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

UNITED STATES OF AMERICA	:	CRIMINAL ACTION
	:	
v.	:	
	:	
CARMEN GRICCO	:	NO. 01-90

MEMORANDUM

Padova, J. **April , 2002**

Before the Court is Defendant Carmen Gricco's Motion In Limine for exclusion of handwriting opinion evidence ("Motion") pursuant to Federal Rules of Evidence 104(A), 702, 703 and 403. Pursuant to the United States Supreme Court's decisions in Daubert v. Merrell Dow Pharm., 509 U.S. 579 (1993) and Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1997), the Court held a hearing on March 27, 2002, to address the issues raised in Defendant's Motion. For the following reasons, the Court denies the Motion.

I. Background

Defendant is charged with various drug, money laundering, and weapons offenses in connection with an alleged conspiracy to manufacture and distribute methamphetamine. Pursuant to Federal Rule of Criminal Procedure 16(a)(1)(E) ("Rule 16"), the Government informed Defendant that it will call Gale Bolsover, a Forensic Document Analyst with the U. S. Postal Inspection Service, to testify as a handwriting expert at trial. In its Rule 16 Disclosure, the Government states that Ms. Bolsover will offer her

expert opinion that there is a handwriting match between Defendant's known handwriting exemplars and two Government exhibits that were retrieved during valid searches. These exhibits include a handwritten list of materials allegedly used in manufacturing methamphetamine, which was found in a metal storage trunk in the basement of Defendant's mother-in-law's residence, and a handwritten list of alleged laboratory supplies, which was found in a briefcase at the mother-in-law's residence. Defendant objects to Ms. Bolsover expressing her opinion that there is a handwriting match. (Def.'s Mem. at 2).[1] Defendant argues that an opinion as to a handwriting match is not reliable primarily because the known or potential rate of error with respect to opinions regarding identity in handwriting analysis is so high that it contaminates the reliability of any such ultimate opinion.

II. Legal Standard

Federal Rule of Evidence Rule 702, as amended December 1, 2000, provides as follows:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience,

[1]Defendant does not seek to exclude the expert testimony of Ms. Bolsover in its entirety; Defendant agrees that Ms. Bolsover can testify regarding "the process by which the exemplars are obtained; the manner of examination of both the exemplars and the questioned documents, and the existence of similarities or dissimilarities in the exemplars and questioned documents." (Def.'s Mem. at 2 n.2).

> training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. Under Rule 702:

> The trial judge must determine at the outset, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.

Daubert, 509 U.S. at 592-93. This gatekeeping role extends to all cases where the "testimony reflects scientific, technical, or other specialized knowledge." Kumho Tire Co., Ltd. v. Carmichael, 526 U.S. at 141.

Under Daubert, the Court must make a two-step inquiry: "First of all, the proffered 'expert' must be qualified to express an expert opinion . . . . Secondly, the proffered expert opinion must be reliable." In re TMI Litig., 193 F.3d 613, 664 (3d Cir. 1999). In determining the reliability of the expert testimony, the Supreme Court and the Third Circuit Court of Appeals ("Third Circuit") have provided a number of factors to offer guidance to the court's inquiry. These factors include:

> (1) whether a method consists of a testable hypothesis; (2) whether the method has been

> subjected to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put.

In re Paoli Railroad Yard PCB Litigation, 35 F.3d 717, 742 n.8 (3d Cir. 1994) ("Paoli II"). This list is not exhaustive, and the inquiry under Daubert remains flexible; each factor need not be applied in every case. See, e.g., Elcock v. Kmart Corp., 233 F.3d 734, 746 (3d Cir. 2000); Schieber v. City of Philadelphia, Civil Action No.98-5648, 2000 U.S. Dist LEXIS 17952, at *6-7 (E.D. Pa. Dec. 13, 2000)("These factors are non-exclusive and no one of the factors weighs more heavily than another; the approach to determining the admissibility of expert testimony is a flexible one.") (citing Daubert, 509 U.S. at 594).

III. Discussion

A. Expert's Qualifications

The Government's witness, Ms. Bolsover, is employed as a Forensic Document Analyst with the Forensic & Technical Services Division, U.S. Postal Inspection Service, where she has worked in that capacity since 1977. Ms. Bolsover received a Masters of Forensic Science from George Washington University. She has completed training in the examination of questioned documents at

the U.S. Treasury Department, Office of the Examiner of Questioned Documents and the U.S. Postal Inspection Service Crime Laboratory, as well as training of document examination at the U.S. Secret Service, the FBI Training Academy and the Antioch School of Law. Ms. Bolsover has also lectured on and been an instructor in questioned document examination and is certified by the American Board of Forensic Document Examiners, Inc. She has been qualified as an expert witness approximately 80 times in federal, state and local courts regarding handwriting comparison and has testified as to her ultimate opinion regarding handwriting matches. (N.T. 3/27/02 at 20). Accordingly, the Court finds that Ms. Bolsover is qualified to testify as an expert. See, e.g., United States v. Velasquez, 64 F.3d at 846 (finding a Forensic Document Analyst with similar extensive qualifications to be qualified as an expert).

B. Reliability of Expert Opinion

Examining the flexible Paoli II factors (which incorporate the Daubert factors) to assist the Court in determining the reliability of an expert's opinion, the Court concludes that Ms. Bolsover's expert opinion as to a handwriting match is admissible. The Court will first examine the error rate of opinions as to a handwriting match of a known exemplar and a questioned document because Defendant bases his argument on this factor. In doing so, it is necessary to examine the methodology Ms. Bolsover followed in this case.

Ms. Bolsover testified that she follows the methodology that is universally accepted in the handwriting analysis field, most recently promulgated by the Scientific Working Group Documents for Forensic Document Examination ("SWGDOC”) which developed protocols for conducting handwriting analysis. This methodology used is the same as that followed by the Government’s forensic document analyst expert in United States v. Velasquez, in which the Third Circuit found that the expert testimony was reliable. 64 F.3d at 850-51. The standard methodology is as follows:

> First, the expert determines whether a questioned document contains a sufficient amount of writing and enough individual characteristics to permit identification. After determining that the questioned document is identifiable, the expert examines the submitted handwriting specimens in the same manner.
>
> If both the questioned document and the specimens contain sufficient identifiable characteristics then the expert compares those characteristics. For example, the slant of the writing, the shapes of the letters, the letter connections, the height of the letters, the spacing between letters, the spacing between words, the “i” dots and “t” crosses, et. cetera.
>
> After making these comparisons, the expert weighs the evidence, considering both the similarities and the differences of handwriting and determines whether or not there is a match.

(N.T. 3/27/02 at 40-42); see also Velasquez, 64 F.3d at 850-51. An identification is determined when there is a significant number

of similarities among handwriting characteristics[2], in the absence of any unexplainable differences.[3] (N.T. 3/27/02 at 65-67). After making a handwriting determination, Ms. Bolsover's conclusion is independently reviewed or reexamined by one of her fellow forensic document analysts at the U.S. Postal Inspection Services – no report is written until there is an agreement between the two examiners, whether that conclusion be a positive match, negative or inconclusive. Id. at 22.

Defendant argues that the opinion as to a handwriting match is a purely subjective opinion that is not reliable. Specifically, Defendant argues that the analysis is left to the individual examiner's subjective judgment, including: (1) what constitutes a sufficient quantity of writing to make the comparison of the documents; (2) what constitutes a significant similarity; and (3)

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[2]An examiner looks at certain objective characteristics when attempting to make a comparison between documents. These include: beginning strokes of the letter, terminal strokes that finish the letter, connecting strokes between letters, spacing between letters and words, the height relationship of the upper case letters to the lower case letters, height relationships of the balls of the G's and the P's to the lower extensions and to the D's and the B's to the upward extensions, the actual formation of the letters, the baseline, how a word or group of words follows a baseline, whether there is a real or imagined baseline, slant or lack thereof of the writing, "i" dots, "t" crosses, and retracing (going back over the ink line as opposed to making a loop). (N.T. 3/27/02 at 26-29).

A magnifying glass and a microscope are common tools used during handwriting analysis. In this case, Ms. Bolsover used a magnifying glass during her analysis. Id. at 29.

[3]An example of an explainable difference would be that one document had a lowercase "w" and the other did not because the writer never made a lowercase "w." Id. at 70.

what constitutes a significant difference. Id. at 55-58. Defendant relies on a 1989 article by law school professors D. Michael Risinger, Mark P. Denbeaux and Michael J. Saks entitled "Exorcism of Ignorance as a Proxy for Rational Knowledge: the Lessons of Handwriting Identification 'Expertise'" ("Exorcism"), 137 U. Pa. L. Rev. 731 (1989). In Exorcism, the professors analyzed and discussed several studies conducted by the Forensic Sciences Foundation, including a 1975 study set out to create proficiency tests for forensic expert specialties, reported in a 1978 government report[4], and four unpublished Forensic Sciences Foundation studies of 1984, 1985, 1986 and 1987. The authors reported that the Forensic Sciences Foundation studies found that in the 1975 study 89 percent of the study participants correctly identified the identity of the scrivener of the questioned document; in the 1984 test 74 percent correctly analyzed one of the submitted documents and 100 percent failed to recognize the author of one of the questioned letters among the known exemplars; in the 1985 study, 41 percent gave correct results; in the 1986 study, 13 percent gave correct answers; and in the 1987 study, 52 percent gave correct answers. Id. at 5-7. The article's authors concluded that a "generous reading" of the reports shows that the document examiners were correct 45 percent of the time. Id. at 7.

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[4]J. Peterson, E. Fabricant & K. Field, Crime Laboratory Proficiency Testing Research Program: Final Report 181-83, 194, 236-37 (1978).

The Court finds reliance on the studies flawed. The studies examined in the Exorcism article were designed to test proficiency rather than accuracy. They were not designed to analyze the reliability of professional experienced document analysts or their ability in comparison to laypersons. The article authors themselves concede:

> [t]hat these studies were never intended to answer the question that courts need answered; they simply come closer to answering it than anything else that exists. Studies with a design capable of directly answering the central question – the performance of handwriting identification experts versus non-experts – have never been undertaken.

Id. at 750 n.79. Since 1989, when this article was published, studies have been conducted to test this very issue. In particular, and as a response to this article, Moshe Kam, Ph.D., professor, Data Fusion Laboratory, Electrical and Computer Engineering Department, Drexel University, conducted a series of studies to measure the ability of certified forensic document examiners to identify writers of questioned documents by comparing such writings to known samples. In doing so, Dr. Kam compared a group of professional document examiners comprised of currently employed or recently retired professional questioned-document examiners, almost all of whom were certified by one or more of the existing forensic document associations, to a control group of uncertified nonprofessionals comprised of students and educators, all with education levels that matched those of the professional examiners.

See Moshe Kam, Ph.D., Gabriel Fielding, M.Sc., & Robert Conn, Ph.D., Writer Identification by Professional Document Examiners, 42(5) J. Forensic Sci. 778 (1997). Dr. Kam found that professional document examiners had an error rate of 6.5 percent, whereas the control group of non-professionals had an error rate of 38.6 percent. See id.; Moshe Kam, Ph.D., Joseph Wetstein, B.S.E.E., & Robert Conn, M.S.S.E., Proficiency of Professional Document Examiners in Writer Identification, 39(1) J. Forensic Sci. 5 (1994).[5] In other words, lay persons make mistakes in comparing handwriting about six times more often than professional examiners. Ms. Bolsover testified that looking at Dr. Kam's findings, the disparity and the error rates between professional examiners and laypersons suggests that an actual technical expertise in document identification exists.

Moreover, the studies relied upon in Exorcism were done in 1975-1987. The state of the art of handwriting analysis has improved and progressed since then. The more recent studies show the reliability of handwriting analysis. Dr. Kam's studies show a

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[5]See also Moshe Kam, Ph.D., Gabriel Fielding, M.S., & Robert Conn, Ph.D., Effects of Monetary Incentives on Performance of Nonprofessionals in Document-Examination Proficiency Tests, 43(5) J. Forensic Sci. 1000, 1003 (1999) (finding that monetary/reward scheme for nonprofessional document examiners did not affect their proficiency scores); Moshe Kam, Ph.D., Kishore Gummadidala, M.S., Gabriel Fielding, Ph.D., and Robert Conn, Ph.D., Signature Authentication by Forensic Document Examiners, 46(4) J. Forensic Sci. 884 (2001) (finding that laypersons classified "nongenuine" signatures as genuine 13 times more often than forensic document examiners).

professional document analyst error rate of 6.5 percent, and this rate does not take into account the second review performed by Ms. Bolsover's colleague.

Most recently, document analysts conducted a study in which they undertook to validate the hypothesis that handwriting is individualistic and that handwriting analysis is reliable.[6] See Sargur N. Srihari, Sung-Hyuk Cha, Hina Arora and Sangjik Lee, Individuality of Handwriting, J. Forensic Sci. (forthcoming May, 2002). In their study, the researchers found that using the same techniques that document analysts use, the accuracy of determining whether two documents were written by the same writer is about 95 percent. Id. at 10. In the study, the researchers examined three handwriting samples each from 1500 individuals. They used computer software to extract features from digitally scanned images of handwriting and employed handwriting analysis features similar to

[6]As a premise for handwriting analysis, document examiners are guided by three basic principles that support the reliability of handwriting analysis. These principles are as follows. First, no two people write exactly alike. This is supported by research conducted on twins and other people of multiple births that show that such people's handwriting is unique; each contained individual characteristics identified to one writer. See Mary S. Beacom, M.A., A Study of Handwritings By Twins and Other People of Multiple Births, 5(1) J. of Forensic Sci. 121 (1960); D. J. Gamble, The Handwriting of Identical Twins, 13 (1) Soc. Forensic Sci. J., 11 (1980). Second, one person does not write exactly the same each time they write. This phenomenon is known as variation. Third, a person cannot write better than he can; in other words, if a person were trying to disguise his writing, he could not scribe it better than his capabilities. (N.T. 3/27/02 at 24).

those used by document analysts in the field. Id. at 2. The researchers specifically concluded that "the objective analysis that was done [by the computer] should provide the basis for the conclusion of individuality when the human analyst is measuring the finer features by hand." Id. at 10. The researchers concluded that the confidence level could be increased from 95 to 100 percent if additional finer features that are used by document analysts were considered by the computer program. Id.; (N.T. 3/27/02 at 61).

Furthermore, the Third Circuit and other circuit courts have allowed testimony regarding handwriting matches, and accepted such testimony as "sufficiently reliable to be admissible." Velasquez, 64 F.3d at 851. See also United States v. Jolivet, 224 F. 3d 902, 906 (8th Cir. 2000) (affirming the district court's admission of expert testimony as an expert opinion that it was likely that defendant wrote the questioned documents and finding such opinion reliable because the expert was well-qualified in handwriting analysis and that his testimony "may be properly characterized as offering the jury knowledge beyond their own and enhancing their understanding of the evidence before them."); United States v. Paul, 175 F.3d 906, 910-11 (11th Cir.), cert. denied, 528 U.S. 1023 (1999) (holding that the expertise of the document examiner could assist the jury and noting that "[c]ourts have long received handwriting analysis testimony as admissible evidence."); United States v. Jones, 107 F.3d 1147, 1160-61 (6th Cir.), cert. denied,

521 U.S. 1127 (1997). Accordingly, the Court concludes that Ms. Bolsover's testimony as to her conclusion regarding the match is reliable expert evidence for Daubert and Rule 702 purposes. "The test of admissibility is not whether a particular scientific opinion has the best foundation or whether it is demonstrably correct. Rather, the test is whether the 'particular opinion is based on valid reasoning and reliable methodology.'" Oddi v. Ford Motor Co., 234 F.3d at 145-46 (citing Kannankeril v. Terminix International Inc., 128 F.3d 802, 806 (3d Cir. 1997)). The Court finds that the subject handwriting analysis performed by Ms. Bolsover is based on valid reasoning and reliable methodology. In this case, the analysis of Ms. Bolsover's conclusions "is for the trier of fact when [she] is subjected to cross-examination." Id.

The other Paoli II factors also support the conclusion that the expert testimony meets the reliability requirements of Daubert and Rule 702. First, handwriting analysis consists of a testable hypothesis. As the studies regarding handwriting comparison of twins and individuals of multiple births show, no two people write alike. See Mary S. Beacom, M.A., A Study of Handwritings By Twins and Other People of Multiple Births, 5(1) J. of Forensic Sci. 121 (196)); D. J. Gamble, The Handwriting of Identical Twins, 13 (1) Soc. of Forensic Sci. J., 11 (1980). See also, Sargur N. Srihari, Sung-Hyuk Cha, Hina Arora and Sangjik Lee, Individuality of Handwriting, J. Forensic Sci. (forthcoming May, 2002). Dr. Kam's

and Mr. Shrihari's studies show that the method consists of a testable hypothesis.[7]

As the above discussion regarding reliability shows, the method of handwriting analysis is subjected to peer review. The Journal of Forensic Science contains numerous articles about forensic document examination.[8]

There are clear standards which control the method applied in handwriting analysis. The Scientific Working Group for Forensic Document Examination ("SWIGDOC") has promulgated standards that are followed by forensic document analysts. Ms. Bolsover follows these protocols for every document analysis she performs, including the ones in this case, as do all of her colleagues. Moreover, Mr. Srihari tested the techniques the document analysts use to identify

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[7]Furthermore, existing databases of handwriting samples provide support as to a testable hypothesis in handwriting analysis and identification. The German law enforcement agency has created a computer database known as Forensic Information System for Handwriting ("FISH") that consists of 80,000 known writers. When a questioned document is examined, the computer compares it to the handwritings in the database to determine whether the person is already in their database. The use of FISH has shown that no two persons have the same handwriting. (N.T. 3/27/02 at 34). The Dutch government and the United States Secret Service have created their own versions of FISH, with the same results – no two persons have the same handwriting. Id.

[8]Additionally, the Scientific Working Group for Forensic Document Examination which established protocols for handwriting analysis was composed of a group of representatives from federal, state and local law enforcement, private attorneys and academicians. (N.T. 3/27/02 at 31). These protocols underwent several rounds of review and comment from the forensic document community before being implemented. Id.

questioned documents and found that these protocols are reliable.

The method used by Ms. Bolsover is generally accepted.[9] SWIGDOC has promulgated this method and it is the same method previously accepted by the Third Circuit. See Velasquez, 64 F.3d at 850-51. Questioned document analysis is used by law enforcement agencies worldwide, including Interpol, Scotland Yard, the German Intelligence Agency, BKA, Revenue Canadian, Irish Garda, Israeli Police, Taiwan Federal Police, the Central Intelligence Agency, the Federal Bureau of Investigation, Immigration & Naturalization Service, the United States Postal Inspection Service, the Bureau of Alcohol, Tobacco and Firearms, and the United States Secret Service. Id. at 42-43.

The Court has already determined that Ms. Bolsover's extensive experience with questioned document analysis makes her an expert, satisfying the seventh factor under the reliability analysis.

Finally, questioned document analysis is used for non-judicial purposes. Ms. Bolsover and her colleagues have done work for the Federal Communications Commission, the Smithsonian Institution and, of course, the United States Postal Service. (N.T. 3/27/02 at 20.) Considering all of these factors, the evidence is sufficiently reliable for purposes of Rule 702.

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[9]Ms. Bolsover also retains her handwriting analysis certification by the American Board of Forensic Document Examiners. She became certified in 1980 and receives recertification every five years. (N.T. 3/27/02 at 19).

C. Admissibility

Finally, Defendant argues the expert opinion should be excluded under Rules 104 and 403. The Court disagrees. Ms. Bolsover's testimony is admissible under Rule 104[10] and will assist the trier of fact. See Daubert, 509 U.S. at 592-93. Ms. Bolsover's testimony regarding the identification of the questioned documents is relevant in this case. Defendant is charged with conspiring to manufacture and distribute methamphetamine, the manufacture and attempted manufacture of methamphetamine, money laundering conspiracy, and other money laundering and firearms offenses. The Government plans to argue at trial that the two documents in question, the list of materials allegedly used in manufacturing methamphetamine, which was found in Defendant's mother-in-law's residence, and the handwritten list of alleged laboratory supplies, found in a briefcase at the mother-in-law's residence, are part of

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[10]Federal Rule of Evidence 104 provides in relevant part:

> (a) Questions of admissibility generally. Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b).
> . . .
> (b) Relevancy conditioned on fact. When the relevancy of evidence depends upon the fulfillment of a condition of fact, the court shall admit it upon, or subject to, the introduction of evidence sufficient to support a finding of the fulfillment of the condition.

Fed. R. Evid. 104.

the evidence relevant to Defendant's participation in the charges. Because Defendant is charged with the manufacture, attempted manufacture and conspiracy to manufacture methamphetamine, the opinion that Defendant wrote these questioned documents is relevant evidence. Moreover, such opinion testimony will assist the trier of fact. Ms. Bolsover, through her expertise at examining hundreds of thousands of questioned documents, can assist the jury in identifying the scrivener of the questioned documents.

Furthermore, under Federal Rule of Civil Procedure 403[11], such testimony will not unduly prejudice the Defendant. In fact, because Ms. Bolsover's proposed testimony includes details about how she analyzed and determined a handwriting match between Defendant's known exemplars and the questioned documents, along with pictorials of the exemplars and questioned documents, this testimony will enable the jury to observe firsthand how she determined the identity of the scrivener. "The ability of jurors to perform the

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[11]Federal Rule of Evidence 403 provides:

> Exclusion of Relevant Evidence on Grounds of Prejudice, Confusion, or Waste of Time.
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> Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

Fed. R. Evid. 403.

crucial visual comparisons relied upon by handwriting experts cuts against the danger of undue prejudice from the mystique attached to 'experts.'" United States v. Jones, 107 F.3d 1147, 1160 (6th Cir. 1997) (citation omitted).

IV. Conclusion

For all of the reasons stated above, Defendant's Motion is denied. An appropriate Order follows.

IN THE UNITED STATES DISTRICT COURT
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UNITED STATES OF AMERICA	:	CRIMINAL ACTION
	:	
v.	:	
	:	
CARMEN GRICCO	:	NO. 01-90

O R D E R

AND NOW, this day of April, 2002, upon consideration of Defendant Carmen Gricco's Motion in Limine for exclusion of handwriting opinion evidence (Doc. No. 76), all supporting and opposing documentation submitted, and the hearing held before the Court on March 27, 2002, **IT IS HEREBY ORDERED** that the said Motion is **DENIED**.

BY THE COURT:

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John R. Padova, J.