James M. Gannalo

Firearms Consultant /Forensic Instructor

P.O. Box 367
Brooklyn, New York 11228

Phone # (718) 236-7616 Fax # (718) 621-4734 Pager # (917) 247-0793
Email: Stria@msn.com

Updated 9/03

Profession:

Private Consultant, Expert Witness, Forensic Instructor and Training Consultant in the fields of Firearms Operability, Microscopic Examination of Ballistics Evidence, Shooting Reconstructions, Courtroom Preparation and Presentation.

Experience:

Independent Private Consultant **Sept. 1998 to Present**

Forensic Consultation - Conducted independent investigations of all types of Firearms and Toolmark related cases using recognized analytical techniques. As a consultant in the above fields, I've been called upon to examine and analyze evidence, Police Reports, Crime Scene information relating to shootings, research information, gather facts and work directly with counsel for Trial Preparation and Presentation. I've testified extensively as an Expert Witness in the fields of Ballistics, Firearms and Microscopic Examination and provided assistance for various criminal and civil matters in cases of Murder, Assault and weapons possession in New York, New Jersey, Pennsylvania, Delaware, Maryland and Florida.

Recently, I have been retained as a Forensic Consultant in the field of Ballistics Evidence by the Argentine Forensic Anthropology Team, recognized by the United Nations and charged with the forensic investigation of discovered mass graves throughout the world.

Forensic Training - I have been retained, by the New York City Police Department, as a Firearms Consultant/Training Coordinator creating a training curriculum and training manual which prepares new examiners for both competency and proficiency tests according to ASCLAD/LAB standards. I am also currently retained by the Rockland County District Attorney's Office as a Forensic Instructor, Firearms Consultant and Microscopist. I continue to lecture in Continuing Legal Education Seminars and Criminal Investigation Courses in both New York and New Jersey.

New York City Firearms Analysis Section **Oct. 1989 to Sept. 1998**

Assigned as a Detective to this unit, my duties included Firearms Operability Testing, Microscopic Examination and Classification of Ballistics Evidence and evaluation of shooting incidents. Performed in excess of 12,000 firearm tests for Operability and Microscopic Examination of Ballistics Evidence cases in my tenure at this Police Lab. Testified and have been qualified as an Expert Witness in 570 trial cases in United States Federal Court, New York City Supreme, Criminal & Family Courts and in Rockland County Superior Court.

I've participated in investigation and examination of cases with the Federal Bureau of Investigation, Alcohol Tobacco and Firearms, Drug Enforcement Agency, New York State Police and various Police Departments and Detective Units in the region.

While designated as a Unit Training Officer, I trained and lectured to hundreds of Detectives, Police Officers, Attorneys and visitors from around the world. I've offered expert testimony in cases of Capital Murder, Murder, Assault and Firearms Possession trials. I've assisted in examination and evaluations of Gunshot Residue Pattern & Distance tests, Laser Trajectory, Shooting Reconstruction and cases of apparent Suicide, which were actually Murders. I've been interviewed by Court TV's Forensic Files Series and have assisted various Authors, Writers and Journalists in novels, screenplays and articles relating to firearms, assassinations and shootings.

Career Recognition:

NYPD Chief of Detective's Achievement Award	1996
NYPD Detective's Endowment Association – Detective of the Month	1998
NYPD citations for Meritorious and Excellent Police Duties	1982 – 1989
American Legion Post 1060 – Police Officer of the Year	1983

Specialized Training and Coursework:

Glock Firearms Armorer Course	3/95
Crime Scene Reconstruction of Shooting Incidents FBI Academy, Quantico, VA.	7/95
Association of Toolmark & Firearms Examiners Training Seminar	9/96
Heckler & Koch Armorer Course	3/97
NYPD Criminal Investigation Course	11/97
Mossberg Firearm Armorer Course	8/97
NYPD Evidence Collection Team Training Course	1/98
Association of Toolmark & Firearms Examiners Training Seminar	7/99
NYSIAI Educational Conference	3/00
NY,NJ,Conn. Tri-State Training Conference	3/00
Shooting Incident Reconstruction Training Course	5/00
Association of Toolmark & Firearms Examiners Training Seminar	5/02
Ricochet Analysis Training Workshop	5/02
Wound Ballistics Training Workshop	5/02
National Integrated Ballistic Information Network (NIBIN) Training Course	6/02
Shooting Reconstruction & Firearms/Toolmark Examination Protocols (FBI)	11/02
Firearm Serial Number Restoration School (BATF)	1/03
Association of Toolmark & Firearms Examiners Training Seminar	5/03

Professional Affiliations:

Association of Firearms and Toolmark Examiners	(AFTE)
National Rifle Association	(NRA)
International Association of Identification	(IAI) (NYSIAI)
New Jersey State Identification Association	(NJAIA)
International Association of Wound Ballistics	(IAWB)
Association of Crime Scene Reconstruction	(ACSR)
National Association of Criminal Defense Lawyers	(NACDL)
NYS Association of Criminal Defense Lawyers	(NYSACDL)

James M. Gannalo
Firearms/Ballistics Consulting & Expert Witness
P.O. Box 367 Brooklyn, NY 11228 Phone# (718)236-7616 Fax# (718)621-4734

10/9/03

Mr. Joseph F. Sklarosky
1575 Wyoming Avenue
Forty Fort, PA 18704

Re: Commonwealth of Pennsylvania v. Mark Anthony Say

Mr. Sklarosky,

This report was prepared, in the above listed matter, based upon the evaluation of reports submitted, conversations with you in person and via the telephone and knowledge obtained in the field of firearms identification. The information submitted represents my opinion and is based solely on my training, casework experience and acquired knowledge during my years of working in this field.

Professional Background

I have been working in the fields of Firearms Identification and Toolmark Analysis since 1989. At that time, I was assigned to the Ballistics Squad of the New York City Police Department as a Firearms Examiner. During the course of my assignment, I performed in excess of 8000 cases involving firearms operability and over 4000 cases requiring microscopic analysis of firearms related toolmarks.

I have attended various courses and seminars relating to the related subjects of Ballistics, Firearms Operability, Microscopy and Crime Scene Reconstruction of Shootings. These courses were presented by Members of the New York City Police Department, Federal Bureau of Investigation and individual experts in the field.

Since retiring from the NYPD in 1998, I have worked as a Private Consultant in the fields of Firearms Operability and Microscopic Analysis of Ballistic Evidence. I have been retained as an independent expert in cases of murder, attempted murder, accidental discharge of a firearm and shooting reconstruction in the states of New York, New Jersey, Pennsylvania, Maryland and Delaware.

I have trained and lectured to groups of Medical Examiners, Lawyers, Judges, Investigators and Police Officers in New York and New Jersey. I have also been retained as a Forensic Consultant by the New York City Police Department and the Rockland County District Attorney's Office.

Case Related Background

To best understand the basis of this report, I feel that basic information on the operability of a firearm and the causes and effects of gunshot residue should be explained.

Definitions are as follows:

A **firearm** is a device that propels a projectile down a tube by the use of a propellant, which has been ignited. This is the basic description that applies to all firearms.

The **propellant**, when ignited, which creates a gas that expands in an enclosed chamber. The rapid expansion of the gas is used to force the projectile down the tube, known as the barrel, and out of the firearm.

A **cartridge** is made of four parts: the projectile (bullet), the propellant (powder) and the primer all held together in the metallic cartridge case. This device allowed for simple loading and unloading when used in firearms that were loaded by opening access to the chamber.

A **revolver** is a weapon with a revolving cylinder containing a number of firing chambers, which may successively be lined up and discharges through a single barrel.

Pistols are usually self-loading weapons meaning that they automatically unload and then reload themselves every time they are discharged. Utilizing a series of devices in the weapon to extract the discharged shell casing (cartridge case), ejecting it from the weapon and forcing another cartridge into the chamber performs this process. Pistols have only one chamber that is located at the rear of the barrel.

Ballistics - The study of moving projectiles. Internal ballistics deals with what happens inside of firearm upon discharge. External ballistics is the study of a projectile's flight, and Terminal ballistics is the study of the impact of a projectile.

Caliber - The measurement of the bore diameter of a firearm expressed in inches, although such a measurement may be frequently stated in millimeters.

Cartridge - A complete unit of ammunition for small arms consisting of a cartridge case, primer, propellant, and projectile(s), which is inserted into the firing chamber

Chamber - The part of a firearm in which the cartridge is placed prior to discharge.

Gunshot Residue - A combination of visible and invisible substances created by the discharge of a firearm that contains partially burned and unburned propellant, ignited gas by-products and primer residues.

Scanning Electron Microscope - An extremely powerful microscope that is capable of recognizing very small particles.

Case of Pennsylvania v. Mark Anthony Say

To date, I have received a number of items relating to the above case including:

- Copy of the cases Procedural History, #63 of 2002
- Pennsylvania State Police Reports
- SEM Analysis of gunshot residue samples by RJ Lee Group
- Various Autopsy and Crime Scene photographs
- Three videotapes (Video 1 of the scene, 2 x test firing of .357mag Taurus)
- RJ Lee reports
- Distance Determination test photographs

These items were utilized in forming the basis for my conclusions in this case.

In this case, the deceased died of a gunshot wound to the head from a firearm. The question is about the presence, or lack, of gunshot resides on the deceased, Mr. Say or Mr. Joseph Laird and the likelihood of the deceased being capable of using the weapon to shoot herself.

To begin, let's discuss what happens when a firearm discharges a live cartridge.

Firing a weapon produces combustion of the primer and powder of the cartridge. The residue of the combustion products, or unburned primer or powder components, can be used to detect a fired cartridge. Residue may be found on the skin or clothing of the person who fired the gun, on an entrance wound of the person shot, or on other target materials at the scene. The discharge of a firearm, particularly a revolver, can deposit residues even to persons at close proximity, so interpretations as to who fired the weapon should be made with caution.

The major primer elements are lead (Pb), barium (Ba), or antimony (Sb). Usually, all three are present. Less common elements include aluminum (Al), sulfur (S), tin (Sn), calcium (Ca), potassium (K), chlorine (Cl), or silicon (Si). A common primer element not easily detectable is mercury (Hg). Primer elements may be easier to detect in residues because they do not get as hot as the powder, and compounds (not just elements) may be detectable.

The cartridge case, bullet, bullet coating, and metal jacket also contain specific elements that can be detected. Virtually all cartridge cases are made of brass (70% copper and 30% zinc). A few have a nickel coating. Primer cases are of similar composition (Cu-Zn).

Bullet cores are most often lead and antimony, with a very few having a ferrous alloy core. Bullet jackets are usually brass (90% copper with 10% zinc), but some are a ferrous alloy and some are aluminum. Some bullet coatings may also contain nickel.

Modern gunpowder, or "smokeless" powder, can contain up to 23 organic compounds. Nitrocellulose is virtually always present, along with other compounds containing nitrate or nitrogen. One of these compounds, diphenylamine (used as a stabilizer in the powder), can be detected using reagents containing sulfuric acid. Modern gunpowder is further described as "single-base" when the basic ingredient is nitrocellulose and as "double-base" when there is additionally 1 to 40% nitroglycerine added.

In the physical examination of the scene or body for evidence of gunshot residue, it must be remembered that lead residues may mimic gunshot residue. Lead residues may be found up to 30 feet from the muzzle, and are always present on the opposite side of a penetrated target.

Detection of Gunshot Residue

This section addresses the testing of a suspect in shooting cases. This testing can also be done on the victim of a shooting and other individuals possibly present during an incident.

The major methods for detection of primer residues are neutron activation analysis (NAA), atomic absorption spectrophotometry (AAS), and scanning electron microscopy with energy dispersive analysis (SEM.EDA). For these methods, samples must be obtained from the skin surfaces of a subject at the earliest opportunity. Delay in obtaining residues, movement, or washing of the body prior to examination will diminish or destroy gunshot residues.

Scanning electron microscopy with energy dispersive analysis (SEM-EDA) has become an excellent method for detection of gunshot residue. The method of collection is quite simple and easily carried out in the field directly onto the gummed surface of a chuck, or holder, applied to the surface (skin or other material) to be tested. The chuck, with the residue on the surface, can be directly prepared for examination in the SEM device.

A major advantage of this method is that SEM can reveal the actual surface details of the particles examined, for comparison with known examples of gunshot residue, and pictures can be taken. The large particles of partially burned powder and the spheres of residue can be distinguished from contaminant materials.

An X-ray analyzer can be beamed directly onto the particles, so that the energy dispersive pattern (EDX) can be generated, giving the elemental composition of the particles. A computer program to speed up the search for GSR particles by SEM has been developed. It should be remembered that any hand or body part that was close to the fired weapon may have residue appearing consistent with having fired the weapon. Clothing should

always be retained on the body up to autopsy, as this may modify entrance wounds, need examination for gunshot residues, or aid in interpretation of the scene.

Gunshot residue analysis requires careful evaluation. False positives may be caused by contamination or transfer of GSR to the body by mishandling, or when the body is heavily contaminated by GSR from previous shooting. False negatives result from washing of the hands (when this area is sampled) or by the subject wearing gloves. A rifle or shotgun may not deposit GSR on hands.

In cases where there is a body recovered, testing can be performed as to the presence of GSR on the body itself and to the presence of a GSR pattern. This pattern may be seen on the deceased's clothing as a visible grouping of scorch marks, damage to material or punctures in the clothing. There is also the presence of invisible evidence either adhering to or imbedded into the clothing.

This pattern can also be seen on the exposed skin of the deceased or the covered skin of the deceased depending upon how much was absorbed by the deceased's clothing. The presence of GSR deposits (partially burned and unburned propellant) on either skin or material is known as stippling. Whenever this stippling on skin causes small wounds or burn marks it is commonly referred to as tattooing. It is possible to recreate these patterns if the firearm involved in the shooting is recovered and available for additional testing.

SEM analysis of gunshot residue sample results

In this case, 22 items were submitted for testing by an independent laboratory, RJ Lee Group, Inc. for the presence of gunshot residue. This testing was performed using SEM analysis and the results were submitted to your office. These results were well documented and extensive so therefore, I will try to condense these into a manageable amount. These limited results are as to what I feel are important to your case. A final evaluation will be made later in this report.

Name	# of GSR Particles	Clothing tested positive
Mark Anthony Say	162	Levi's Right & Left Legs, Sneakers
Joseph Laird	899	Sweat Shirt, Jeans and Boots
Jamie Walling	121	Jeans, Sweatshirt and Short Sleeved Shirt

These particles were a combination of Barium, Antimony and Lead in sometimes differing percentages but all characteristic of GSR. Additional inconclusive results were submitted for Mr. Say's belt and Rolex watch is just that inconclusive.

According to the court papers submitted for review, both Mr. Say's and Mr. Laird's hands were tested for the presence of GSR, with negative results. The testing of the deceased's hands, for the presence of GSR, apparently was not requested nor attempted.

Gunshot Residue Distance Determination Testing

At times it will be necessary, either for the investigation or prosecution of a case, to attempt to recreate a GSR pattern that is present on the deceased's skin or clothing. This pattern must be recreated using the weapon fired in this case and all attempts must be made to use the same or similar ammunition used in the actual shooting. This is due to the fact that different ammunition can create different patterns from the same gun. Naturally, different firearms, even if they are the same model and brand, will create different patterns.

Whenever a firearm is discharged, an amount of burning gases, partially burnt and unburnt propellant will be expelled from the weapon. These substances, known as gunshot residue, will travel away from the firearm for a distance and expand into a rapidly growing circular pattern. This pattern will be visible out to a distance of about 18 inches, depending upon the firearm, length of barrel, angle of the muzzle to target, type of ammunition and caliber. This pattern will adhere itself to the victim's skin or clothing and can be replicated in laboratory conditions by the Firearms Examiner. When evaluating test results against the actual shooting evidence, factors such as excessive bleeding, administered first aid and damage caused to clothing by emergency medical personnel must be considered.

Pennsylvania State Police GSR Distance Determination Test results

According to the submitted report, W00-3065-B, test results concluded that ***"significant amounts of gunpowder residues were absent at a muzzle distance of 12 inches or greater and that no residues were found at a muzzle distance of 24 inches or greater."***

Additionally, it was concluded that ***"The absence of gunpowder residue or singing or burning of the hair indicates that the distance of the muzzle of the firearm to the deceased's head was not contact or near contact, but held a distance away."***

These conclusions were based on the test results conducted by Sgt. Mogish of the Pennsylvania State Police Laboratory.

Opinions, Testing and Conclusions

The following conclusions are based solely on the submitted case information, discussions with your office and a combination of my training, knowledge and practical experience of similar casework.

As stated previously in this report, whenever a firearm is discharged a large amount of gunshot residue is expelled from the barrel and other parts of the weapon. This GSR is made up of super heated gases and particles that are by-products of the propellant used to push the bullet down the barrel of the weapon. The particles travel a relatively short distance away from the barrel, a few feet, and then fall to the ground if they do not adhere

to a surface. The gases, on the other hand, are spewed forth into the air where they are moved about by normal air flow, movement of objects and gravity.

The molecule that is created by the primer material, a combination of barium, antimony and lead, is forced out of the barrel as a gas and eventually cools to a fine vapor. This vapor contains the molecules of GSR that are shaped into round particles that are extremely small, about 10 microns. As an example as to how small that is, a bacteria is about 3-15 microns across and weapons grade Anthrax, small enough to pass through the fibers of an envelope are 3 microns in size.

Therefore, GSR particles will be airborne for a period of time after a weapon is discharged and will travel through the air at different heights and distances until they either adhere to a surface or fall to the ground. A person walking into an area where a firearm has been discharged will encounter airborne GSR particles. This can cause a positive result for the test of the presence of GSR in a person who did not fire the weapon.

In this case, all three of the persons present had positive results as to the presence of GSR on their clothing. Both the deceased and Mr. Say had approximately the same amount of particles present whereas Mr. Laird has about five times the amount of particles present on his clothing. This is not to conclude that Mr. Laird was the person firing the weapon, it just illustrates how the GSR particles are distributed in a room.

Naturally, the deceased was directly exposed to the expelling of the firearms discharge as the presence of GSR on most of her clothing shows. The other two people present also have a presence of GSR on their clothing but in different location on their bodies. Mr. Laird had GSR present on the upper & lower portions of his body and Mr. Say had GSR present on the lower portion of his body alone.

The basic question in this case is not if GSR was present on Mr. Say's clothing, it is how it was deposited there. He may have picked it up on his clothing, jeans and sneakers, as he entered the room after a gunshot was fired. The same can be true for Mr. Laird who showed the presence of GSR on his clothing. Did these men walk into the room after the gunshot, did they render assistance to the deceased and expose themselves to the GSR, and both are valid questions.

According to the submitted reports, both Mr. Say's and Mr. Laird's hands tested negative as to the presence of GSR. Why wasn't the deceased's hands tested in this matter? This test could have been done at anytime after the shooting. The reason being, the test for GSR on the hands of a live person must always be done in a timely fashion due to the possibility of that person washing or wiping their hands. GSR on a dead person is less likely to be removed by either police officials or responding medical personnel and obviously not by the decedent.

Ms. Walling's hands appear to have some sort of dirt or discoloration on them as they appear in the medical examiner's photographs. I had an opportunity to review these

photographs in both black/white and color. Remembering that the mere presence of GSR on a person's hands doesn't necessarily mean that the person fired the weapon, a test for its presence should have been conducted.

I feel that this test, if it were conducted, could have provided valuable information to the investigators in this case. Unfortunately, this information was lost when the decision was made not to test Ms. Walling's hands.

The wound on the deceased's head appears to be consistent with a near to intermediate contact wound. These types of wounds are created when the firearm is discharged at a close proximity or within a few inches of the body. These wounds will create a bullet wound with an amount of soot and stippling visible. The amount and size of the pattern of the stippling, also referred to as tattooing, can be used to determine how far away the weapon was discharged from. In this case, only a small amount of stippling is visible which is consistent with a near or intermediate wound. The gunshot pattern test, conducted by the prosecution, was necessary to accurately determine the distance that this particular weapon was discharged from the deceased's body.

The GSR distance determination tests results show a large amount of GSR was present on the test material up to 12" and were significantly absent after 12 inches. Additional factors such as the deceased's hair, excessive bleeding of the wound and first aid rendered on Ms. Walling have to be considered in evaluating the presence or lack thereof gunshot residue around the wound. This would then allow, based on these factors and the significant decrease of GSR deposits after a distance of 12 inches, the deceased the **possibility** of holding the barrel of the weapon as close as 12 ½" away from her head when discharged.

Your office raised the possibility that the deceased could have held the firearm in two different ways. The first could have been by holding the firearm in a two handed grip with both arms extended away from the body and with the trigger depressed by using one or both of her thumbs. The characteristics of the wound, on the right side of the head, front to back, right to left and at an upward angle would mean that the deceased's head would have to be turned toward her left shoulder when the shot was discharged.

Judging by the stated length of the victims arms this would bring the muzzle of the firearm to a distance less then 24 inches from the head. Conversely, the firearm could have been held to a distance greater than 12 inches from her head and discharged in that applied fashion. I feel that the deceased could have held the firearm and squeezed the trigger in such a fashion with the muzzle of the firearm greater then 12 inches away from her head. I based this opinion after considering factors such as the angle of the head combined with the range of angles that the weapon could have been held away from the deceased's body.

With regards to the other possible scenario, with the deceased holding the firearm away from her head in her right hand, I tried to address this problem by conducting an independent test using a variety of test subjects.

I attempted to recreate conditions allowing for the deceased to hold and operate the revolver, held in her right hand, at a distance in excess of 12" from the side of her head. I also took into account the angle of the shot, the movement possibilities of the head and wrist and the strength needed to pull the trigger. I was able to use myself, four female subjects and a .38cal Colt revolver with a 2" barrel that is similar to the recovered firearm.

The weapon was fitted, for distance testing purposes, with a 12" cardboard tube that was affixed to the barrel with a barrel cleaning brush. The overall distance from the end of the cardboard tube to the barrel, including a small exposed portion of the brush was 12 ½" long.

All of the test subjects held the unloaded firearm in their right hands and attempted to operate the weapon at an angle similar to the actual fatal shot in both double and single action fashion. I recorded the maximum distance that each was able to operate the firearm successfully. I have listed the results below:

Test Data:

Subject	Age	Length of arm	Distance from head	Trigger Action
Male	49	Shoulder/Wrist 24" Shoulder/Fingertip 31"	12 ½" to 14 ½"	Double/single
Female	49	Shoulder/Wrist 19" Shoulder/Fingertip 24 ½"	12 ½"	Single (Only)
Female	24	Shoulder/Wrist 20" Shoulder/Fingertip 24 ½"	12 ½" to 13"	Single (Only)
Female	51	Shoulder/Wrist 19 ½" Shoulder/Fingertip 23 ½"	12 ½"	Single (Only)
Female	19	Shoulder/Wrist 21" Shoulder/Fingertip 25 ½"	12 ½" to 13 ½"	Single (Only)

Results - As the results show, it was ***possible*** for all of the females to extend to at least the 12 ½" distance needed to recreate the deceased shooting herself and possibly obtaining the same GSR results. The male (myself) was able to extend to 14 ½", but you must take into account the difference in arm length and dexterity operating a firearm.

All of the females showed a lack of strength to operate the trigger in a double action method, but ***were capable*** of firing the weapon when the weapon was cocked. Factors affecting this test would be arm length, wrist flexibility and strength in both the fingers and forearm.

In conclusion, in this case, as in all cases that question homicide v. suicide, a few unanswered questions exist. Did the deceased shoot herself or was she shot by another person. Let's take the most important questions raised in this case individually.

Gunshot Residue Test Results - The GSR evidence results are inconclusive as to whether she was shot by Mr. Say or not. If one assumes that she was shot by Mr. Say, then why wasn't GSR found to be present on his hands or watch. Also why was the presence of GSR only detected on clothing from his lower body? Additionally, why weren't the deceased's hands tested for the presence of GSR? This test could have been completed anytime after she was removed to the hospital or morgue. Is Mr. Say right handed and what wrist did he wear his watch on? These are all, in my opinion valid questions that can be asked in this matter.

Lack of Stippling at the Wound - During our meeting, we discussed the possibilities of both the distance that the deceased could have held the weapon from her head and if the introduction of an intermediate object (hair) could affect the GSR results. The possibilities of these factors affecting the GSR tests are, in my opinion, plausible. Anytime an intermediate object is placed between the barrel of a weapon and the wound, it can affect the visible results of GSR deposits.

Additionally, the method of safeguarding the wound for before examination is questionable. Understandably, the treatment of the deceased to save her life is paramount, but the medical stitching of the wound combined with the cleansing and handling of the area around the wound must be taken into account.

Gunshot Residue Distance Determination Test Results - These results can usually be important to the determination of a self-inflicted wound. The Pennsylvania State Police Lab was able to conduct this test using similar live cartridges to the rounds found in the revolver. Their results were that the distance the muzzle of the firearm was held from the deceased's head was not contact or near contact but held a distance away. There is no mention of the examiner determining that the weapon was held over 24 inches away. Therefore, it is plausible that the weapon could have been discharged at a distance less then 24 inches away, based on the factors mentioned previously.

My own test results support the possibility that this weapon could have been discharged from a distance of 12 ½" from the test participants heads. These results were concluded using five people of varying ages, arm lengths and manual dexterity with the purpose of illustrating the ability of various test subjects to discharge the weapon.

Taking into account the angle relationship of the side of the head to the muzzle of the firearm a variety of factors were considered in reaching this conclusion.

Another factor, born out by the tests that should be addressed is the familiarity of firearms to the deceased. In my opinion, the deceased would know how to cock the firearm and discharge the weapon in a single action manner. We may assume that the

deceased had similar dexterity as the test subjects had, considering the varied differences in age and length of the subject's arm.

Therefore, it is my opinion, based on a reasonable degree of professional certainty, that it ***was possible*** for the deceased to hold the weapon at least 12 ½" away from her head, in either a two handed grip with the head turned to the left or a one handed grip with the weapon in her right hand extended to the right of the head and discharge the firearm.

Respectfully Submitted,

James M. Gannalo

James M. Gannalo

James M. Gannalo

Firearms Consultant /Forensic Instructor

P.O. Box 367
Brooklyn, New York 11228

Phone # (718) 236-7616 Fax # (718) 621-4734 Pager # (917) 247-0793
Email: Stria@msn.com

Updated 9/03

Profession:

Private Consultant, Expert Witness, Forensic Instructor and Training Consultant in the fields of Firearms Operability, Microscopic Examination of Ballistics Evidence, Shooting Reconstructions, Courtroom Preparation and Presentation.

Experience:

Independent Private Consultant **Sept. 1998 to Present**

Forensic Consultation - Conducted independent investigations of all types of Firearms and Toolmark related cases using recognized analytical techniques. As a consultant in the above fields, I've been called upon to examine and analyze evidence, Police Reports, Crime Scene information relating to shootings, research information, gather facts and work directly with counsel for Trial Preparation and Presentation. I've testified extensively as an Expert Witness in the fields of Ballistics, Firearms and Microscopic Examination and provided assistance for various criminal and civil matters in cases of Murder, Assault and weapons possession in New York, New Jersey, Pennsylvania, Delaware, Maryland and Florida.

Recently, I have been retained as a Forensic Consultant in the field of Ballistics Evidence by the Argentine Forensic Anthropology Team, recognized by the United Nations and charged with the forensic investigation of discovered mass graves throughout the world.

Forensic Training - I have been retained, by the New York City Police Department, as a Firearms Consultant/Training Coordinator creating a training curriculum and training manual which prepares new examiners for both competency and proficiency tests according to ASCLAD/LAB standards. I am also currently retained by the Rockland County District Attorney's Office as a Forensic Instructor, Firearms Consultant and Microscopist. I continue to lecture in Continuing Legal Education Seminars and Criminal Investigation Courses in both New York and New Jersey.

New York City Firearms Analysis Section **Oct. 1989 to Sept. 1998**

Assigned as a Detective to this unit, my duties included Firearms Operability Testing, Microscopic Examination and Classification of Ballistics Evidence and evaluation of shooting incidents. Performed in excess of 12,000 firearm tests for Operability and Microscopic Examination of Ballistics Evidence cases in my tenure at this Police Lab. Testified and have been qualified as an Expert Witness in 570 trial cases in United States Federal Court, New York City Supreme, Criminal & Family Courts and in Rockland County Superior Court.

I've participated in investigation and examination of cases with the Federal Bureau of Investigation, Alcohol Tobacco and Firearms, Drug Enforcement Agency, New York State Police and various Police Departments and Detective Units in the region.

While designated as a Unit Training Officer, I trained and lectured to hundreds of Detectives, Police Officers, Attorneys and visitors from around the world. I've offered expert testimony in cases of Capital Murder, Murder, Assault and Firearms Possession trials. I've assisted in examination and evaluations of Gunshot Residue Pattern & Distance tests, Laser Trajectory, Shooting Reconstruction and cases of apparent Suicide, which were actually Murders. I've been interviewed by Court TV's Forensic Files Series and have assisted various Authors, Writers and Journalists in novels, screenplays and articles relating to firearms, assassinations and shootings.

Career Recognition:

NYPD Chief of Detective's Achievement Award	1996
NYPD Detective's Endowment Association – Detective of the Month	1998
NYPD citations for Meritorious and Excellent Police Duties	1982 – 1989
American Legion Post 1060 – Police Officer of the Year	1983

Specialized Training and Coursework:

Glock Firearms Armorer Course	3/95
Crime Scene Reconstruction of Shooting Incidents FBI Academy, Quantico, VA.	7/95
Association of Toolmark & Firearms Examiners Training Seminar	9/96
Heckler & Koch Armorer Course	3/97
NYPD Criminal Investigation Course	11/97
Mossberg Firearm Armorer Course	8/97
NYPD Evidence Collection Team Training Course	1/98
Association of Toolmark & Firearms Examiners Training Seminar	7/99
NYSIAI Educational Conference	3/00
NY,NJ,Conn. Tri-State Training Conference	3/00
Shooting Incident Reconstruction Training Course	5/00
Association of Toolmark & Firearms Examiners Training Seminar	5/02
Ricochet Analysis Training Workshop	5/02
Wound Ballistics Training Workshop	5/02
National Integrated Ballistic Information Network (NIBIN) Training Course	6/02
Shooting Reconstruction & Firearms/Toolmark Examination Protocols (FBI)	11/02
Firearm Serial Number Restoration School (BATF)	1/03
Association of Toolmark & Firearms Examiners Training Seminar	5/03

Professional Affiliations:

Association of Firearms and Toolmark Examiners	(AFTE)
National Rifle Association	(NRA)
International Association of Identification	(IAI) (NYSIAI)
New Jersey State Identification Association	(NJAIA)
International Association of Wound Ballistics	(IAWB)
Association of Crime Scene Reconstruction	(ACSR)
National Association of Criminal Defense Lawyers	(NACDL)
NYS Association of Criminal Defense Lawyers	(NYSACDL)

James M. Gannalo
Firearms/Ballistics Consulting & Expert Witness
P.O. Box 367 Brooklyn, NY 11228 Phone# (718)236-7616 Fax# (718)621-4734

10/9/03

Mr. Joseph F. Sklarosky
1575 Wyoming Avenue
Forty Fort, PA 18704

Re: Commonwealth of Pennsylvania v. Mark Anthony Say

Mr. Sklarosky,

This report was prepared, in the above listed matter, based upon the evaluation of reports submitted, conversations with you in person and via the telephone and knowledge obtained in the field of firearms identification. The information submitted represents my opinion and is based solely on my training, casework experience and acquired knowledge during my years of working in this field.

Professional Background

I have been working in the fields of Firearms Identification and Toolmark Analysis since 1989. At that time, I was assigned to the Ballistics Squad of the New York City Police Department as a Firearms Examiner. During the course of my assignment, I performed in excess of 8000 cases involving firearms operability and over 4000 cases requiring microscopic analysis of firearms related toolmarks.

I have attended various courses and seminars relating to the related subjects of Ballistics, Firearms Operability, Microscopy and Crime Scene Reconstruction of Shootings. These courses were presented by Members of the New York City Police Department, Federal Bureau of Investigation and individual experts in the field.

Since retiring from the NYPD in 1998, I have worked as a Private Consultant in the fields of Firearms Operability and Microscopic Analysis of Ballistic Evidence. I have been retained as an independent expert in cases of murder, attempted murder, accidental discharge of a firearm and shooting reconstruction in the states of New York, New Jersey, Pennsylvania, Maryland and Delaware.

I have trained and lectured to groups of Medical Examiners, Lawyers, Judges, Investigators and Police Officers in New York and New Jersey. I have also been retained as a Forensic Consultant by the New York City Police Department and the Rockland County District Attorney's Office.

Case Related Background

To best understand the basis of this report, I feel that basic information on the operability of a firearm and the causes and effects of gunshot residue should be explained.

Definitions are as follows:

A **firearm** is a device that propels a projectile down a tube by the use of a propellant, which has been ignited. This is the basic description that applies to all firearms.

The **propellant**, when ignited, which creates a gas that expands in an enclosed chamber. The rapid expansion of the gas is used to force the projectile down the tube, known as the barrel, and out of the firearm.

A **cartridge** is made of four parts: the projectile (bullet), the propellant (powder) and the primer all held together in the metallic cartridge case. This device allowed for simple loading and unloading when used in firearms that were loaded by opening access to the chamber.

A **revolver** is a weapon with a revolving cylinder containing a number of firing chambers, which may successively be lined up and discharges through a single barrel.

Pistols are usually self-loading weapons meaning that they automatically unload and then reload themselves every time they are discharged. Utilizing a series of devices in the weapon to extract the discharged shell casing (cartridge case), ejecting it from the weapon and forcing another cartridge into the chamber performs this process. Pistols have only one chamber that is located at the rear of the barrel.

Ballistics - The study of moving projectiles. Internal ballistics deals with what happens inside of firearm upon discharge. External ballistics is the study of a projectile's flight, and Terminal ballistics is the study of the impact of a projectile.

Caliber - The measurement of the bore diameter of a firearm expressed in inches, although such a measurement may be frequently stated in millimeters.

Cartridge - A complete unit of ammunition for small arms consisting of a cartridge case, primer, propellant, and projectile(s), which is inserted into the firing chamber

Chamber - The part of a firearm in which the cartridge is placed prior to discharge.

Gunshot Residue - A combination of visible and invisible substances created by the discharge of a firearm that contains partially burned and unburned propellant, ignited gas by-products and primer residues.

Scanning Electron Microscope - An extremely powerful microscope that is capable of recognizing very small particles.

Case of Pennsylvania v. Mark Anthony Say

To date, I have received a number of items relating to the above case including:

- Copy of the cases Procedural History, #63 of 2002
- Pennsylvania State Police Reports
- SEM Analysis of gunshot residue samples by RJ Lee Group
- Various Autopsy and Crime Scene photographs
- Three videotapes (Video 1 of the scene, 2 x test firing of .357mag Taurus)
- RJ Lee reports
- Distance Determination test photographs

These items were utilized in forming the basis for my conclusions in this case.

In this case, the deceased died of a gunshot wound to the head from a firearm. The question is about the presence, or lack, of gunshot resides on the deceased, Mr. Say or Mr. Joseph Laird and the likelihood of the deceased being capable of using the weapon to shoot herself.

To begin, let's discuss what happens when a firearm discharges a live cartridge.

Firing a weapon produces combustion of the primer and powder of the cartridge. The residue of the combustion products, or unburned primer or powder components, can be used to detect a fired cartridge. Residue may be found on the skin or clothing of the person who fired the gun, on an entrance wound of the person shot, or on other target materials at the scene. The discharge of a firearm, particularly a revolver, can deposit residues even to persons at close proximity, so interpretations as to who fired the weapon should be made with caution.

The major primer elements are lead (Pb), barium (Ba), or antimony (Sb). Usually, all three are present. Less common elements include aluminum (Al), sulfur (S), tin (Sn), calcium (Ca), potassium (K), chlorine (Cl), or silicon (Si). A common primer element not easily detectable is mercury (Hg). Primer elements may be easier to detect in residues because they do not get as hot as the powder, and compounds (not just elements) may be detectable.

The cartridge case, bullet, bullet coating, and metal jacket also contain specific elements that can be detected. Virtually all cartridge cases are made of brass (70% copper and 30% zinc). A few have a nickel coating. Primer cases are of similar composition (Cu-Zn).

Bullet cores are most often lead and antimony, with a very few having a ferrous alloy core. Bullet jackets are usually brass (90% copper with 10% zinc), but some are a ferrous alloy and some are aluminum. Some bullet coatings may also contain nickel.

Modern gunpowder, or "smokeless" powder, can contain up to 23 organic compounds. Nitrocellulose is virtually always present, along with other compounds containing nitrate or nitrogen. One of these compounds, diphenylamine (used as a stabilizer in the powder), can be detected using reagents containing sulfuric acid. Modern gunpowder is further described as "single-base" when the basic ingredient is nitrocellulose and as "double-base" when there is additionally 1 to 40% nitroglycerine added.

In the physical examination of the scene or body for evidence of gunshot residue, it must be remembered that lead residues may mimic gunshot residue. Lead residues may be found up to 30 feet from the muzzle, and are always present on the opposite side of a penetrated target.

Detection of Gunshot Residue

This section addresses the testing of a suspect in shooting cases. This testing can also be done on the victim of a shooting and other individuals possibly present during an incident.

The major methods for detection of primer residues are neutron activation analysis (NAA), atomic absorption spectrophotometry (AAS), and scanning electron microscopy with energy dispersive analysis (SEM.EDA). For these methods, samples must be obtained from the skin surfaces of a subject at the earliest opportunity. Delay in obtaining residues, movement, or washing of the body prior to examination will diminish or destroy gunshot residues.

Scanning electron microscopy with energy dispersive analysis (SEM-EDA) has become an excellent method for detection of gunshot residue. The method of collection is quite simple and easily carried out in the field directly onto the gummed surface of a chuck, or holder, applied to the surface (skin or other material) to be tested. The chuck, with the residue on the surface, can be directly prepared for examination in the SEM device.

A major advantage of this method is that SEM can reveal the actual surface details of the particles examined, for comparison with known examples of gunshot residue, and pictures can be taken. The large particles of partially burned powder and the spheres of residue can be distinguished from contaminant materials.

An X-ray analyzer can be beamed directly onto the particles, so that the energy dispersive pattern (EDX) can be generated, giving the elemental composition of the particles. A computer program to speed up the search for GSR particles by SEM has been developed. It should be remembered that any hand or body part that was close to the fired weapon may have residue appearing consistent with having fired the weapon. Clothing should

always be retained on the body up to autopsy, as this may modify entrance wounds, need examination for gunshot residues, or aid in interpretation of the scene.

Gunshot residue analysis requires careful evaluation. False positives may be caused by contamination or transfer of GSR to the body by mishandling, or when the body is heavily contaminated by GSR from previous shooting. False negatives result from washing of the hands (when this area is sampled) or by the subject wearing gloves. A rifle or shotgun may not deposit GSR on hands.

In cases where there is a body recovered, testing can be performed as to the presence of GSR on the body itself and to the presence of a GSR pattern. This pattern may be seen on the deceased's clothing as a visible grouping of scorch marks, damage to material or punctures in the clothing. There is also the presence of invisible evidence either adhering to or imbedded into the clothing.

This pattern can also be seen on the exposed skin of the deceased or the covered skin of the deceased depending upon how much was absorbed by the deceased's clothing. The presence of GSR deposits (partially burned and unburned propellant) on either skin or material is known as stippling. Whenever this stippling on skin causes small wounds or burn marks it is commonly referred to as tattooing. It is possible to recreate these patterns if the firearm involved in the shooting is recovered and available for additional testing.

SEM analysis of gunshot residue sample results

In this case, 22 items were submitted for testing by an independent laboratory, RJ Lee Group, Inc. for the presence of gunshot residue. This testing was performed using SEM analysis and the results were submitted to your office. These results were well documented and extensive so therefore, I will try to condense these into a manageable amount. These limited results are as to what I feel are important to your case. A final evaluation will be made later in this report.

Name	# of GSR Particles	Clothing tested positive
Mark Anthony Say	162	Levi's Right & Left Legs, Sneakers
Joseph Laird	899	Sweat Shirt, Jeans and Boots
Jamie Walling	121	Jeans, Sweatshirt and Short Sleeved Shirt

These particles were a combination of Barium, Antimony and Lead in sometimes differing percentages but all characteristic of GSR. Additional inconclusive results were submitted for Mr. Say's belt and Rolex watch is just that inconclusive.

According to the court papers submitted for review, both Mr. Say's and Mr. Laird's hands were tested for the presence of GSR, with negative results. The testing of the deceased's hands, for the presence of GSR, apparently was not requested nor attempted.

Gunshot Residue Distance Determination Testing

At times it will be necessary, either for the investigation or prosecution of a case, to attempt to recreate a GSR pattern that is present on the deceased's skin or clothing. This pattern must be recreated using the weapon fired in this case and all attempts must be made to use the same or similar ammunition used in the actual shooting. This is due to the fact that different ammunition can create different patterns from the same gun. Naturally, different firearms, even if they are the same model and brand, will create different patterns.

Whenever a firearm is discharged, an amount of burning gases, partially burnt and unburnt propellant will be expelled from the weapon. These substances, known as gunshot residue, will travel away from the firearm for a distance and expand into a rapidly growing circular pattern. This pattern will be visible out to a distance of about 18 inches, depending upon the firearm, length of barrel, angle of the muzzle to target, type of ammunition and caliber. This pattern will adhere itself to the victim's skin or clothing and can be replicated in laboratory conditions by the Firearms Examiner. When evaluating test results against the actual shooting evidence, factors such as excessive bleeding, administered first aid and damage caused to clothing by emergency medical personnel must be considered.

Pennsylvania State Police GSR Distance Determination Test results

According to the submitted report, W00-3065-B, test results concluded that ***"significant amounts of gunpowder residues were absent at a muzzle distance of 12 inches or greater and that no residues were found at a muzzle distance of 24 inches or greater."***

Additionally, it was concluded that ***"The absence of gunpowder residue or singing or burning of the hair indicates that the distance of the muzzle of the firearm to the deceased's head was not contact or near contact, but held a distance away."***

These conclusions were based on the test results conducted by Sgt. Mogish of the Pennsylvania State Police Laboratory.

Opinions, Testing and Conclusions

The following conclusions are based solely on the submitted case information, discussions with your office and a combination of my training, knowledge and practical experience of similar casework.

As stated previously in this report, whenever a firearm is discharged a large amount of gunshot residue is expelled from the barrel and other parts of the weapon. This GSR is made up of super heated gases and particles that are by-products of the propellant used to push the bullet down the barrel of the weapon. The particles travel a relatively short distance away from the barrel, a few feet, and then fall to the ground if they do not adhere

to a surface. The gases, on the other hand, are spewed forth into the air where they are moved about by normal air flow, movement of objects and gravity.

The molecule that is created by the primer material, a combination of barium, antimony and lead, is forced out of the barrel as a gas and eventually cools to a fine vapor. This vapor contains the molecules of GSR that are shaped into round particles that are extremely small, about 10 microns. As an example as to how small that is, a bacteria is about 3-15 microns across and weapons grade Anthrax, small enough to pass through the fibers of an envelope are 3 microns in size.

Therefore, GSR particles will be airborne for a period of time after a weapon is discharged and will travel through the air at different heights and distances until they either adhere to a surface or fall to the ground. A person walking into an area where a firearm has been discharged will encounter airborne GSR particles. This can cause a positive result for the test of the presence of GSR in a person who did not fire the weapon.

In this case, all three of the persons present had positive results as to the presence of GSR on their clothing. Both the deceased and Mr. Say had approximately the same amount of particles present whereas Mr. Laird has about five times the amount of particles present on his clothing. This is not to conclude that Mr. Laird was the person firing the weapon, it just illustrates how the GSR particles are distributed in a room.

Naturally, the deceased was directly exposed to the expelling of the firearms discharge as the presence of GSR on most of her clothing shows. The other two people present also have a presence of GSR on their clothing but in different location on their bodies. Mr. Laird had GSR present on the upper & lower portions of his body and Mr. Say had GSR present on the lower portion of his body alone.

The basic question in this case is not if GSR was present on Mr. Say's clothing, it is how it was deposited there. He may have picked it up on his clothing, jeans and sneakers, as he entered the room after a gunshot was fired. The same can be true for Mr. Laird who showed the presence of GSR on his clothing. Did these men walk into the room after the gunshot, did they render assistance to the deceased and expose themselves to the GSR, and both are valid questions.

According to the submitted reports, both Mr. Say's and Mr. Laird's hands tested negative as to the presence of GSR. Why wasn't the deceased's hands tested in this matter? This test could have been done at anytime after the shooting. The reason being, the test for GSR on the hands of a live person must always be done in a timely fashion due to the possibility of that person washing or wiping their hands. GSR on a dead person is less likely to be removed by either police officials or responding medical personnel and obviously not by the decedent.

Ms. Walling's hands appear to have some sort of dirt or discoloration on them as they appear in the medical examiner's photographs. I had an opportunity to review these

photographs in both black/white and color. Remembering that the mere presence of GSR on a person's hands doesn't necessarily mean that the person fired the weapon, a test for its presence should have been conducted.

I feel that this test, if it were conducted, could have provided valuable information to the investigators in this case. Unfortunately, this information was lost when the decision was made not to test Ms. Walling's hands.

The wound on the deceased's head appears to be consistent with a near to intermediate contact wound. These types of wounds are created when the firearm is discharged at a close proximity or within a few inches of the body. These wounds will create a bullet wound with an amount of soot and stippling visible. The amount and size of the pattern of the stippling, also referred to as tattooing, can be used to determine how far away the weapon was discharged from. In this case, only a small amount of stippling is visible which is consistent with a near or intermediate wound. The gunshot pattern test, conducted by the prosecution, was necessary to accurately determine the distance that this particular weapon was discharged from the deceased's body.

The GSR distance determination tests results show a large amount of GSR was present on the test material up to 12" and were significantly absent after 12 inches. Additional factors such as the deceased's hair, excessive bleeding of the wound and first aid rendered on Ms. Walling have to be considered in evaluating the presence or lack thereof gunshot residue around the wound. This would then allow, based on these factors and the significant decrease of GSR deposits after a distance of 12 inches, the deceased the **possibility** of holding the barrel of the weapon as close as 12 ½" away from her head when discharged.

Your office raised the possibility that the deceased could have held the firearm in two different ways. The first could have been by holding the firearm in a two handed grip with both arms extended away from the body and with the trigger depressed by using one or both of her thumbs. The characteristics of the wound, on the right side of the head, front to back, right to left and at an upward angle would mean that the deceased's head would have to be turned toward her left shoulder when the shot was discharged.

Judging by the stated length of the victims arms this would bring the muzzle of the firearm to a distance less then 24 inches from the head. Conversely, the firearm could have been held to a distance greater than 12 inches from her head and discharged in that applied fashion. I feel that the deceased could have held the firearm and squeezed the trigger in such a fashion with the muzzle of the firearm greater then 12 inches away from her head. I based this opinion after considering factors such as the angle of the head combined with the range of angles that the weapon could have been held away from the deceased's body.

With regards to the other possible scenario, with the deceased holding the firearm away from her head in her right hand, I tried to address this problem by conducting an independent test using a variety of test subjects.

I attempted to recreate conditions allowing for the deceased to hold and operate the revolver, held in her right hand, at a distance in excess of 12" from the side of her head. I also took into account the angle of the shot, the movement possibilities of the head and wrist and the strength needed to pull the trigger. I was able to use myself, four female subjects and a .38cal Colt revolver with a 2" barrel that is similar to the recovered firearm.

The weapon was fitted, for distance testing purposes, with a 12" cardboard tube that was affixed to the barrel with a barrel cleaning brush. The overall distance from the end of the cardboard tube to the barrel, including a small exposed portion of the brush was 12 ½" long.

All of the test subjects held the unloaded firearm in their right hands and attempted to operate the weapon at an angle similar to the actual fatal shot in both double and single action fashion. I recorded the maximum distance that each was able to operate the firearm successfully. I have listed the results below:

Test Data:

Subject	Age	Length of arm	Distance from head	Trigger Action
Male	49	Shoulder/Wrist 24" Shoulder/Fingertip 31"	12 ½" to 14 ½"	Double/single
Female	49	Shoulder/Wrist 19" Shoulder/Fingertip 24 ½"	12 ½"	Single (Only)
Female	24	Shoulder/Wrist 20" Shoulder/Fingertip 24 ½"	12 ½" to 13"	Single (Only)
Female	51	Shoulder/Wrist 19 ½" Shoulder/Fingertip 23 ½"	12 ½"	Single (Only)
Female	19	Shoulder/Wrist 21" Shoulder/Fingertip 25 ½"	12 ½" to 13 ½"	Single (Only)

Results - As the results show, it was ***possible*** for all of the females to extend to at least the 12 ½" distance needed to recreate the deceased shooting herself and possibly obtaining the same GSR results. The male (myself) was able to extend to 14 ½", but you must take into account the difference in arm length and dexterity operating a firearm.

All of the females showed a lack of strength to operate the trigger in a double action method, but ***were capable*** of firing the weapon when the weapon was cocked. Factors affecting this test would be arm length, wrist flexibility and strength in both the fingers and forearm.

In conclusion, in this case, as in all cases that question homicide v. suicide, a few unanswered questions exist. Did the deceased shoot herself or was she shot by another person. Let's take the most important questions raised in this case individually.

Gunshot Residue Test Results - The GSR evidence results are inconclusive as to whether she was shot by Mr. Say or not. If one assumes that she was shot by Mr. Say, then why wasn't GSR found to be present on his hands or watch. Also why was the presence of GSR only detected on clothing from his lower body? Additionally, why weren't the deceased's hands tested for the presence of GSR? This test could have been completed anytime after she was removed to the hospital or morgue. Is Mr. Say right handed and what wrist did he wear his watch on? These are all, in my opinion valid questions that can be asked in this matter.

Lack of Stippling at the Wound - During our meeting, we discussed the possibilities of both the distance that the deceased could have held the weapon from her head and if the introduction of an intermediate object (hair) could affect the GSR results. The possibilities of these factors affecting the GSR tests are, in my opinion, plausible. Anytime an intermediate object is placed between the barrel of a weapon and the wound, it can affect the visible results of GSR deposits.

Additionally, the method of safeguarding the wound for before examination is questionable. Understandably, the treatment of the deceased to save her life is paramount, but the medical stitching of the wound combined with the cleansing and handling of the area around the wound must be taken into account.

Gunshot Residue Distance Determination Test Results - These results can usually be important to the determination of a self-inflicted wound. The Pennsylvania State Police Lab was able to conduct this test using similar live cartridges to the rounds found in the revolver. Their results were that the distance the muzzle of the firearm was held from the deceased's head was not contact or near contact but held a distance away. There is no mention of the examiner determining that the weapon was held over 24 inches away. Therefore, it is plausible that the weapon could have been discharged at a distance less then 24 inches away, based on the factors mentioned previously.

My own test results support the possibility that this weapon could have been discharged from a distance of 12 ½" from the test participants heads. These results were concluded using five people of varying ages, arm lengths and manual dexterity with the purpose of illustrating the ability of various test subjects to discharge the weapon.

Taking into account the angle relationship of the side of the head to the muzzle of the firearm a variety of factors were considered in reaching this conclusion.

Another factor, born out by the tests that should be addressed is the familiarity of firearms to the deceased. In my opinion, the deceased would know how to cock the firearm and discharge the weapon in a single action manner. We may assume that the

deceased had similar dexterity as the test subjects had, considering the varied differences in age and length of the subject's arm.

Therefore, it is my opinion, based on a reasonable degree of professional certainty, that it ***was possible*** for the deceased to hold the weapon at least 12 ½" away from her head, in either a two handed grip with the head turned to the left or a one handed grip with the weapon in her right hand extended to the right of the head and discharge the firearm.

Respectfully Submitted,

James M. Gannalo

James M. Gannalo

James M. Gannalo

Firearms Consultant /Forensic Instructor

P.O. Box 367
Brooklyn, New York 11228

Phone # (718) 236-7616 Fax # (718) 621-4734 Pager # (917) 247-0793
Email: Stria@msn.com

Updated 9/03

Profession:

Private Consultant, Expert Witness, Forensic Instructor and Training Consultant in the fields of Firearms Operability, Microscopic Examination of Ballistics Evidence, Shooting Reconstructions, Courtroom Preparation and Presentation.

Experience:

Independent Private Consultant — Sept. 1998 to Present

Forensic Consultation - Conducted independent investigations of all types of Firearms and Toolmark related cases using recognized analytical techniques. As a consultant in the above fields, I've been called upon to examine and analyze evidence, Police Reports, Crime Scene information relating to shootings, research information, gather facts and work directly with counsel for Trial Preparation and Presentation. I've testified extensively as an Expert Witness in the fields of Ballistics, Firearms and Microscopic Examination and provided assistance for various criminal and civil matters in cases of Murder, Assault and weapons possession in New York, New Jersey, Pennsylvania, Delaware, Maryland and Florida.

Recently, I have been retained as a Forensic Consultant in the field of Ballistics Evidence by the Argentine Forensic Anthropology Team, recognized by the United Nations and charged with the forensic investigation of discovered mass graves throughout the world.

Forensic Training - I have been retained, by the New York City Police Department, as a Firearms Consultant/Training Coordinator creating a training curriculum and training manual which prepares new examiners for both competency and proficiency tests according to ASCLAD/LAB standards. I am also currently retained by the Rockland County District Attorney's Office as a Forensic Instructor, Firearms Consultant and Microscopist. I continue to lecture in Continuing Legal Education Seminars and Criminal Investigation Courses in both New York and New Jersey.

New York City Firearms Analysis Section — Oct. 1989 to Sept. 1998

Assigned as a Detective to this unit, my duties included Firearms Operability Testing, Microscopic Examination and Classification of Ballistics Evidence and evaluation of shooting incidents. Performed in excess of 12,000 firearm tests for Operability and Microscopic Examination of Ballistics Evidence cases in my tenure at this Police Lab. Testified and have been qualified as an Expert Witness in 570 trial cases in United States Federal Court, New York City Supreme, Criminal & Family Courts and in Rockland County Superior Court.

I've participated in investigation and examination of cases with the Federal Bureau of Investigation, Alcohol Tobacco and Firearms, Drug Enforcement Agency, New York State Police and various Police Departments and Detective Units in the region.

While designated as a Unit Training Officer, I trained and lectured to hundreds of Detectives, Police Officers, Attorneys and visitors from around the world. I've offered expert testimony in cases of Capital Murder, Murder, Assault and Firearms Possession trials. I've assisted in examination and evaluations of Gunshot Residue Pattern & Distance tests, Laser Trajectory, Shooting Reconstruction and cases of apparent Suicide, which were actually Murders. I've been interviewed by Court TV's Forensic Files Series and have assisted various Authors, Writers and Journalists in novels, screenplays and articles relating to firearms, assassinations and shootings.

Career Recognition:

NYPD Chief of Detective's Achievement Award	1996
NYPD Detective's Endowment Association – Detective of the Month	1998
NYPD citations for Meritorious and Excellent Police Duties	1982 – 1989
American Legion Post 1060 – Police Officer of the Year	1983

Specialized Training and Coursework:

Glock Firearms Armorer Course	3/95
Crime Scene Reconstruction of Shooting Incidents	
FBI Academy, Quantico, VA.	7/95
Association of Toolmark & Firearms Examiners Training Seminar	9/96
Heckler & Koch Armorer Course	3/97
NYPD Criminal Investigation Course	11/97
Mossberg Firearm Armorer Course	8/97
NYPD Evidence Collection Team Training Course	1/98
Association of Toolmark & Firearms Examiners Training Seminar	7/99
NYSIAI Educational Conference	3/00
NY,NJ,Conn. Tri-State Training Conference	3/00
Shooting Incident Reconstruction Training Course	5/00
Association of Toolmark & Firearms Examiners Training Seminar	5/02
Ricochet Analysis Training Workshop	5/02
Wound Ballistics Training Workshop	5/02
National Integrated Ballistic Information Network (NIBIN) Training Course	6/02
Shooting Reconstruction & Firearms/Toolmark Examination Protocols (FBI)	11/02
Firearm Serial Number Restoration School (BATF)	1/03
Association of Toolmark & Firearms Examiners Training Seminar	5/03

Professional Affiliations:

Association of Firearms and Toolmark Examiners	(AFTE)
National Rifle Association	(NRA)
International Association of Identification	(IAI) (NYSIAI)
New Jersey State Identification Association	(NJAIA)
International Association of Wound Ballistics	(IAWB)
Association of Crime Scene Reconstruction	(ACSR)
National Association of Criminal Defense Lawyers	(NACDL)
NYS Association of Criminal Defense Lawyers	(NYSACDL)

James M. Gannalo
Firearms/Ballistics Consulting & Expert Witness
P.O. Box 367 Brooklyn, NY 11228 Phone# (718)236-7616 Fax# (718)621-4734

10/9/03

Mr. Joseph F. Sklarosky
1575 Wyoming Avenue
Forty Fort, PA 18704

Re: Commonwealth of Pennsylvania v. Mark Anthony Say

Mr. Sklarosky,

This report was prepared, in the above listed matter, based upon the evaluation of reports submitted, conversations with you in person and via the telephone and knowledge obtained in the field of firearms identification. The information submitted represents my opinion and is based solely on my training, casework experience and acquired knowledge during my years of working in this field.

Professional Background

I have been working in the fields of Firearms Identification and Toolmark Analysis since 1989. At that time, I was assigned to the Ballistics Squad of the New York City Police Department as a Firearms Examiner. During the course of my assignment, I performed in excess of 8000 cases involving firearms operability and over 4000 cases requiring microscopic analysis of firearms related toolmarks.

I have attended various courses and seminars relating to the related subjects of Ballistics, Firearms Operability, Microscopy and Crime Scene Reconstruction of Shootings. These courses were presented by Members of the New York City Police Department, Federal Bureau of Investigation and individual experts in the field.

Since retiring from the NYPD in 1998, I have worked as a Private Consultant in the fields of Firearms Operability and Microscopic Analysis of Ballistic Evidence. I have been retained as an independent expert in cases of murder, attempted murder, accidental discharge of a firearm and shooting reconstruction in the states of New York, New Jersey, Pennsylvania, Maryland and Delaware.

I have trained and lectured to groups of Medical Examiners, Lawyers, Judges, Investigators and Police Officers in New York and New Jersey. I have also been retained as a Forensic Consultant by the New York City Police Department and the Rockland County District Attorney's Office.

Case Related Background

To best understand the basis of this report, I feel that basic information on the operability of a firearm and the causes and effects of gunshot residue should be explained.

Definitions are as follows:

A **firearm** is a device that propels a projectile down a tube by the use of a propellant, which has been ignited. This is the basic description that applies to all firearms.

The **propellant**, when ignited, which creates a gas that expands in an enclosed chamber. The rapid expansion of the gas is used to force the projectile down the tube, known as the barrel, and out of the firearm.

A **cartridge** is made of four parts: the projectile (bullet), the propellant (powder) and the primer all held together in the metallic cartridge case. This device allowed for simple loading and unloading when used in firearms that were loaded by opening access to the chamber.

A **revolver** is a weapon with a revolving cylinder containing a number of firing chambers, which may successively be lined up and discharges through a single barrel.

Pistols are usually self-loading weapons meaning that they automatically unload and then reload themselves every time they are discharged. Utilizing a series of devices in the weapon to extract the discharged shell casing (cartridge case), ejecting it from the weapon and forcing another cartridge into the chamber performs this process. Pistols have only one chamber that is located at the rear of the barrel.

Ballistics - The study of moving projectiles. Internal ballistics deals with what happens inside of firearm upon discharge. External ballistics is the study of a projectile's flight, and Terminal ballistics is the study of the impact of a projectile.

Caliber - The measurement of the bore diameter of a firearm expressed in inches, although such a measurement may be frequently stated in millimeters.

Cartridge - A complete unit of ammunition for small arms consisting of a cartridge case, primer, propellant, and projectile(s), which is inserted into the firing chamber

Chamber - The part of a firearm in which the cartridge is placed prior to discharge.

Gunshot Residue - A combination of visible and invisible substances created by the discharge of a firearm that contains partially burned and unburned propellant, ignited gas by-products and primer residues.

Scanning Electron Microscope - An extremely powerful microscope that is capable of recognizing very small particles.

Case of Pennsylvania v. Mark Anthony Say

To date, I have received a number of items relating to the above case including:

- Copy of the cases Procedural History, #63 of 2002
- Pennsylvania State Police Reports
- SEM Analysis of gunshot residue samples by RJ Lee Group
- Various Autopsy and Crime Scene photographs
- Three videotapes (Video 1 of the scene, 2 x test firing of .357mag Taurus)
- RJ Lee reports
- Distance Determination test photographs

These items were utilized in forming the basis for my conclusions in this case.

In this case, the deceased died of a gunshot wound to the head from a firearm. The question is about the presence, or lack, of gunshot resides on the deceased, Mr. Say or Mr. Joseph Laird and the likelihood of the deceased being capable of using the weapon to shoot herself.

To begin, let's discuss what happens when a firearm discharges a live cartridge.

Firing a weapon produces combustion of the primer and powder of the cartridge. The residue of the combustion products, or unburned primer or powder components, can be used to detect a fired cartridge. Residue may be found on the skin or clothing of the person who fired the gun, on an entrance wound of the person shot, or on other target materials at the scene. The discharge of a firearm, particularly a revolver, can deposit residues even to persons at close proximity, so interpretations as to who fired the weapon should be made with caution.

The major primer elements are lead (Pb), barium (Ba), or antimony (Sb). Usually, all three are present. Less common elements include aluminum (Al), sulfur (S), tin (Sn), calcium (Ca), potassium (K), chlorine (Cl), or silicon (Si). A common primer element not easily detectable is mercury (Hg). Primer elements may be easier to detect in residues because they do not get as hot as the powder, and compounds (not just elements) may be detectable.

The cartridge case, bullet, bullet coating, and metal jacket also contain specific elements that can be detected. Virtually all cartridge cases are made of brass (70% copper and 30% zinc). A few have a nickel coating. Primer cases are of similar composition (Cu-Zn).

Bullet cores are most often lead and antimony, with a very few having a ferrous alloy core. Bullet jackets are usually brass (90% copper with 10% zinc), but some are a ferrous alloy and some are aluminum. Some bullet coatings may also contain nickel.

Modern gunpowder, or "smokeless" powder, can contain up to 23 organic compounds. Nitrocellulose is virtually always present, along with other compounds containing nitrate or nitrogen. One of these compounds, diphenylamine (used as a stabilizer in the powder), can be detected using reagents containing sulfuric acid. Modern gunpowder is further described as "single-base" when the basic ingredient is nitrocellulose and as "double-base" when there is additionally 1 to 40% nitroglycerine added.

In the physical examination of the scene or body for evidence of gunshot residue, it must be remembered that lead residues may mimic gunshot residue. Lead residues may be found up to 30 feet from the muzzle, and are always present on the opposite side of a penetrated target.

Detection of Gunshot Residue

This section addresses the testing of a suspect in shooting cases. This testing can also be done on the victim of a shooting and other individuals possibly present during an incident.

The major methods for detection of primer residues are neutron activation analysis (NAA), atomic absorption spectrophotometry (AAS), and scanning electron microscopy with energy dispersive analysis (SEM.EDA). For these methods, samples must be obtained from the skin surfaces of a subject at the earliest opportunity. Delay in obtaining residues, movement, or washing of the body prior to examination will diminish or destroy gunshot residues.

Scanning electron microscopy with energy dispersive analysis (SEM-EDA) has become an excellent method for detection of gunshot residue. The method of collection is quite simple and easily carried out in the field directly onto the gummed surface of a chuck, or holder, applied to the surface (skin or other material) to be tested. The chuck, with the residue on the surface, can be directly prepared for examination in the SEM device.

A major advantage of this method is that SEM can reveal the actual surface details of the particles examined, for comparison with known examples of gunshot residue, and pictures can be taken. The large particles of partially burned powder and the spheres of residue can be distinguished from contaminant materials.

An X-ray analyzer can be beamed directly onto the particles, so that the energy dispersive pattern (EDX) can be generated, giving the elemental composition of the particles. A computer program to speed up the search for GSR particles by SEM has been developed. It should be remembered that any hand or body part that was close to the fired weapon may have residue appearing consistent with having fired the weapon. Clothing should

always be retained on the body up to autopsy, as this may modify entrance wounds, need examination for gunshot residues, or aid in interpretation of the scene.

Gunshot residue analysis requires careful evaluation. False positives may be caused by contamination or transfer of GSR to the body by mishandling, or when the body is heavily contaminated by GSR from previous shooting. False negatives result from washing of the hands (when this area is sampled) or by the subject wearing gloves. A rifle or shotgun may not deposit GSR on hands.

In cases where there is a body recovered, testing can be performed as to the presence of GSR on the body itself and to the presence of a GSR pattern. This pattern may be seen on the deceased's clothing as a visible grouping of scorch marks, damage to material or punctures in the clothing. There is also the presence of invisible evidence either adhering to or imbedded into the clothing.

This pattern can also be seen on the exposed skin of the deceased or the covered skin of the deceased depending upon how much was absorbed by the deceased's clothing. The presence of GSR deposits (partially burned and unburned propellant) on either skin or material is known as stippling. Whenever this stippling on skin causes small wounds or burn marks it is commonly referred to as tattooing. It is possible to recreate these patterns if the firearm involved in the shooting is recovered and available for additional testing.

SEM analysis of gunshot residue sample results

In this case, 22 items were submitted for testing by an independent laboratory, RJ Lee Group, Inc. for the presence of gunshot residue. This testing was performed using SEM analysis and the results were submitted to your office. These results were well documented and extensive so therefore, I will try to condense these into a manageable amount. These limited results are as to what I feel are important to your case. A final evaluation will be made later in this report.

Name	# of GSR Particles	Clothing tested positive
Mark Anthony Say	162	Levi's Right & Left Legs, Sneakers
Joseph Laird	899	Sweat Shirt, Jeans and Boots
Jamie Walling	121	Jeans, Sweatshirt and Short Sleeved Shirt

These particles were a combination of Barium, Antimony and Lead in sometimes differing percentages but all characteristic of GSR. Additional inconclusive results were submitted for Mr. Say's belt and Rolex watch is just that inconclusive.

According to the court papers submitted for review, both Mr. Say's and Mr. Laird's hands were tested for the presence of GSR, with negative results. The testing of the deceased's hands, for the presence of GSR, apparently was not requested nor attempted.

Gunshot Residue Distance Determination Testing

At times it will be necessary, either for the investigation or prosecution of a case, to attempt to recreate a GSR pattern that is present on the deceased's skin or clothing. This pattern must be recreated using the weapon fired in this case and all attempts must be made to use the same or similar ammunition used in the actual shooting. This is due to the fact that different ammunition can create different patterns from the same gun. Naturally, different firearms, even if they are the same model and brand, will create different patterns.

Whenever a firearm is discharged, an amount of burning gases, partially burnt and unburnt propellant will be expelled from the weapon. These substances, known as gunshot residue, will travel away from the firearm for a distance and expand into a rapidly growing circular pattern. This pattern will be visible out to a distance of about 18 inches, depending upon the firearm, length of barrel, angle of the muzzle to target, type of ammunition and caliber. This pattern will adhere itself to the victim's skin or clothing and can be replicated in laboratory conditions by the Firearms Examiner. When evaluating test results against the actual shooting evidence, factors such as excessive bleeding, administered first aid and damage caused to clothing by emergency medical personnel must be considered.

Pennsylvania State Police GSR Distance Determination Test results

According to the submitted report, W00-3065-B, test results concluded that ***"significant amounts of gunpowder residues were absent at a muzzle distance of 12 inches or greater and that no residues were found at a muzzle distance of 24 inches or greater."***

Additionally, it was concluded that ***"The absence of gunpowder residue or singing or burning of the hair indicates that the distance of the muzzle of the firearm to the deceased's head was not contact or near contact, but held a distance away."***

These conclusions were based on the test results conducted by Sgt. Mogish of the Pennsylvania State Police Laboratory.

Opinions, Testing and Conclusions

The following conclusions are based solely on the submitted case information, discussions with your office and a combination of my training, knowledge and practical experience of similar casework.

As stated previously in this report, whenever a firearm is discharged a large amount of gunshot residue is expelled from the barrel and other parts of the weapon. This GSR is made up of super heated gases and particles that are by-products of the propellant used to push the bullet down the barrel of the weapon. The particles travel a relatively short distance away from the barrel, a few feet, and then fall to the ground if they do not adhere

to a surface. The gases, on the other hand, are spewed forth into the air where they are moved about by normal air flow, movement of objects and gravity.

The molecule that is created by the primer material, a combination of barium, antimony and lead, is forced out of the barrel as a gas and eventually cools to a fine vapor. This vapor contains the molecules of GSR that are shaped into round particles that are extremely small, about 10 microns. As an example as to how small that is, a bacteria is about 3-15 microns across and weapons grade Anthrax, small enough to pass through the fibers of an envelope are 3 microns in size.

Therefore, GSR particles will be airborne for a period of time after a weapon is discharged and will travel through the air at different heights and distances until they either adhere to a surface or fall to the ground. A person walking into an area where a firearm has been discharged will encounter airborne GSR particles. This can cause a positive result for the test of the presence of GSR in a person who did not fire the weapon.

In this case, all three of the persons present had positive results as to the presence of GSR on their clothing. Both the deceased and Mr. Say had approximately the same amount of particles present whereas Mr. Laird has about five times the amount of particles present on his clothing. This is not to conclude that Mr. Laird was the person firing the weapon, it just illustrates how the GSR particles are distributed in a room.

Naturally, the deceased was directly exposed to the expelling of the firearms discharge as the presence of GSR on most of her clothing shows. The other two people present also have a presence of GSR on their clothing but in different location on their bodies. Mr. Laird had GSR present on the upper & lower portions of his body and Mr. Say had GSR present on the lower portion of his body alone.

The basic question in this case is not if GSR was present on Mr. Say's clothing, it is how it was deposited there. He may have picked it up on his clothing, jeans and sneakers, as he entered the room after a gunshot was fired. The same can be true for Mr. Laird who showed the presence of GSR on his clothing. Did these men walk into the room after the gunshot, did they render assistance to the deceased and expose themselves to the GSR, and both are valid questions.

According to the submitted reports, both Mr. Say's and Mr. Laird's hands tested negative as to the presence of GSR. Why wasn't the deceased's hands tested in this matter? This test could have been done at anytime after the shooting. The reason being, the test for GSR on the hands of a live person must always be done in a timely fashion due to the possibility of that person washing or wiping their hands. GSR on a dead person is less likely to be removed by either police officials or responding medical personnel and obviously not by the decedent.

Ms. Walling's hands appear to have some sort of dirt or discoloration on them as they appear in the medical examiner's photographs. I had an opportunity to review these

photographs in both black/white and color. Remembering that the mere presence of GSR on a person's hands doesn't necessarily mean that the person fired the weapon, a test for its presence should have been conducted.

I feel that this test, if it were conducted, could have provided valuable information to the investigators in this case. Unfortunately, this information was lost when the decision was made not to test Ms. Walling's hands.

The wound on the deceased's head appears to be consistent with a near to intermediate contact wound. These types of wounds are created when the firearm is discharged at a close proximity or within a few inches of the body. These wounds will create a bullet wound with an amount of soot and stippling visible. The amount and size of the pattern of the stippling, also referred to as tattooing, can be used to determine how far away the weapon was discharged from. In this case, only a small amount of stippling is visible which is consistent with a near or intermediate wound. The gunshot pattern test, conducted by the prosecution, was necessary to accurately determine the distance that this particular weapon was discharged from the deceased's body.

The GSR distance determination tests results show a large amount of GSR was present on the test material up to 12" and were significantly absent after 12 inches. Additional factors such as the deceased's hair, excessive bleeding of the wound and first aid rendered on Ms. Walling have to be considered in evaluating the presence or lack thereof gunshot residue around the wound. This would then allow, based on these factors and the significant decrease of GSR deposits after a distance of 12 inches, the deceased the **possibility** of holding the barrel of the weapon as close as 12 ½" away from her head when discharged.

Your office raised the possibility that the deceased could have held the firearm in two different ways. The first could have been by holding the firearm in a two handed grip with both arms extended away from the body and with the trigger depressed by using one or both of her thumbs. The characteristics of the wound, on the right side of the head, front to back, right to left and at an upward angle would mean that the deceased's head would have to be turned toward her left shoulder when the shot was discharged.

Judging by the stated length of the victims arms this would bring the muzzle of the firearm to a distance less then 24 inches from the head. Conversely, the firearm could have been held to a distance greater than 12 inches from her head and discharged in that applied fashion. I feel that the deceased could have held the firearm and squeezed the trigger in such a fashion with the muzzle of the firearm greater then 12 inches away from her head. I based this opinion after considering factors such as the angle of the head combined with the range of angles that the weapon could have been held away from the deceased's body.

With regards to the other possible scenario, with the deceased holding the firearm away from her head in her right hand, I tried to address this problem by conducting an independent test using a variety of test subjects.

I attempted to recreate conditions allowing for the deceased to hold and operate the revolver, held in her right hand, at a distance in excess of 12" from the side of her head. I also took into account the angle of the shot, the movement possibilities of the head and wrist and the strength needed to pull the trigger. I was able to use myself, four female subjects and a .38cal Colt revolver with a 2" barrel that is similar to the recovered firearm.

The weapon was fitted, for distance testing purposes, with a 12" cardboard tube that was affixed to the barrel with a barrel cleaning brush. The overall distance from the end of the cardboard tube to the barrel, including a small exposed portion of the brush was 12 ½" long.

All of the test subjects held the unloaded firearm in their right hands and attempted to operate the weapon at an angle similar to the actual fatal shot in both double and single action fashion. I recorded the maximum distance that each was able to operate the firearm successfully. I have listed the results below:

Test Data:

Subject	Age	Length of arm	Distance from head	Trigger Action
Male	49	Shoulder/Wrist 24" Shoulder/Fingertip 31"	12 ½" to 14 ½"	Double/single
Female	49	Shoulder/Wrist 19" Shoulder/Fingertip 24 ½"	12 ½"	Single (Only)
Female	24	Shoulder/Wrist 20" Shoulder/Fingertip 24 ½"	12 ½" to 13"	Single (Only)
Female	51	Shoulder/Wrist 19 ½" Shoulder/Fingertip 23 ½"	12 ½"	Single (Only)
Female	19	Shoulder/Wrist 21" Shoulder/Fingertip 25 ½"	12 ½" to 13 ½"	Single (Only)

Results - As the results show, it was ***possible*** for all of the females to extend to at least the 12 ½" distance needed to recreate the deceased shooting herself and possibly obtaining the same GSR results. The male (myself) was able to extend to 14 ½", but you must take into account the difference in arm length and dexterity operating a firearm.

All of the females showed a lack of strength to operate the trigger in a double action method, but ***were capable*** of firing the weapon when the weapon was cocked. Factors affecting this test would be arm length, wrist flexibility and strength in both the fingers and forearm.

In conclusion, in this case, as in all cases that question homicide v. suicide, a few unanswered questions exist. Did the deceased shoot herself or was she shot by another person. Let's take the most important questions raised in this case individually.

Gunshot Residue Test Results - The GSR evidence results are inconclusive as to whether she was shot by Mr. Say or not. If one assumes that she was shot by Mr. Say, then why wasn't GSR found to be present on his hands or watch. Also why was the presence of GSR only detected on clothing from his lower body? Additionally, why weren't the deceased's hands tested for the presence of GSR? This test could have been completed anytime after she was removed to the hospital or morgue. Is Mr. Say right handed and what wrist did he wear his watch on? These are all, in my opinion valid questions that can be asked in this matter.

Lack of Stippling at the Wound - During our meeting, we discussed the possibilities of both the distance that the deceased could have held the weapon from her head and if the introduction of an intermediate object (hair) could affect the GSR results. The possibilities of these factors affecting the GSR tests are, in my opinion, plausible. Anytime an intermediate object is placed between the barrel of a weapon and the wound, it can affect the visible results of GSR deposits.

Additionally, the method of safeguarding the wound for before examination is questionable. Understandably, the treatment of the deceased to save her life is paramount, but the medical stitching of the wound combined with the cleansing and handling of the area around the wound must be taken into account.

Gunshot Residue Distance Determination Test Results - These results can usually be important to the determination of a self-inflicted wound. The Pennsylvania State Police Lab was able to conduct this test using similar live cartridges to the rounds found in the revolver. Their results were that the distance the muzzle of the firearm was held from the deceased's head was not contact or near contact but held a distance away. There is no mention of the examiner determining that the weapon was held over 24 inches away. Therefore, it is plausible that the weapon could have been discharged at a distance less then 24 inches away, based on the factors mentioned previously.

My own test results support the possibility that this weapon could have been discharged from a distance of 12 ½" from the test participants heads. These results were concluded using five people of varying ages, arm lengths and manual dexterity with the purpose of illustrating the ability of various test subjects to discharge the weapon.

Taking into account the angle relationship of the side of the head to the muzzle of the firearm a variety of factors were considered in reaching this conclusion.

Another factor, born out by the tests that should be addressed is the familiarity of firearms to the deceased. In my opinion, the deceased would know how to cock the firearm and discharge the weapon in a single action manner. We may assume that the

deceased had similar dexterity as the test subjects had, considering the varied differences in age and length of the subject's arm.

Therefore, it is my opinion, based on a reasonable degree of professional certainty, that it ***was possible*** for the deceased to hold the weapon at least 12 ½" away from her head, in either a two handed grip with the head turned to the left or a one handed grip with the weapon in her right hand extended to the right of the head and discharge the firearm.

Respectfully Submitted,

James M. Gannalo

James M. Gannalo

Firearms Consultant /Forensic Instructor

P.O. Box 367
Brooklyn, New York 11228

Phone # (718) 236-7616 Fax # (718) 621-4734 Pager # (917) 247-0793
Email: Stria@msn.com

Updated 9/03

Profession:

Private Consultant, Expert Witness, Forensic Instructor and Training Consultant in the fields of Firearms Operability, Microscopic Examination of Ballistics Evidence, Shooting Reconstructions, Courtroom Preparation and Presentation.

Experience:

Independent Private Consultant — Sept. 1998 to Present

Forensic Consultation - Conducted independent investigations of all types of Firearms and Toolmark related cases using recognized analytical techniques. As a consultant in the above fields, I've been called upon to examine and analyze evidence, Police Reports, Crime Scene information relating to shootings, research information, gather facts and work directly with counsel for Trial Preparation and Presentation. I've testified extensively as an Expert Witness in the fields of Ballistics, Firearms and Microscopic Examination and provided assistance for various criminal and civil matters in cases of Murder, Assault and weapons possession in New York, New Jersey, Pennsylvania, Delaware, Maryland and Florida.

Recently, I have been retained as a Forensic Consultant in the field of Ballistics Evidence by the Argentine Forensic Anthropology Team, recognized by the United Nations and charged with the forensic investigation of discovered mass graves throughout the world.

Forensic Training - I have been retained, by the New York City Police Department, as a Firearms Consultant/Training Coordinator creating a training curriculum and training manual which prepares new examiners for both competency and proficiency tests according to ASCLAD/LAB standards. I am also currently retained by the Rockland County District Attorney's Office as a Forensic Instructor, Firearms Consultant and Microscopist. I continue to lecture in Continuing Legal Education Seminars and Criminal Investigation Courses in both New York and New Jersey.

New York City Firearms Analysis Section — Oct. 1989 to Sept. 1998

Assigned as a Detective to this unit, my duties included Firearms Operability Testing, Microscopic Examination and Classification of Ballistics Evidence and evaluation of shooting incidents. Performed in excess of 12,000 firearm tests for Operability and Microscopic Examination of Ballistics Evidence cases in my tenure at this Police Lab. Testified and have been qualified as an Expert Witness in 570 trial cases in United States Federal Court, New York City Supreme, Criminal & Family Courts and in Rockland County Superior Court.

I've participated in investigation and examination of cases with the Federal Bureau of Investigation, Alcohol Tobacco and Firearms, Drug Enforcement Agency, New York State Police and various Police Departments and Detective Units in the region.

While designated as a Unit Training Officer, I trained and lectured to hundreds of Detectives, Police Officers, Attorneys and visitors from around the world. I've offered expert testimony in cases of Capital Murder, Murder, Assault and Firearms Possession trials. I've assisted in examination and evaluations of Gunshot Residue Pattern & Distance tests, Laser Trajectory, Shooting Reconstruction and cases of apparent Suicide, which were actually Murders. I've been interviewed by Court TV's Forensic Files Series and have assisted various Authors, Writers and Journalists in novels, screenplays and articles relating to firearms, assassinations and shootings.

Career Recognition:

NYPD Chief of Detective's Achievement Award	1996
NYPD Detective's Endowment Association – Detective of the Month	1998
NYPD citations for Meritorious and Excellent Police Duties	1982 – 1989
American Legion Post 1060 – Police Officer of the Year	1983

Specialized Training and Coursework:

Glock Firearms Armorer Course	3/95
Crime Scene Reconstruction of Shooting Incidents	
FBI Academy, Quantico, VA.	7/95
Association of Toolmark & Firearms Examiners Training Seminar	9/96
Heckler & Koch Armorer Course	3/97
NYPD Criminal Investigation Course	11/97
Mossberg Firearm Armorer Course	8/97
NYPD Evidence Collection Team Training Course	1/98
Association of Toolmark & Firearms Examiners Training Seminar	7/99
NYSIAI Educational Conference	3/00
NY,NJ,Conn. Tri-State Training Conference	3/00
Shooting Incident Reconstruction Training Course	5/00
Association of Toolmark & Firearms Examiners Training Seminar	5/02
Ricochet Analysis Training Workshop	5/02
Wound Ballistics Training Workshop	5/02
National Integrated Ballistic Information Network (NIBIN) Training Course	6/02
Shooting Reconstruction & Firearms/Toolmark Examination Protocols (FBI)	11/02
Firearm Serial Number Restoration School (BATF)	1/03
Association of Toolmark & Firearms Examiners Training Seminar	5/03

Professional Affiliations:

Association of Firearms and Toolmark Examiners	(AFTE)
National Rifle Association	(NRA)
International Association of Identification	(IAI) (NYSIAI)
New Jersey State Identification Association	(NJAIA)
International Association of Wound Ballistics	(IAWB)
Association of Crime Scene Reconstruction	(ACSR)
National Association of Criminal Defense Lawyers	(NACDL)
NYS Association of Criminal Defense Lawyers	(NYSACDL)