidavit: The most appropriate true scientific discipline dealing with these firearms issues is that of metallurgy and material science.

And I outline in the affidavit all the way from extraction of the ore, all the way into service usage that the science and principles involved in material science and metallurgy is the most relevant science to deal with all these issue of interactions with each other.

Now, the actual identification part -- you know, in other words, if I was asked in my opinion is this a claimed match or is this not a claimed match, I would not opine or render opinions that this would be a match suitable to claim that it came from this weapon. I never did that.

Q. So you've never looked at the microscope and compared different bullets or shell casings to determine individual class characteristics or subclass characteristics and have done no testing in that field?

A. I'm going to give you some literary license and say "no." In large part because I don't agree with the process of individualization.

Q. So you've never done that?

A. With firearms that's correct.

Q. In speaking -- and again I apologize for jumping back and forth. I'm just kind of going with some of the

answers were they may lead me.

Speaking of your affidavit, the affidavit that you provided that is part of the defense motion in limine to exclude or limit the State's proposed expert testimony, sir, other than section C of that, that is the same affidavit that you use in every case that you may consult with; is that correct?

A. That's too general. I can't agree with that. I don't try to reinvent the wheel at a consideration to clients and courts so that I don't keep running costs up. I try to be very cost effective or focused. So I will take the general framework because I've created an overview summary.

In fact, my colleague Michael Reisinger wanted to publish it as a paper. But -- and then I try to -- try to -- what's the word -- customize it to a particular case. So I will modify the general framework, but many of the paragraphs are quite similar if not identical.

Q. And you've never examined any of the evidence in this case?

A. Is that a question?

Q. Yes, sir.

A. No.

Q. You've never compared any of the shell casings or the firearm, never even seen that firearm, have you?

A. No.

Q. And in your affidavit, you mentioned that individualization and forensic firearm toolmark practice is rejected by unanimous consensus of my colleagues and collaborator. There's no court that has accepted this, is that true -- isn't that true? Excuse me.

A. What is "this"?

Q. Isn't it true your -- your statement in your affidavit says individualization of forensic firearm toolmark practice is rejected by unanimous consensus of my colleagues and collaborators most with scientific backgrounds or specializing in forensic science from whom I frequently or periodically interact.

That's your opinion?

A. Yes.

Q. And the opinion of these -- your colleagues, correct?

A. Yes. Quoted with permission, yes.

Q. Sure. There's been no court that has accepted what you and your colleagues have said with regard to firearm and toolmark identification?

A. Well, no, that's not true either. Now, what that was primarily for were the Frye considerations of general acceptance. And as one of my friends and colleagues who was -- wrote the majority opinion in the Fourth Circuit of

the *Blackwell v. Wyeth*, Justice Battaglia, pointed out that under a Frye regime the very existence of controversy is per se adequate to show that it's not accepted in the relevant scientific community. So my purpose there was to indicate that there is significant controversy. Whether I have five scientific or legal friends or a thousand is almost a moot issue.

Q. What studies or research exercises have you participated in which involved looking at toolmarks known to have been produced by the same and different tools?

A. Would you -- I need the first part of that question again.

Q. Sure. What studies or research exercises have you participated in which involved looking at toolmarks known to have been produced by the same or different tools?

A. I'll try to get to where I think you're going and save you a lot of time. None published, but I've done massive numbers when I was a plant metallurgist. I've done it at the FBI laboratory with colleague for various reasons. But we did not publish any papers on that if that's where you're going.

Q. And you've done no studies on firearms and toolmark identifications in that same area, have you?

A. Well, in the way you're using firearms identification, no.

Q. Have you ever participated in any proficiency test to test your own proficiency in terms of firearm and toolmark identification?

A. No. I don't hold myself out to be an examiner in firearms identification.

Q. And you've already said you're not a member of the Association of Firearm and Toolmark Examiners, correct?

A. That's correct.

Q. Why not?

A. My time is so limited I do not have time to participate in activities or membership in nonscientific entities. Other than my Marine Corp. association, all my other affiliations are in scientific endeavor.

Q. What are those other affiliations?

A. I'd have to look at my CV, but basically the National Association of Corrosion Engineers, the Society for Experimental Mechanics, the National Association of --

May I review my -- look at my CV?

Q. Sure.

The only trade association that you're associated with is the 1st Marine Division; is that correct?

A. Yes.

THE COURT: Counsel, approach please.

THE WITNESS: But the others in answer to your question: The American Society for Metals, National

Association of Corrosion Engineers.

(Whereupon, a bench conference was had.)

THE COURT: Anyone with a bronze star -- anyone with a bronze star would be valor, please tread lightly with what you're saying about his military association. I'm just asking you to do that, please.

MS. VALENTINI: Well, I wasn't --

THE COURT: I'm just asking.

MS. VALENTINI: That's what he's a member of and I acknowledged and recognized that.

THE COURT: Okay. I understand. Just be careful.

MS. VALENTINI: That's why I was careful to say that one out loud because I know he is.

THE COURT: All right. Thank you.

(The proceedings resumed in open court.)

THE COURT: All right. You may proceed.

THE WITNESS: Did you want me to finish answering?

BY MS. VALENTINI:

Q. Yes, sir.

A. To go down the list, the Society for Experimental Mechanics; National Association of Corrosion Engineers; the American Society for Testing and Materials; the American Society for Metals International; The Minerals, Metals & Materials Society; the National Fire Protection Association; the International Metallographic Society; and the American

Foundry Society; along with the 1st Marine Division Association.

Q. Now, when we were talking when you were on direct examination and were talking about the Association of Firearm and Toolmark Examiners, you said that the journal is not accessible to you. Is that what you said?

A. I didn't say it that way, but I'll need to know where you're going whether to give you a literary license. I have to jump through -- well, it's not directly acceptable to me, that's correct.

Q. Well, you have to go to the Internet and go to their website?

A. No.

Q. Sir, isn't it true that to get a journal -- the AFTE Journal is available to anyone at their website?

A. It may be only very recently. But I have to go through colleagues, and I've had colleagues -- other colleagues who tried to even get some of their papers and they were declined because they weren't members. So if that is, in fact, true, it would have been within the last months if not year or so. So the archives are not available.

Q. But you've had access to the journals from AFTE, have you not?

A. Yes, I've had access -- indirect access, yes.

Q. Well, you've had them and you've reviewed them?

A. Oh, yes. I'm sorry.

Q. Because earlier you said that there were no research papers with regard to this area when, in fact, there are many research papers in this field; is that not correct?

A. No, you're mischaracterizing. I've indicated -- I've not addressed the plethora or lack thereof, or the volume or number of papers within the AFTE Journal. What I'm addressing are papers that are in publically available or readily accessible in the public domain.

Q. Well, anyone can get a journal article from AFTE? You have to go to the website, and you get it?

A. I don't know that that's true, but it might be. If it is, it's within the last very relatively short period of time.

Q. But nevertheless, they exist?

A. I'll have to accept your representation. That's not been my experience or that of my colleagues.

Q. So it's your position that there are not journal articles published by AFTE with regard to firearm and toolmark identification?

A. No, that's not my position. Again, you're mischaracterizing it. The overwhelming majority have been published in the AFTE Journal. Now, there are -- have been some in the FSI, the Forensic Science International, and

some others. But they still don't represent what experimenters believe they represent for various reasons.

Q. Isn't it true that all those research papers are subject to peer review by at least three different people from AFTE?

A. That may be true, yes.

Q. And, sir, isn't it true that the AFTE Journal is, in fact, indexed?

A. No, it is not indexed.

Q. On what basis are you -- do you say it is not indexed?

First of all, you're not a member, right?

A. That's correct.

Q. So what is your grounds for saying it is not indexed?

A. My colleague and coauthor has indicated -- and that's Doctor -- Professor Clifford Spiegelman, who's a distinguished professor of statistics at Texas A & M, has made several inquiries and found that it is not an indexed journal. And there are reasons why it wouldn't be indexed.

Q. Okay. So it's your -- you are relying on what somebody else has said to say that it's not indexed. You yourself have not contacted AFTE or have not made any efforts on your own to verify that it's not indexed?

A. That's correct. And I would also have to suspect

because I have other scholars or academicians who -- in fact, just one this week from University of California at Irvine --

Q. Again --

A. -- asked me for access to papers because he couldn't get them.

Q. Again, you have not yourself verified that AFTE is not indexed?

A. That's correct.

Q. The publications that you have -- do you have any publications that deal specifically with firearm and toolmark identification?

A. Yes.

Q. Which one?

A. Toolmark. Actually -- I'm sorry. Well, actually, both: Firearms and toolmarks identification.

Q. Okay. And which publication are you talking about?

A. The very first. When I was in the Bureau, Mr. J. Edgar Hoover did not condone agents writing papers, so there was a large span of years. And subsequent directors wouldn't allow us to publish. But my first paper that finally was published was one on toolmarks of -- was on toolmarks. And then my latest two papers are on the practice of firearms identification addressing both the

validation studies and proficiency testing processes and the practice of firearms identification as a whole.

Q. Okay. So you didn't do any of the statistical analysis in any of those papers, correct?

A. I need a second to think about that because my coauthoring one was a distinguished professor in statistics, and then the paper -- oh, I'm sorry. Make that four. Well, in one, we won the 2008 statistics and chemistry. So that would have been with chemistry -- I mean with statisticians.

I do some, but I would not have been the source of whatever was in the paper. We either cross-check each other's work or I'll say let's look at the probabilities or binomial distributions for this and that. But in answer to your question, I would handle the metallurgy material science issues generally, but statistics is an overlapping discipline in my field.

Q. Well, you're not a statistician?

A. No.

Q. And the answer is in those studies or those papers, you did nothing with regard to this statistics?

A. I wouldn't say I did nothing. I mean, that's too stark a characterization. I wasn't responsible for doing whatever we published with regard to the statistical implications.

Q. The article -- the most recent articles that you

have participated in, those are simply a critical evaluation of other people's studies in the area of firearms analysis, are they not?

A. Primarily. I don't know exclusively, but primarily yes.

Q. So in other words, you took a bunch of people's work product and studied, and then you critiqued them the way they did their study?

A. Primarily, yes.

Q. Your papers were not peer-reviewed by anyone in the field of firearms or toolmark identification?

A. I can't say that. In fact, I believe one of them might have been. If I could explain the process of referring, we don't know who they are. And, in fact, that's a major component of the -- of the publishing in scientific journals. The referring process involves complete total anonymity.

And that process basically is the paper is submitted to the editor, the editor redacts the author's name, it's submitted to typically three scientists, they critique the paper, send their critique back to the editor, and the editor redacts their name, and then the critique is submitted to the author for editing or acceptance or rejection. We're not allowed to know who the -- who the referees were.

Q. I want to go back to toolmark identification.

A. I'm sorry. If you want me to elaborate on that latter one where there's a possibility of -- okay.

Q. No, thank you.

Can you please define what is toolmark identification?

A. Well, as I -- I don't use that term. So I'm out of my element because I don't use the term. But I would say evaluation of characteristics to see if there might be an association between a tool and a workpiece.

Q. So you can't identify -- you can't define toolmark identification because you don't use that term?

A. I think that would vary with whether you're using it or a forensic examiner is using it or I'm using it. But I don't generally use that term.

Q. Can you ID what tool made a particular mark?

A. No, that's actually at the heart of our objection.

Q. Would you agree --

A. Well, I'm sorry, if I could take that back. If I knew that there were only two or three available and these are the only possible choices and it's a logical necessity that it has to one of them, I might in that circumstance.

Q. Would you agree that it takes specialized training and experience to do that?

A. To do what?

Q. To ID what tool made a particular mark.

A. I can't answer that. I don't -- what we're discussing here with regard to pattern recognition almost falls within a lay purview. It's common sense. It's -- and the way it's practiced, I would disagree that there was much training required to. . .

Q. Well, let me ask you this, sir: Would someone without training and experience be able to express competent opinion on metallurgy research?

A. No.

Q. Then how can you express an opinion on firearm and toolmark identification when you're not trained in that field?

A. You're now conflating issues again. I do not hang myself out to be a firearms identification. I am not qualified to address the nomenclature or various part, how they may or may not function unless it's described to me in a specific scenario. That's firearms identification. Whether an item functions as it designates, I don't do that as a routine exam.

But the actual pattern matching of lining bar codes, for example, that's pretty common sense, that's logical. And there are going to be disagreements, and that's part of our issue. There are no objective criteria by which to claim whether these are, in fact, associated or

not. So it's up to the individual person. And that probably ranges all the way from the lay observer to a forensic examiner.

Q. Sir, but wouldn't you agree that somebody who doesn't have any training or experience would not be able to express an opinion over somebody that has training and experience?

A. In a subjective field, no, I wouldn't agree with it. For example, we could put my UPC symbol up there, I could ask you does that look like a match?

Q. Respectfully, we're not talking about UPC codes, right?

A. Well, we're talking pattern matching recognition. I've tried to separate that --

Q. Well, let me --

A. -- compound sentence from firearms identification, which they have a wider range of duties than simply pattern matching.

Q. Let's -- can we -- let me talk a little bit about this subjective argument that you're making. It's your position that the field of firearm and toolmark identification is completely subjective?

Is that your argument?

A. No, that's not my argument. Again, you're conflating the duties involved in a forensic examiner being

a firearms identification expert, and that is not what I do. Now, if you want to focus the questions on pattern matching that's done in DNA, that's done in fingerprints, that's done in firearms, then that's a different issue. But. . .

Q. Sir, we're -- I'm sorry. We are here with regard to -- we have a member of AFTE who is a member of the Florida Department of Law Enforcement who tested three shell casings and compared those three shell casings to test-fire shell casings from a firearm, right? So she is a firearm and toolmark examiner, correct?

A. Yes.

Q. And that's -- that is what you are here today saying is a subjective field. But now I'm confused because I'm thinking you're not thinking it's as subjective as you thought you said.

So are you saying it's a subjective field or are you saying it's not?

A. You're now trying to get me to characterize the whole field, and I'm only trying to have a focus on the act of pattern matching and then claiming an individualization. That is purely subjective. All the other duties associated with a firearms identification examiner, as they call it, I don't address those issues, I don't make any -- take any position or claim that it's subjective, objective. I don't even address those.

Q. So maybe this helps it. Observations are objective, right? The observations that a firearm and toolmark examiner make, observations are objective, they can be measured and they can be repeated, right?

A. No, I would not allow that generalization to be made.

Q. Sir, isn't it true that all science has a subjective component, all science has a subjective component?

A. To some degree maybe from half percent, one percent. But there is no science that allows one hundred percent subjectivity. And I would point out, too, that observational studies -- for example, you might, under your categorization of observations, maybe an observation that this is a match, you might have considered in your characterization of observations being objective. But that's why I can't go along with your characterization that all observations are objective. And I would also point out that observational studies had the least predictive power to a population.

Q. Sir, what I'm asking you --

A. Sure.

Q. -- would you not agree that all science, all science has a subjective component? I'm not saying it's a hundred percent. But all science has a subjective

component?

A. Given that we're dealing with a continuum of zero to a hundred percent, we could be dealing with ten to the minus ninth subjectivity. I'll agree that probably all scientific endeavor has some element of subjectivity.

Q. What do you think about a doctor? You go to the doctor because you have a cold, right? And the doctor makes a diagnosis based on these objective symptoms, right? Some of that is his subjective observations of those symptoms, correct?

A. Sure, yes. But I would even caution you characterizing the symptoms that are presented as all objective because some of them can by psychosomatic or subjective assessments that do not in reality exist.

I'm trying to give you some literary license to help you get to where you wan to go.

Q. Well, sir, I appreciate that, but I would just appreciate it if you would just answer the questions.

A. Well, I can't as you're phrasing them, so.

Q. Well, if you would like me to rephrase, I'll be happy to rephrase. I'm not trying to confuse you at all.

Have you ever looked at a comparison microscope in attempt to link a toolmark to a tool?

A. I'm sure I have.

Q. Would you agree that toolmarks contain class

characteristics, subclass characteristics, and individual characteristics?

A. Well, now we're dealing with two issues there. There's an esoteric erudite level that's almost moot, but -- and then there's the pragmatic level. So in correlating it with the premise of uniqueness, there are two issues about uniqueness.

One is does uniqueness exist? And that is an ethereal argument or erudite or scholarly argument that turns out to be almost irrelevant to these types of cases. What is most relevant however is the phenomenon of discernable uniqueness. Probably at some level above the subatomic, all scientists probably agree that all items are unique. I'm sorry. Scientists probably agree that above the subatomic level items are probably unique.

But the seminal question is can a human observer discern that uniqueness? So I can't answer your question because at some level, possibly subatomic, but let's just say we'll restrict it above the atomic level, that at some level it's probably unique. But the question is can a human observer detect where those discernible -- where that uniqueness exists?

Q. So this is my question, yes or no, do you agree that toolmarks contain class characteristics, subclass characteristics, and individual characteristics: Yes or no?

A. At some level, but I would disagree that an individual could discern whatever the individual ones are.

Q. So you agree that those three levels of class characteristics exist?

A. They probably do.

Q. Now, you -- there was some great length discussion about subclass characteristics. If subclass characteristics are such a problem, why is there not a higher error rate in proficiency tests?

A. Because the proficiency tests don't even come close to represent what proponents are claiming that they do represent.

Q. You've never taken a proficiency test, right?

A. No, that's not true.

Q. I'm sorry, sir. That was one of the first questions asked. I thought you said you'd never taken one?

A. The question you just asked is you've never taken a proficiency test and I answered correctly that that's not true.

THE COURT: In what area, Ms. Valentini?

BY MS. VALENTINI:

Q. Sir, have you ever taken a proficiency test in firearm or toolmark identification?

A. No.

Q. Okay. And, sir, isn't is true that manufacturing

methods are limited when it comes to firearms?

A. You're getting better there. That's still a broad statement. For the time being, I'll, again, agree that generically -- well, let's just say that's true.

Q. And, sir, the field of Association of Firearm and Toolmark Examiners, they address the issues with regard to subclass problems in their peer journal, and examiners are aware of those potential problems with regards to subclass characteristics; are they not?

A. Well, that's a compound statement again.

Q. It is. I apologize. You're correct.

Well, let's start is -- is it not true that AFTE addresses that issue and they publish articles with regard to subclass characteristics?

A. They've attempted to -- they acknowledge the existence of it, and they've attempted to educate the examiners to be cautious about the existence of subclass characteristics. And, in fact, one of the papers I think by Rivera starts out that there are -- that it's the specter of subclass looms large over the domain or something like that.

So that is -- well, expresses recognition that the problem exists. But they don't -- nowhere in the literature have we found that they address the issues on how an examiner at the bench significantly remote from the production process is in a position to assess what is

individual and what is subclass.

Q. So one of the things that you're extremely critical of -- and at the very end of your direct testimony you put up this chart and you got all zeros except for one little point five. That was all your subjective opinion, correct? That was not based on any formal research or not based on anything, but that's your opinion, correct?

A. Well, based on my research, yes.

Q. Okay. Your research then includes what?

A. An exhaustive literature review, collaborations with colleague, not just the domain literature, but those of respected scholars in treatises in the National Academy of Sciences. I mean, it's a very -- I, slash, we have reviewed I would say very exhaustively the entirety of the available literature and scientific opinions and forensic opinions.

Q. It's your subjective opinion?

A. Well, it's my opinion that that slide --

Q. Subjective opinion?

A. -- represents my opinion.

Q. Subjective opinion?

A. I don't know how you want to characterize it: Objective or subjective. But how do you get -- how do you make an object the subjective out of a zero? If it doesn't exist, it doesn't exist.

Q. But it does exist. Because on there you gave zero

about research in the field when -- if you'd like, I can rattle off a bunch of articles, and you just mentioned one yourself by Gene Rivera that is published in the AFTE Journal called *Subclass Characteristics in Smith & Wesson SW 40VE SIGMA Pistols.* That was a published research article dealing with the area of subclass characteristics; was it not?

A. That is such a long sentence, and you started out with an unacceptable premise that I cannot accept, so, unfortunately, I blocked out the remainder of the question.

I did not represent there was no research. At any time did I not indicate that there was no research. What I qualified it as there was not comprehensive or meaningful research that allows it to obtain the status of whatever the particular criteria was. So I at no time ever indicated there was no research.

Q. So articles that appear in the AFTE Journal are not competent research? I'm just asking. You give no value to articles that appear in the AFTE Journal?

A. That's not true. What we evaluate when we read a paper is the first element is what is the stated hypothesis of the experiment if they even state it, and most of the time they don't even frame a hypothesis.

But in those that do, we then look to see if the sample population is within the target population or are we

talking two totally different -- the target population doesn't match the sample population. Have they treated -- considered what are called interaction effects or what are known as threshold effects? Does the experiment full outcome or conclusions, are they properly confined within the realm of the experiment that was conducted?

There are many reasons that we evaluate these papers. I would not characterize any research as incompetent if the outcome or conclusions were properly confined within the refined -- restrained to the boundaries of the experiment. And if the experiment was probably conducted, the sample population coincides with the target population. And they are all consistent with the stated hypotheses.

That said, that would be considered what's known as internal validity for the experiment. And the definition of internal validity is basically -- internal validity is -- probably the best way to define it is in the null -- would be the absence of which an experiment cannot properly be interpreted.

But many of the experiments, if not most of them, whether or not internal validity exists, there is no external validity. And external validity is defined as generalizability. So in this particular experiment, can the experimenters' conclusion be -- be extrapolated as a

universal assumption to the field?

And that's where the majority of these have been perpetuated on courts. It presented as purportedly validating the practice. But they're irrelevant. They -- they cannot be generalized to a particular case at bar, so.

Q. So it's -- and correct me if I'm wrong. It's your position that this particular article that you actually cited in your PowerPoint and that we're talking about today by Gene Rivera the *Subclass Characteristics in Smith & Wesson SW 40VE SIGMA Pistols* is not valid? Irrelevant? I mean, what's your position regarding this article?

A. I don't make any claim about its validity per se as I sit here. I'd have to review it if you wanted to look at the various claims in there. What we -- what I'm using that paper for is to show the existence of the fact that we have two cartridge cases, if that's the paper you're thinking that we're talking, that are so virtually so similar as to be very easily confusible if a red flag or yellow flag hadn't been raised somewhere along examination process, that had that red flag not popped up, that could have presented the scenario that would have ended up as a type-one error or a false positive.

Q. So you don't take any issue with this article and this research project that was done?

A. Well, I'm not saying that either. You asked me

what I was using for it. And all I'm saying is all I'm using that is to show how astonishingly similar, as they -- one of the authors indicates, at the risk of appalling misidentifications or how startling high correspondence in -- in fact, I think that's -- no, that's a different -- startling high correspondence.

Q. But they're trained firearm and toolmark examiners. In fact, in this article it says in this instance a Smith & Wesson pistol produced a distinct share pattern that could be used to differentiate the test from the two pistols if they're in that field.

A. Is that a question?

Q. Well, the point is that they recognize --

A. Sure.

Q. -- that it could be difficult?

A. Sure.

Q. To a trained firearm and toolmark examiner, it's distinguishable?

A. Yes, I will agree with that.

Q. And there's many more articles that include validity studies. Are you familiar with the article by Bunch and Murphy --

A. I believe --

Q. -- *A Comprehensive Validity Study for the Forensic Examination of Cartridge Cases* in AFTE Journal?

A. I believe that's one of the ones we reviewed in one of our papers. I'd have to look at my paper.

Q. That was another validity study, and the false-positive and false-negative rates were zero in that study.

A. We reviewed almost all of those purported validation studies, yes.

Q. And you say "purported." Again, so you disagree with their studies? That's your subjective opinions that you disagree with this study?

A. You're putting a very broad brush of disagreeing with the study. We don't disagree with a study if it's what -- depending on what it's represented to have measured. That's where we disagree. They can measure what they want, and if they -- their conclusions are consistent with the experimental design, if any, we don't take issue with that paper as far as internal validity. Where we would take issue is what's the relevance of that paper to the case at bar today with regard to the particular firearm that was used?

Q. Well, what's at case at bar is that a firearm and toolmark examiner from -- follows the protocol of AFTE in doing her examination. And all of that is based on the research that is done by AFTE and the proficiency testings and that protocol. And this article by Bunch and Murphy is

another example that that protocol and those procedures, the false-positive and false-negative rates are zero.

That's -- that's, in my opinion, the relevance. I mean, you asked me a question, I answered. I shouldn't have done that, but that is kind of where I was at going with that.

A. Well, you have about four or five premises in that sentence alone so I don't know which one you want me to address. The problem is if the examiner is not on -- she's examining a weapon and doesn't know how it was manufactured or the breechface was manufactured, if you're not specifically standing at the production and sampled the production lot, happen to be aware of the characteristics exhibits from that specific production lot, any studies about some other gun under some other circumstance on some other day -- and believe it or not even these characteristics and part of the firearms depend on whether we're in a recession or whether we're in a --

As surprisingly as remote as that may sound, economic conditions can significantly alter the characteristics on a firearm depending on what are called feeds and speeds. For example, if we're in a high-demand environment, we now have different sets of characteristics imparted because production is dramatically different in that environment than it would be in a recession.

Q. Sir, with all due respect, the production of the item -- the firearm happens, right?

A. Sure.

Q. And once that production happens, that firearm is what that firearm is as it comes off the production line, correct?

A. Sure, yes.

Q. So whether -- are you expecting a firearm and toolmark examiner to be standing there and watch every firearm come off the assembly line to be able to do an analysis? Is that what you're saying is the proper analysis that should be done?

A. No, of course not.

Q. The reason I'm talking about these articles is because you mentioned that there -- that there's no research, there's no data, there's nothing to base it on.

And when there's -- wouldn't agree, sir, that there are hundreds of articles where validation studies have been done, statistical analysis has been done, you know, another article by Coffman, *Computer Numerical Control Production Tooling and Repeatable Characteristics on Ten Remington Model 870 Production Run Breech Bolts.* It's in the AFTE Journal.

Familiar with that article?

A. Would you repeat the question?

THE COURT: Slow down. Slow down when you read it.

MS. VALENTINI: Okay.

BY MS. VALENTINI:

Q. There's an article by B.C. Coffman that was published in AFTE titled *Computer Numerical Control (CNC) Production Tooling and Repeatable Characteristics on Ten Remington Model 870 Production Run Breech Bolts* published the winter of 2003.

A. I believe we reviewed that, yes.

Q. There's another article by A.C. Coody, *Consecutively Manufactured Ruger P-89 Slides* in the AFTE Journal.

Are you familiar with that article?

A. Not as I sit here; but as I indicated, we did an exhaustive review of up until 2000, I believe, '11.

Q. T.G. Fadul, F-A-D-U-L, *An Empirical Study to Evaluate the Repeatability and Uniqueness of Striations/Impressions in Fired Cartridge Casings Fired in Ten Consecutively Manufactured Slides.* That was published by the National Institute of Justice.

Familiar with that one?

A. Not as I sit here.

Q. And that was two hundred and seventeen examiners participated from all across the country in that one.

Hamby and Thorpe, *The Examination, Evaluation, and Identification of 9mm Cartridge Cases Fired From 617 Different GLOCK Model 17 & 10 Semiautomatic Pistols.*

Are you familiar with that one?

A. Yes.

Q. D. LaPorte, *An Empirical Validation Study of Breechface Marks on .380 ACP Caliber Cartridge Cases Fired from Ten Consecutively Finished Hi-Point Model C9 Pistols.*

Familiar with that one?

A. Who are the authors?

Q. D. LaPorte, L-A-P-O-R-T-E.

A. That sounds vaguely familiar.

Q. W. Matty, article: *Raven .25 Automatic Pistol Breech Face Tool Marks* also published in the AFTE Journal.

Familiar with that one?

A. Not as I sit here.

THE COURT: Ms. Valentini, I've been sitting here three hours. I'm going to take a break.

MS. VALENTINI: Yes, sir.

(Whereupon, the Court considered another matter and then a recess was had from 3:32 p.m. to 3:40 p.m.)

THE COURT: Ms. Valentini, when you're ready.

MS. VALENTINI: Thank you, sir.

BY MS. VALENTINI:

Q. I'm not going to go through all of those articles.

The point is on direct examination you said there has been no research in this field. And the point is there has been a lot of research in this field; isn't that true?

A. No, it's not true. And you keep mischaracterizing my statement. I've never said there hasn't been any research. What I meant -- what I had indicated repeatedly is there's been no meaningful or comprehensive research. And I would say that the one recurring flaw in every study you just cited that I remember and probably those that I don't is that they present to a respondent a deductive environment.

And we've already -- I've already indicated the folly of trying to use sample enumeration, and I think in my latest paper I said regardless of seemingly impressive numbers of respondent in any particular experiments. That doesn't negate the -- the flaw is that you're presenting a deductive environment to respondents. And that is not real life. So those --

Q. So it's -- it's your position that you disagree with all of those studies? It's not that the research isn't out there, you just -- it's your opinion that you don't agree with the research?

A. You're using too broad a brush. If you want to refine that, I'll address it. But I'm not saying I disagree with the studies. I might accept each and every one of

those for whatever each claims that they're doing in that particular study. I don't doubt that there were, whatever you said, one or two percent error in a particular study.

The problem is -- and even firearms examiners within the field recognize that those studies are of no value to anyone other than the people who participated in the study. And that is, I believe, Biasotti and Murdock that indicated that in both their papers and internal memos.

Q. So, again, this field, the firearm and toolmark identification, there's been a lot of research?

A. Sure.

Q. There's been a lot of articles published in this area?

A. Absolutely, yes.

Q. I want to talk a little bit about protocol. You again on your zero chart you say that there's no protocol in this field. Well, in fact, isn't it true that the American Society of Crime Lab Directors has, in fact, protocol and that they have accreditations?

A. One recurring problem we are having --

Q. I'm just asking you that question first, and then if you need to explain it further, we can. But isn't it true that there is protocol that has been established by the American Society of Crime Lab Directors?

A. That may well be true. I'll have to accept your

representation.

Q. And that labs get accredited in this area; isn't that true?

A. Sure, yes.

Q. And in order to get accredited, they have to do proficiency testing and they're subject to quality control?

A. Is that a question?

Q. Yes, sir.

A. Yes.

Q. So there is protocol in this field, yes?

A. By your and their definition, it's probably a protocol. It's not a scientific protocol.

Q. You may disagree with the protocol --

A. Correct.

Q. -- but there's protocol that has been established in the field?

A. We've never disagreed that there are what they call SOPs or protocols. The problem is what is a scientific protocol and what is not scientific protocol? So I will agree with the word "protocol." It's the same thing with validation. Calling something a validation study does not make it so.

Q. Have you ever familiarized yourself with the Florida Department of Law Enforcement standards of procedures with regard to firearm and toolmark

identification?

A. FDLE was our biggest contributor when I was at the FBI laboratory so I was fairly familiar with the various protocols. But recently, I'm not intimately familiar with it. So I don't know how to answer that.

Q. You put an example on direct examination of a bar code that you got, I guess, from your wife from Cracker Barrel. Is there a scientific community that deals with bar codes from Cracker Barrel?

A. I'm not aware of any.

Q. And are you comparing what firearm and toolmark examiners do to what you did with regard to the bar code?

A. My only use or purpose for the bar code was to demonstrate the hypothesis that within a small area there are only a finite number of locations or loci and finite number of interspatial relationships so there will be likely a possible coincidental random matches or coincidental matches. That's all I was demonstrating with that metaphoric -- that experiment.

Q. But, again, these are trained firearm and toolmark examiners that are trained in how to identify these subclass characteristics; are they not?

A. That's your representation. We don't agree with that.

Q. All right. Another thing that you said on direct

examination we were -- counsel was talking to you about database, and you said that you printed -- you had printed off something that had been downloaded into the database and it always came up number -- came up first. Is that what you said?

A. I think you're referring to the AB 1717 De Kinder Study, yes.

Q. Okay. What database did you use?

A. What database did I use for what?

Q. In that study. You said you -- you said -- and I could have misunderstood you, but you said you entered this into a database. Did you not say that?

A. No, I don't recall saying that.

Q. Okay. Because you, in fact, have never entered anything into a NIBIN database at all, right?

A. No. Not directly, no.

Q. Okay. Well, you have never entered anything into NIBIN?

A. Directly, no.

Q. Okay. And that's just an investigative tool, right? They don't use that to compare firearms or test-fires or anything like that, correct?

A. That's correct, yes.

Q. You don't have access to NIBIN?

A. No. Well, not that I'm aware of.

Q. You know I want to ask you a little bit about. . . let me find it. You have it in your affidavit. Just give me one second please to locate it.

When you're talking about the work in this case that was done with regard to shell casings, it is not your position that -- you're not rebutting what Ms. Skoglund -- the analysis that she's done, you're not rebutting the fact that these shell casings were not fired from that firearm, are you?

A. No.

Q. You just disagree with how she has gone about coming to that conclusion?

A. Yes, ma'am.

Q. And one of the reasons that you disagree is because she can't say -- I mean, she testified that she can say that those shell casings were fired from that firearm, right? You heard her testify to that?

A. The question is did I hear her testify to that?

Q. Yes.

A. Yes.

Q. And you disagree with that -- you don't disagree with that, correct?

A. Well, that's a tricky question there.

How do you want me to. . .

Q. You're not debating that it's a match?

A. Well, that's a two-prong -- that's a bifurcated decision path there. Am I disagreeing with her -- the truth of the matter asserted, the fact of a claimed match, or am I disagreeing with her ability to even say that? That's two different issues.

Q. Okay. Well, you're not offering your testimony to rebut the truth of the matter that she's claiming it's a match, correct?

A. That's correct.

Q. Okay. And kind of where I'm going, just to talk a little bit about it, in your affidavit, page thirty-eight, you throw out DNA?

A. Uh-huh.

Q. And you're not an expert in DNA, correct?

A. In a legal sense, I probably know more than the average juror, but I don't hold myself out to be a DNA expert.

Q. Okay. Neither am I.

A. Okay.

Q. So we'll try to keep it as lay terms as we can if that's all right with you?

A. Sure.

Q. When people test DNA and they get the match, whether it's thirteen loci or sixteen loci or whatever it is, then they come up with a statistical number, correct?

A. Yes.

Q. And they will say it's one in however many quatrillion or million or sometimes thousands really. I mean, it varies. But even when it's one in this quatrillion number, would you expect them to test every single living and nonliving human being to come up with that statistical analysis?

A. No. And that is exactly what I've been saying here, and that's exactly why they associate a probabilistic statement with their opinions because it's inductive inference, not deductive inference.

Q. But it's well-accepted?

A. Yes, it is. And that is in scientifically and forensically and legally.

MS. VALENTINI: Judge, if I could just have a couple of minutes --

THE COURT: Sure.

MS. VALENTINI: -- to kind of see where I'm at and what I have left?

THE COURT: Sure.

BY MS. VALENTINI:

Q. And I just want to confirm, you've never been qualified as a firearms identification expert in any court, correct?

A. That's correct.

Q. And the -- you mentioned two hundred and forty-seven times you've testified. How many of those times have been with regard to this area?

THE COURT: What area?

MS. VALENTINI: Firearms and toolmark identification.

THE COURT: Thank you.

THE WITNESS: I'm going to guess twenty to thirty. I don't know. That's not a number that stays in my head.

BY MS. VALENTINI:

Q. Because of last November, I believe you testified it was about nine and that was in the field only allowed to testify about it with relates to science and meter --

Say that word for me.

A. Metallurgy.

Q. -- metallurgy standpoint?

A. Okay. I think -- I'm starting to remember. I think the last time I tallied there were seventeen testimonies in the field of, quote, ballistics, end quote, and then its further broken down because there are three areas of ballistics. So I wasn't too off on my original guess so I believe maybe fifteen times.

Q. But it's never been as an expert firearm or toolmark identification?

A. No. I was proffered in each case as a forensic metallurgist material scientist to address issues of either the scientific methodology or scientific underpinnings or lack thereof of a practice or in the field of terminal ballistics which is very complex and very scientific.

Q. Sir, isn't it true that in your testimony in *State of Maryland vs. Winningham* you conceded that the underlying theory that toolmarks are left during the machine process and can be used to match specific items of evidence to a specific source is generally accepted theory?

A. No, I don't recall that. It might have been some -- you'd have to either read it again or give me some context in there.

Q. Sure. That you conceded that the underlying theory that toolmarks are left during the machine process?

A. Sure, yes.

Q. And can be used to match specific items of evidence to a specific source is the generally accepted theory?

A. I don't know if I was addressing legal acceptance or scientific acceptance. But to save you, maybe, some time, yes, the toolmarks imparted can be used to -- and it may be the definition of match might be the other issue -- to associate items with sources, and sources being production lots possibly or larger.

Q. Sir, are you aware that NAS, the National Organization of Science, recognizes firearm analysis as a science?

A. I'm sorry. What organization?

Q. Isn't it true that NAS --

A. Oh.

Q. -- recognizes firearm analysis as a science?

A. That, I don't know. They may accept the forensic examiners characterizations of forensic science because that's in common -- I mean, just as ballistics is misapplied and it's hard to -- it's trying to, like, turn a battleship around in a bathtub or stop a locomotive. They may accept the phraseology, but they do take issues as to whether it's, in fact, a science.

Q. And, sir, isn't it true that the American Association of CrimeLine Directors recognizes firearm analysis as a science?

A. That may or may not be true. But there's same issues with ASCLD. I think that's what you're referring to there.

Q. And isn't it true that the laboratory accreditation board also recognizes it as a science?

A. Sure. But they -- I believe the overwhelming majority, if not all of them, are forensic practitioners, forensic examiners.

Q. You can't make any conclusions regarding any of the evidence in this case, correct?

A. That's another broad brush. I would say that's not true.

Q. Well, you haven't examined the evidence?

A. Well, that's true.

Q. So what conclusions can you make regarding the evidence if you haven't even examined it?

A. My conclusions are that you can't make a conclusion as to providence without -- without a concomitant expression of probabilistic certainly to a certain level of confidence.

Q. Isn't it true that defense can take an expert and use whatever method -- take the evidence to an expert and they can use whatever method they want and do their own testing and can also research the subclass characteristics and markings?

A. I'm sorry. Can the defense?

Q. Sure.

A. Oh, sure.

Q. They can take it and they can have another expert look at it, and they can use whatever methodology they would like to reach whatever conclusion they would like to reach?

THE COURT: Before the answer's out, let me ask you a question, Ms. Valentini. Is this not the case

where you objected to me releasing the firearm for examination?

MS. VALENTINI: We did object to the process of mailing it via mail to Virginia.

THE COURT: If you're going to go into this area and the defense now asks me to allow for that happen, it will happen. So it's your --

Sir, you've been good through this whole process. All right? I don't want to have to exclude you. All right?

THE WITNESS: I'm sorry, Your Honor.

THE COURT: It's okay. It's all right.

I'm not talking to you, I'm trying to talk to the defendant.

THE WITNESS: Oh, okay.

MS. VALENTINI: I understand what you're saying, Your Honor.

THE COURT: Okay.

MS. VALENTINI: I'll move on.

THE COURT: So if you're going go there --

MS. VALENTINI: I'll move on. I'll move on.

THE COURT: All right.

BY MS. VALENTINI:

Q. In simplest terms that you're just simply a critique of the method of firearms and toolmark

identification? That's -- that's really what you do?

A. What I do or what I did in this case? They're two different issues. I'll say "yes" to the latter and "very limited" in the former.

Q. Your methodology is not what has been accepted in the courts worldwide, correct?

A. I can't answer that question the way it's phrased.

Q. Okay. The courts accept this as a science, firearms -- the courts accept firearms and toolmark identification as a generally accepted scientific methodology; is that not correct?

A. Well, if the courts do, it's a legal opinion and not a scientific opinion.

Q. That's how the courts view it?

A. I'm sorry?

Q. That's how the courts view it?

A. I don't agree all courts. If that was the question, I don't agree. In fact, I believe --

Q. There's not a court that hasn't accepted it, right?

A. Well, now you just changed the ground -- the question. I believe in either *Green* or *Montero* they even said this is not a science. You can call it anything you want, you cannot call it a science. So at least one, and I believe there are others that. . .

Q. They have not excluded the evidence; have they not?

A. No, that's true. Well, based on these issues. They may have excluded the evidence for other reasons.

Q. Are you familiar with the AFTE responses to the NAS report that you were speaking of from 2009?

A. Is that by -- from Ron -- Ronald G. Nichols?

Q. It's the AFTE response. It's from AFTE.

A. Yeah, I think he may have authored one or more of those. I'm generally familiar. I didn't -- I'd have to -- you'd have to refresh my recollection if you're going to get specific about it.

Q. And, basically, AFTE had already addressed some of these suggestions that were made in recommendations that were made by the NAS report. For example, one of AFTE's recommend -- I'm sorry. One of NAS's recommendations in that report was for them to establish definitions in the glossary of terms.

Well, AFTE has had a glossary of terms since 1980, correct? If you know. You may not know that.

A. No, I don't know that.

MS. VALENTINI: Judge, may I just have one moment?

THE COURT: Mr. Tobin, my comments were not directed towards you. They were directed towards Mr. Richardson.

THE WITNESS: Oh, thank you, Your Honor.

THE COURT: Counsel, just a moment, please. For security purposes and transport issues, do you believe we're going to be going beyond five?

MS. VALENTINI: Judge, if I can just have a wrap-up question and then I would call Ms. Skoglund as rebuttal. That may take thirty minutes. I don't know how long redirect --

MR. CHANG: Short redirect for defense.

THE COURT: Okay. Well, let's try if we can -- I'm not going to hold you to it, but let's try and get everybody out of here by five or a minute or two afterwards if we can. We have fifty-five minutes to get that done. I don't want to hold the whole courtroom -- or courthouse full of deputies.

MS. VALENTINI: Yes, sir.

THE COURT: Okay. Thank you.

THE COURT DEPUTY: I'll let them know, sir.

THE COURT: Thank you.

MS. VALENTINI: One more flip through the notes, Judge, and then I'll be done.

Nothing further, Your Honor.

THE COURT: All right. Thank you.

Defense.

REDIRECT EXAMINATION

BY MR. CHANG:

Q. Mr. Tobin, are you aware of federal courts that have limited the opinions of firearms and toolmark examiners?

A. Yes.

Q. Okay. On their ability to individualize?

A. Yes.

Q. Okay. Is that a recent trend, sir?

A. Yes. It's -- we call it a paradigm shift.

Q. Okay. Validity studies, I believe Ms. Skoglund discussed one that she participated in or was involved in where she specifically mentioned Rugers. Okay? I'm paraphrasing, but, essentially, what you're saying is the studies on Rugers can't be generalized to apply to, in this case, Browning firearms? Would that be accurate, sir?

A. Correct.

Q. Similarly, studies on Remingtons and Winchesters and other brands cannot be generalized to apply to the Browning in this case?

A. Correct.

And I assume you're meaning the existing studies, yes?

Q. Existing studies, that's correct, sir.

A. Yes.

Q. Very briefly, I'm going to talk about DNA. DNA has been recognized by the National Academy of Sciences and the reports as being a -- how would you describe the practice of DNA as it relates to the forensic sciences?

A. Well, it's somewhat misleading, but we call it the gold standard. You still have to be careful how you're applying that moniker. But we consider it the gold standard at least with regard to how an inductive practice where you cannot feasibly sample the entire possible sample pool should be handled.

Q. All right. However, with DNA I'm going to oversimplify. I know this Court probably has done some DNA cases. But, essentially, with DNA, there are protocols to, basically, tell another scientist, another DNA technician how to extract the DNA, correct?

A. Yes.

Q. There are protocols in place to identify the loci that they're looking for differences, correct?

A. Yes.

Q. They have, in fact, identified those are loci. Whatever standard you go by with twelve, fourteen, sixteen, those loci are standardized, have been identified, and are utilized by virtually any DNA lab worldwide?

A. Correct. They create the two missing cornerstones of firearms and toolmark practice. And that is

repeatability and reproducibility.

Q. Okay. As it relates to the statistics in DNA, they've done the requisite sampling of the population; they can break it down geographically; ethnically in terms of Asian Americans, African Americans, Caucasian Americans and basically create statistics in terms of the frequency within a given population.

Is that a fair assessment that I'm oversimplifying?

A. That's correct. And when they present characteristics saying one in -- I'm going to make up a number -- three hundred quadrillion, that far exceeds the human population. But what that implies is now that the practical impossibility or whatever is going to be the claim they don't need to find additional loci or rates of the parameters of detection in order to -- they don't need to expand that currently because the population doesn't exceed that one in -- I mean, doesn't exceed whatever I just said, three hundred quadrillion.

Q. In other words, there is, in essence, a mathematical basis for them to quantify the likelihood of repeating those DNA loci --

A. Absolutely.

Q. -- for any given individual?

A. That's correct.

Q. Such statistical databases have not been calculated for frequency in this particular field, specifically, firearm and toolmarks analysis; is that accurate?

A. That we found, that's correct.

Q. And is that the -- one of the bases of the scientific community's objection to this practice in this area?

A. Yes. In most particularly with a -- also with error -- rate of error.

Q. Certainly, sir, the statements or the whole bunch of studies, literature, publishing, AFTE Journals, or elsewhere as it relates to this field, fair to say you reviewed most of those articles and studies?

A. Yes.

Q. Okay. Based upon your review of these sciences, sir --

A. Oh, I'm sorry. No. I say "you" meaning me and my colleagues. I can't read thousands of papers. But my colleagues have read many, I've read most probably, but...

Q. Based upon your review of all the available studies or literature that you have reviewed, can you, as a scientist, determine what objective criteria there is in order to make comparisons or elimination as relates to the field of firearms and toolmark analysis?

A. Objectively, they do look for patterns. But from that point -- do I say forward? Yeah -- forward the interpretation of those patterns is virtually purely subjective. So depending on which aspect, yes, they use some objective criteria to start assessing class characteristics and then seeking some indicia or characteristics to compare. But that's where the objectivity generally stops. The remaining portion of the practice is subjective.

Q. Let me rephrase it in my layperson's terminology. Using your bar code example or we've discussed lining up of striating lines, based upon your review of the literature, is there an objective criteria, number of lines matching up that exists anywhere in the materials that would tell a forensic firearm and toolmark analyst whether something is or is not a match, or is or is not an exclusion, or may or may not be excluded? Is there an objective standard?

A. The general answers is no, particularly on the East Coast. They've attempted to remedy that on the West Coast with CMS or consecutively matching striae. Striae, by the way, is S-T-R-I-A-E. But the is answer, no, there are no parameters of detection or rules of application. They've started that in -- on the West Coast. They indicate that there should be a minimum of three -- two sets of three or a consecutive six or something. But the answer is generally

no.

Q. Okay. Sir, we started off this morning with Ms. Skoglund, and I basically got her to give the Court her opinion: The three cartridge casings recovered at the scene in this case were, in fact, fired from the particular firearm that ultimately was submitted along with those three.

Did you hear her render that opinion, sir?

A. Yes.

Q. As a scientist, based on your review of all the literature, do you have an opinion as to her ability to render that opinion and her ability to individualize those cartridges to this particular firearm?

A. Yes.

Q. What would your opinion be?

A. The opinion is that there is no scientific foundation for such a claim and it's considered a fallacy and an exaggerated claim in the true or mainstream scientific community.

MR. CHANG: Okay. Thank you, sir.

Nothing further, Judge.

THE COURT: Ms. Valentini, other questions?

MS. VALENTINI: Just one.

RECROSS-EXAMINATION

BY MS. VALENTINI:

Q. Sir --

MS. VALENTINI: May I stay here, Judge?

THE COURT: Sure.

BY MS. VALENTINI:

Q. Sir, you just said that you claim there's no scientific foundation, but you do not disagree with her findings, do you?

A. Well, now there's the broad brush bifurcation again. I disagree with the statement, but I don't rebut the possible -- the claim of a possible match, which would be a type-three error, meaning you got the right answer but for the wrong reasons. The problem --

Q. Sir, you do not disagree with her opinion that those shell casings were fired from that firearm that she tested?

A. Well, the reality of it is I have some problems with what I'm seeing here as a basis for it even what's provided. I'm not sure there's adequate data provided to the defense bar, but that said, no, I'm not here to rebut the claim of a match.

MS. VALENTINI: Okay. No further questions.

THE COURT: All right. May this witness be excused?

MR. CHANG: Yes, sir.

THE COURT: All right. Sir, you may step down.

THE WITNESS: Thank you.

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CERTIFICATE OF REPORTER

STATE OF FLORIDA
COUNTY OF SEMINOLE

We, ERIN LEBEN, Florida Professional Reporter; and CHARITI L. COLÓN, Florid Professional Reporter, certify that we were authorized to and did stenographically report the foregoing proceedings; and that the transcript is a true and complete record of our stenographic notes.

We further certify that we are not a relative, employee, attorney or counsel of any of the parties, nor are we a relative or employee of any of the parties' attorneys or counsel connected with the action, nor are we financially interested in the action.

Dated this the 25th day of September, 2013.

_____
ERIN LEBEN

_____
CHARITI L. COLÓN, FPR