were photographs of the prints of Lee Harvey Oswald, are accurate photographs of prints from the objects, Commission Exhibit Nos. 637, 649, 142, and 641, and that the prints on Commission Exhibit Nos. 637, 649, 142, and 641, are the prints of Lee Harvey Oswald.

Signed this 17th day of September 1964, at Washington, D.C.

(S) Det. Arthur Mandella NYCPD,
ARTHUR MANDELLA.

---

## TESTIMONY OF JOHN F. GALLAGHER

The testimony of John F. Gallagher was taken at 10 a.m., on September 15, 1964, at 200 Maryland Avenue NE., Washington, D.C., by Mr. Norman Redlich, assistant counsel of the President's Commission.

Mr. REDLICH. The purpose of this deposition is to take the testimony of Mr. John F. Gallagher. Mr. Gallagher, before we start I would like to advise you that under the rules of this Commission you are entitled to 3 days' notice prior to your testimony. You have not had 3 days' notice. However, you are also free to waive that notice if you wish. Are you willing to testify this morning?

Mr. GALLAGHER. I am, sir.

Mr. REDLICH. It is customary to administer an oath, so would you stand? Do you solemnly swear that the testimony you are about to give will be the truth, the whole truth, and nothing but the truth, so help you God?

Mr. GALLAGHER. I do.

Mr. REDLICH. For the record, would you state your name?

Mr. GALLAGHER. My name is John F. Gallagher.

Mr. REDLICH. Mr. Gallagher, what is your occupation?

Mr. GALLAGHER. I am a special agent of the Federal Bureau of Investigation, presently assigned to the Physics and Chemistry Section of the FBI Laboratory.

Mr. REDLICH. How long have you been with the FBI?

Mr. GALLAGHER. I have been with the FBI approximately 18 years.

Mr. REDLICH. Very briefly, what has been the nature of your affiliation with the FBI?

Mr. GALLAGHER. The greater part of that 18 years I have been assigned to the FBI Laboratory, and in particular to the Physics and Chemistry Section. I work in the spectrographic unit of the FBI Laboratory.

Mr. REDLICH. And this is what you have been doing for the greater portion of your 18 years with the FBI?

Mr. GALLAGHER. That is correct.

Mr. REDLICH. What is your educational background, Mr. Gallagher?

Mr. GALLAGHER. I graduated from Boston College with a bachelor of science degree in 1939, and I returned for 2 years on a fellowship to obtain a master of science degree.

When I entered the military service I was sent for a 9-month course at Massachusetts Institute of Technology in meteorology. Following my discharge from the Army, I joined the Federal Bureau of Investigation. I received special agents' training, and have taken specialized courses during my period in the FBI, one of which was a course in neutron activation analysis at the Oak Ridge National Laboratory—correction—at Oak Ridge Institute of Nuclear Studies, from September 24 to October 5, 1962.

Mr. REDLICH. Are you familiar with a technique of analysis which is called neutron activation analysis?

Mr. GALLAGHER. Yes, sir; I am familiar with the technique known as neutron activation analysis.

Mr. REDLICH. Could you describe briefly, without reference to the specific evidence that is under investigation here, the nature of this technique?

Mr. GALLAGHER. Neutron activation analysis involves subjecting small samples to a beam of sub-atomic particles known as neutrons. Elements within the

sample having been bombarded by neutrons are transformed in many instances to radioactive atoms. These radioactive atoms will decay and emit characteristic radiations. By studying the emitted radiations, one can determine and trace quantities of elements in specimens.

Mr. REDLICH. This is a technique whereby certain elements are made radioactive as a result of being bombarded by neutrons; is that correct?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. This enables you to isolate certain elements for purposes of analysis; is that correct? Let me rephrase the question: Does this enable you to determine the presence of certain elements for purposes of analysis?

Mr. GALLAGHER. This enables you to determine and to measure the quantity of certain elements in a given specimen.

Mr. REDLICH. What is the advantage of the neutron activation technique over other methods of determining the presence of certain elements?

Mr. GALLAGHER. Well, this method of analysis, because of its extreme sensitivity, offers a great advantage over more conventional procedures. Furthermore, chemical treatments of your samples subsequent to activation do not distort your results by contamination. If an acid, for example, is added to a specimen after irradiation which is under study for the presence of antimony, and the acid itself contains antimony, it will not contain a radioactive form of antimony, and this is the form which is measured during the analysis.

Mr. REDLICH. Has neutron activation analysis been used in criminal investigation work, to your knowledge, Mr. Gallagher?

Mr. GALLAGHER. It has been used in criminal investigative work.

Mr. REDLICH. Could you, for the sake of the record, give me a few examples of the types of situations in which it has been used—without reference to any particular case?

Mr. GALLAGHER. Neutron activation analysis has been used to determine the arsenic content in hair, urine, and fingernail scrapings, in a suspected arsenic-poisoning case.

Mr. REDLICH. Has it been—is it used as a method of determining whether or not a person has fired a weapon?

Mr. GALLAGHER. I do know that this technique has been used to attempt to determine if an individual has fired a weapon.

Mr. REDLICH. Do you believe that it is a technique which could be used under certain conditions to determine whether or not a person has fired a weapon?

Mr. GALLAGHER. I do believe that it is a technique which can be used to determined if a person has fired a weapon or handled a recently fired weapon.

Mr. REDLICH. Have you yourself, Mr. Gallagher, ever testified in court with regard to the results of a neutron activation analysis?

Mr. GALLAGHER. No, sir.

Mr. REDLICH. Now let us turn, Mr. Gallagher, to the specific investigation that we are concerned with in this inquiry. Are you familiar with any neutron activation analyses which were conducted in connection with the assassination of President Kennedy?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. Could you describe what they were?

Mr. GALLAGHER. Neutron activation analyses were conducted at Oak Ridge National Laboratory, Oak Ridge, Tenn., on the paraffin casts from the right hand, the left hand, and the right cheek of Lee Harvey Oswald.

Mr. REDLICH. May I interrupt you there, Mr. Gallagher? Your determination that these were the casts from the right and left hand and right cheek of Lee Harvey Oswald was based upon information given to you and is not based upon your own personal knowledge; isn't that correct?

Mr. GALLAGHER. It is based upon knowledge which I obtained from an official Bureau report.

Mr. REDLICH. The record would indicate that these casts were made in Dallas, and were made in connection with tests performed by the Dallas police. And then subsequently they were forwarded to the FBI in Washington. That is our understanding of the manner in which the casts were made and placed into the possession of the Federal Bureau of Investigation. Do you have any information to the contrary?

Mr. GALLAGHER. It is my understanding that Dr. Morton Mason, Director of Dallas City-County Criminal Investigation Laboratory made and processed the paraffin casts.

Mr. REDLICH. Now, would you proceed?

Mr. GALLAGHER. The paraffin casts were analyzed by neutron activation analyses to determine if these casts from Oswald, which were made, chemically treated, and subsequently washed by investigators in the Dallas area, bear any deposits which could be associated with the rifle cartridges found in the Texas School Book Depository Building.

Mr. REDLICH. Do you know why the casts had been chemically treated in Dallas?

Mr. GALLAGHER. Reportedly, these casts were chemically treated for the presence of nitrates.

Mr. REDLICH. This is what is popularly referred to as the paraffin test?

Mr. GALLAGHER. Yes; it has been popularly referred to as the paraffin test.

Mr. REDLICH. And your testimony is that these casts had been washed by the time they reached your possession; is that correct?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. Would you continue?

Mr. GALLAGHER. The deposits found on the paraffin casts from the hands and cheek of Oswald could not be specifically associated with the rifle cartridges. The casts from Oswald bore elements—namely, barium and antimony—which were present in the powder residues from both the rifle, and revolver cartridges. No characteristic elements were found by neutron activation analysis of the residues which could be used to distinguish the rifle from the revolver cartridges. In view of the fact that the paraffin casts were not made until after the reported firing and handling of the fired revolver, no significance could be attached to the residues found on the casts other than the conclusion that the barium and antimony in these residues are present in amounts greater than found on the hands of an individual who has not recently fired or handled a recently fired weapon.

Mr. REDLICH. You mentioned in your answer, Mr. Gallagher, that the elements which you found present on the paraffin casts, which were also present on the spent cartridges found at the Texas School Book Depository, were the elements barium and antimony; is that correct?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. In your opinion, what is the source of the elements barium and antimony on these cartridges?

Mr. GALLAGHER. Barium and antimony are residues left from the spent primers in the cartridges.

Mr. REDLICH. The primer being the portion of the cartridge which ignites the principal explosive substance in the cartridge; is that correct?

Mr. GALLAGHER. The primer is that portion of the cartridge which is——

Mr. REDLICH. If I may interrupt—which is initially struck by the firing pin?

Mr. GALLAGHER. Which is struck by the firing pin, and detonates to initiate the explosive charge in the cartridge itself.

Mr. REDLICH. Now, are the elements barium and antimony found in most primer residues?

Mr. GALLAGHER. Barium and antimony are found in most primer residues; yes.

Mr. REDLICH. Did you determine whether barium and antimony are present in the Western Cartridge Co. ammunition which was found on the sixth floor of the Texas School Book Depository?

Mr. GALLAGHER. I did, sir.

Mr. REDLICH. And did you find that barium and antimony are, in fact, found in ammunition of that manufacturer?

Mr. GALLAGHER. Yes.

Mr. REDLICH. Did you also determine whether the elements barium and antimony are found in the .38 caliber ammunition manufactured by Remington Peters and Winchester Western, which was the ammunition used in the shooting of officer Tippit?

Mr. GALLAGHER. Yes; I did.

Mr. REDLICH. And did you find that the elements barium and antimony were, in fact, present in this type of ammunition?

Mr. GALLAGHER. Yes; I did.

Mr. REDLICH. With regard to the rifle cartridges, did you examine the cartridges which were actually found on the sixth floor of the Texas School Book Depository?

Mr. GALLAGHER. Yes; I did.

Mr. REDLICH. And did you determine that the elements barium and antimony were present on those particular cartridges?

Mr. GALLAGHER. Yes; I did.

Mr. REDLICH. Are you able to give us your opinion as to the possible effect of the washing of the paraffin casts on the analysis which you performed? Let me rephrase the question. Did the fact that these casts were washed prior to the neutron activation test materially alter, in your opinion, the results of the neutron activation analysis?

Mr. GALLAGHER. I can say that the washing did not remove all the antimony and barium.

Mr. REDLICH. In your opinion, would the washing of these paraffin casts remove substantial amounts of the elements barium and antimony if they were present on those casts?

Mr. GALLAGHER. Chemical treatment and washing will remove portions of the barium and antimony from these casts. This was determined from test casts which were studied in connection with these analyses. But it did not remove all the barium and antimony.

Mr. REDLICH. Can you describe exactly what you did with these paraffin casts in order to perform a neutron activation analysis?

Mr. GALLAGHER. Do you want me to tell who I worked with here?

Mr. REDLICH. Yes.

Mr. GALLAGHER. These casts were taken to the Oak Ridge National Laboratory at Oak Ridge, Tenn., and there, with a Dr. Frank F. Dyer, and Mr. J. F. Emery, work was performed on these casts. The casts were studied under a binocular microscope. The surface of the casts were scraped. These paraffin scrapings were put into a small container which was then placed in a pneumatic tube and sent into the heart of the research reactor to be bombarded by neutrons for a 3-minute period. The neutron flux was 6 times 10 to the 13th neutrons per square centimeter per second. After the 3 minutes were up, the container with its contents was discharged from the reactor.

The gamma ray spectrum was studied. And then chemical tests were made to precipitate barium and also to precipitate the antimony. The barium and antimony were quantitatively determined.

Mr. REDLICH. You stated in your answer that——

Mr. GALLAGHER. Correction. Were quantitatively determined by studying the gamma rays emitted by the barium isotope 139 and the antimony isotope 122.

Mr. REDLICH. Now, according to your testimony, you determined that the elements barium and antimony were present in the hand casts in an amount greater than would be expected in the case of a person who had not fired a revolver.

Mr. GALLAGHER. Fired or handled a recently fired weapon.

Mr. REDLICH. Confining ourselves for the moment to the hand casts, does such a conclusion enable you to state that the person from whose hands these cases were made had in fact fired a revolver? The question I am asking you, Mr. Gallagher, is one designed to determine the extent to which the neutron activation technique is able to result in definitive judgments. Your initial answer was that the elements barium and antimony were present in these casts in an amount greater than would be expected from a person who had not either fired a weapon or handled a recently fired weapon. Are you able to, on the basis of this, make a judgment as to whether in fact the person from whose hands these casts were made had in your opinion fired a revolver, or handled a fired revolver?

Do you understand my question, before you attempt to answer it?

Mr. GALLAGHER. Well, first of all I reported that there was more on the hands than would be found on the hands of a normal individual who had not fired or handled a recently fired weapon. Now, I don't quite get the point of your question.

Mr. REDLICH. The point of my question is whether you are able, on the basis of

this analysis, to express an opinion as to whether the person from whose hands these casts were made had fired a weapon.

Mr. GALLAGHER. It is my opinion that the person from whom these casts were removed may have either handled a fired weapon, or fired a weapon.

Mr. REDLICH. I would like to introduce into the record a letter which I have marked Gallagher Exhibit No. 1.

(Gallagher Exhibit No. 1 was marked for identification.)

Mr. REDLICH. This is a letter from FBI Director J. Edgar Hoover to J. Lee Rankin, general counsel of this Commission. Are you familiar with the contents of this letter, Mr. Gallagher?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. You will note that this letter indicates a variety of substances which contain the element barium, the element antimony, and substances which contain the elements barium and antimony.

The last question I asked you, Mr. Gallagher, was whether you could make a judgment as to whether a person from whose hands these casts were made had fired a weapon or handled a fired weapon, and you indicated that on the basis of these tests you could make such a judgment.

The question I now ask you is in light of the contents of the letter which has been designated as Gallagher Exhibit No. 1, are you able to isolate the source of the elements barium and antimony which you found on the hand casts as coming from the primer residues rather than from the substances which are described in Gallagher Exhibit No. 1?

Mr. GALLAGHER. It is true that there are common commercial products which contain barium and which contain antimony.

Mr. REDLICH. And which contain barium and antimony together?

Mr. GALLAGHER. And also which contain barium and antimony together. However, before these elements can contaminate the hands or person—hands or body of an individual—they must be accessible so they can adhere by mechanical adhesion to the individual. Under normal circumstances, most of the ingredients mentioned in Exhibit No. 1——

Mr. REDLICH. Excuse me—could you refer to that as Gallagher Exhibit No. 1?

Mr. GALLAGHER. Gallagher Exhibit No. 1, is not normally in the form which will permit contamination by this mechanical adhesion.

Mr. REDLICH. Are you generally familiar with the test which is commonly referred to as the paraffin test, which tests paraffin casts for nitrate residues?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. As I understand it, Mr. Gallagher, one of the reasons why this test is considered unreliable for purposes of determining whether or not someone has fired a weapon is the fact that the elements which react with the reagents in the paraffin test are found in a variety of common substances. Is that correct?

Mr. GALLAGHER. The diphenylamine or the diphenylbenzadene tests are not specific. They react with many ingredients and for this reason the results obtained from such tests are difficult to interpret.

Mr. REDLICH. And when I asked you to evaluate the results of the neutron activation test performed on the hand casts in the light of the contents of Gallagher Exhibit No. 1, do I understand your answer to be that in the case of the neutron activation analysis it is possible to make a valid determination as to the presence of the elements barium and antimony, notwithstanding the fact that the elements barium and antimony are found in common substances and not merely found in primer residues.

Mr. GALLAGHER. The determination of barium and antimony by neutron activation analysis is specific. Although there are commercial products which contain the elements barium and antimony, these components in many of these commercial products are not as available for contaminating purposes as are nitrates and oxidizing agents detected by the diphenylamine or diphenylbenzidine tests.

Mr. REDLICH. So that the differences between the neutron activation analysis and the paraffin test for nitrate residues relate both to the question of the availability of the nitrates and oxidizing agents in the paraffin test as compared to the barium and antimony in the neutron activation analysis, and also to the fact that in the paraffin test for nitrate residues, the result is not necessarily

specific as to nitrate residues, whereas in the neutron activation analysis for the presence of the elements barium and antimony, the results are specific to the elements barium and antimony. Is that a correct statement?

Mr. GALLAGHER. Yes. And furthermore, in Gallagher Exhibit No. 1, it says that paint, for example, contains both barium and antimony—this does not mean that every sample of paint contains barium and antimony. And so it is with the other items mentioned in Gallagher Exhibit No. 1.

Mr. REDLICH. All right. Now let us turn to the cheek casts, Mr. Gallagher. Could you tell us the results of your examination of the cheek casts with reference to the presence of the elements barium and antimony?

Mr. GALLAGHER. Barium and antimony were found on the cheek casts. However, when the cheek cast was analyzed, both surfaces of the cheek cast were studied. That is, the surface adjacent to the skin of the subject and the surface away from the skin of the subject, or the outside surface of the cast.

Mr. REDLICH. For our record, let us call the surface adjacent to the skin the inside surface, and the other surface the outside surface.

Mr. GALLAGHER. The outside surface of this cast was found to contain barium and antimony—actually more barium was found on the outside surface of the cast than on the inside surface.

Mr. REDLICH. And as far as antimony is concerned, was there more on the outside than on the inside?

Mr. GALLAGHER. There was slightly less antimony on the outside of the cast than on the inside of the cast.

Mr. REDLICH. Do you have any explanation for the presence of barium and antimony on the outside of the cast, and as part of the same question, do you have any explanation for their being more barium on the outside than the inside?

Mr. GALLAGHER. I have no explanation for this difference.

Mr. REDLICH. Were you able to make determination as to whether the barium and antimony present on the inside cast was more than would be expected in the case of a person who had not fired a weapon or handled a fired weapon?

Mr. GALLAGHER. I found that there was more barium and antimony on the inside surface of the cast than you would find on the cheek of an individual who had recently washed his cheek. However, the significance of this antimony and barium on the inside of the cheek is not known.

Mr. REDLICH. Is that because the outside surface acts as a sort of control on the basis of which you can make a comparison?

Mr. GALLAGHER. The outside surface of the cheek was run as a control for this particular specimen.

Mr. REDLICH. And therefore the presence of a lesser amount of barium and a slightly larger amount of antimony on the inside surface was one of the reasons why you could not make a determination as to the significance of the barium and antimony on the inside surface, is that correct?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. Did the fact that Oswald was believed to have fired a revolver prior to the time the paraffin casts were made have an effect on your ability to determine the significance of the barium and antimony on the inside of the cheek cast?

Mr. GALLAGHER. The subsequent repeated firing of the revolver definitely overshadowed the results. That is why it was reported that no significance could be attached to the residues found on the cast other than the conclusion than the barium and antimony in these residues are present in amounts greater than found on the hands of a normal individual who had not recently fired or handled a fired weapon.

Mr. REDLICH. In other words, given the known fact, or the assumed fact, that the suspect had fired a revolver repeatedly, the barium and antimony could have found their way to the suspect's cheek as a result of the repeated firing of that revolver, and therefore precluded you from making any determination as to whether the elements barium and antimony were placed on the cheek as the result of the firing of the rifle. Is that a correct statement?

Mr. GALLAGHER. Well, there is no way to eliminate the fact that the subject may have wiped a contaminated hand across his cheek subsequent to the firing of the revolver, thus contaminating his cheek with barium and antimony.

Mr. REDLICH. Getting back to the hand casts, did you use the outside surface of the hand casts as a control surface?

Mr. GALLAGHER. Yes; I did, sir.

Mr. REDLICH. Could you tell us how the inside or the outside surface of the hand cast compared with regard to the elements barium and antimony?

Mr. GALLAGHER. Much more barium and antimony were found on the inside of the hand casts than were found on the control specimens taken from the outside of the hand casts of the subject.

Mr. REDLICH. Mr. Gallagher, prior to this morning's deposition, you and I had a conversation in which we covered the general subject matter which was to be the subject of this deposition. Is there anything in your recorded testimony which is inconsistent with the information which you provided prior to this recorded testimony?

Mr. GALLAGHER. No, sir.

Mr. REDLICH. Have we, to the best of your recollection, covered in our recorded testimony at least everything that was discussed in our off the record conversation?

Mr. GALLAGHER. Yes, sir.

Mr. REDLICH. Is there anything which you would like to add at this time to your testimony concerning the matters under investigation?

Mr. GALLAGHER. No, sir.

Mr. REDLICH. All right, Mr. Gallagher. This testimony will be transcribed and will be available for your review. We will adjourn the deposition at 10:56 p.m.