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This version is intended for a public talk to a lay audience.

OPTICAL DENSITY MEASUREMENTS
OF THE JFK AUTOPSY X-RAYS
and
A NEW OBSERVATION BASED
ON THE CHEST X-RAY

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In this talk I will present new evidence that the autopsy X-rays of President John F. Kennedy have been altered, that there were 2 shots which struck the head, and that the magic bullet is anatomically impossible.

Just before Halloween this year, I visited the National Archives on four separate days to examine the autopsy X-rays and photographs. While there I used a technique -- called optical densitometry -- to study the X-rays. This technique has been available for many years but has never been applied to the JFK autopsy X-rays. It measures the transmission of ordinary light through selected points of the X-ray film. If I had measured thousands of points I could have constructed a three dimensional topographic map of the X-rays. The higher points on this map would represent the blackest areas of the X-ray film and would correspond to areas in the body where the most X-rays had passed through to strike the film. In a way, therefore, the information contained in the X-ray film is converted from two dimensions into three dimensions and is that much richer in detail. The range of peaks and valleys on such a topographic map would be expected to fall within a well defined range for a normal human skull. Any values which lie outside of this range -- and especially those which lie unnaturally far outside -- would not be consistent with ordinary skulls and would raise questions of authenticity.

Abnormal Optical Density Measurements

In an X-ray the whiter areas represent denser tissues, such as bone. That is because fewer X-rays strike the film and, during the development process, this area turns relatively lucent. On the other hand, less dense tissues, such as air, permit more X-rays to pass through to the film and these areas then become dark. With that in mind, I shall turn to the JFK autopsy X-rays. On the skull X-rays taken from the side -- they are called lateral X-rays -- in the rear portion there is an obvious large white area that is easy to see on both the left and right skull X-rays. By contrast, in the frontal area the X-ray is unusually dark. When I first saw these two areas I was struck both by how extremely

white and how extremely black they looked. Both areas looked very different from what I was used to seeing in my own patients. I was therefore very anxious to measure these areas for optical density to see if they were normal or not. What I found was quite astonishing. The posterior white area transmits almost 1000 times more light than the dark area! This large difference was seen on both the left and right lateral skull X-rays. I suspected that this large ratio was nowhere near normal so I measured these same areas for patients whom I had seen in the clinic. Their X-rays looked entirely unremarkable to me -- like hundreds of others that I had seen. My measurements showed only small differences in optical densities between the front and the back. At most, the rear portion of the skull was slightly whiter and transmitted up to twice as much light as the anterior portion. I concluded therefore that the measured differences of about 1000 between the front and back of the JFK skull were too large to be explained by any ordinary differences as seen in typical patients. In fact, the very lucent area at the rear of the skull was almost as lucent as the densest bone in the body -- and I actually measured this on the JFK autopsy X-ray. This bone is the one which surrounds the ear canal. Not only is this bone around the ear very dense, but it is also very thick -- it extends from one side of the skull to the other. In order for the white area at the rear of the skull to match the whiteness of this very dense bone, all of the brain in this posterior area would have to be replaced by very dense bone -- and the bone would have to extend from one side of the skull to the other. No human skull is constructed in this fashion.

I was fortunate to have for comparison an 8 x 10 black and white print, obtained from the National Archives, of a lateral skull X-ray, taken of JFK during his lifetime. This extreme range of whiteness to blackness is not seen in this X-ray print, as judged by the unaided human eye. Unfortunately, these X-rays are kept at the JFK Presidential Library in Massachusetts and were not made available to me for optical density measurements.

Besides the two lateral skull X-rays --one left and one right -- I also examined the X-ray taken from the front. There is a 6.5 mm nearly round so-called bullet fragment seen within the right eye socket. On the lower border of this fragment, at about the 5 o'clock position, a large bite is missing. The left to right width of this object at this lower level is therefore much less than the width of this object at its center. On the lateral X-ray, therefore, using the optical density measurements, I would naturally have expected this object to appear thicker at the center than at the bottom. To my surprise, however, the optical density measurements showed just the opposite: they implied distinctly more metal at the bottom! This fragment clearly does not behave like an object which was physically present on the body during the original X-rays. If, on the other hand, it was

added later as a second image to the original frontal X-ray, as in a composite, it could hardly be expected to be consistent with the lateral X-ray. Because no one bothers to take optical density measurements, anyone who prepared such a composite would not have worried about making the two views consistent for optical density.

This disagreement between the frontal X-ray and the lateral X-ray was not found in other objects on the X-rays. For example, there is a 7 x 2 mm metal fragment located well above the right eye. This is seen on both frontal and lateral views. On the lateral view its optical density was quite homogeneous. That is what I would have expected from the way it looks from the front. It therefore appears to be real -- that is, it was located on the body during the original X-rays. In fact, the pathologists described removing it. By contrast, it is most peculiar that the pathologists did not remove the much larger and more obvious 6.5 mm round object which should have been quite accessible at the back of the skull. Considering that the pathologists' main task was to find bullets, or at least large bullet fragments, it is astonishing that they did not even describe this object! My work suggests that they did not see it for a good reason -- perhaps it was not there, at least not in its present appearance. I should also add that when I asked the autopsy radiologist, Dr. John Ebersole, whether he saw this object on the X-ray on the night of the autopsy, he refused to answer my question and he abruptly terminated what had otherwise been a reasonable conversation. JAMA has so far refused to publish my article which contained a summary of my conversation with him. Unfortunately, Dr. Ebersole passed away several months ago. I believe that I was the last to ask him questions about the autopsy.

I noticed several additional odd features in this large white area at the rear of the skull. If this white area really represents a normal bone fragment, it should have about the same shape on both the left and right lateral X-rays, allowing, of course, for small differences in perspective. In fact, however, the superior border has a distinctly different shape on these two lateral views: on the left view, a small, but distinct, peninsula juts upward at one point where no similar feature is seen on the right view. The other, more normal appearing, bone fragments do not show such odd features.

On close inspection, this remarkable white area is distinctly wider on one lateral view than on the other. This implies that it was located closer to the right side of the skull. On the frontal X-ray, such an extremely dense object should have been as visible as a tyrannosaurus rex in downtown Manhattan at noon. However, when I looked at the frontal X-ray, there was no such beast to be seen.

The aberrations seen on these X-rays are so diverse that no explanation can accommodate such an ensemble except for the explanation of composites, i.e., they are composed of superpositions of more than one image. Most likely, the original image was

authentic. There are numerous unique features of JFK in these X-rays which were confirmed both in this study and in the prior study of the House Select Committee on Assassinations (HSCA). After the original image was reproduced by an X-ray copying machine, and before development, a second image was most likely superimposed on the first. This technique could have been used to add both the very dense area at the rear on the lateral X-ray and also the 6.5 mm object on the frontal view. Such a technique, of course, had no guarantee of producing consistent optical densities. On the contrary, it almost guarantees inconsistency.

You may well ask why no physician has officially proposed composites before. Well, you must remember that such composite X-rays are simply not seen in clinical practice. If you have never in your life seen a ghost would you recognize one if you saw one? And if you really did see one, would you admit that you believed in ghosts? Harry Livingstone tells me that his radiologist friend, Dr. Donald Siple, had actually suspected for some time that these X-rays were composites, so perhaps I am actually arriving at this conclusion rather late in the game. Quite possibly, there are many more of us out there than anyone has suspected. After today we may find out!

A Search for the Posterior Bullet Entry Site in the Skull

The HSCA concluded that a bullet entered the back of the head slightly above the 6.5 mm object which is seen on the frontal skull X-ray. They reached this opinion based on observations of the lateral views. Oddly enough, they did not comment on the location of this bullet hole as seen on the frontal X-ray. On this frontal X-ray, I carefully scanned the area above the 6.5 mm fragment, looking for their described bullet hole. As judged by optical density measurements, there is no such hole anywhere in this vicinity.

An alternate, but much lower site, was emphatically described by the autopsy pathologists in their official HSCA testimony and was recently confirmed in their interviews with the Journal of the American Medical Association (JAMA). Unfortunately, I could not do satisfactory measurements at this lower site on the frontal skull X-ray because there is dense bone from the front of the skull which overlaps this site. If, however, this lower site is correct -- and it is generally agreed that there are no other candidates for this bullet entry site -- then there is no good explanation for the obvious and numerous metallic fragments near the top of the skull, at least 4 inches higher than the lower entry site. I have always found it odd that these fragments near the top of the head were not described by the pathologists. Even JAMA did not venture to ask the pathologists about these oddly located metal fragments which are so obviously

inconsistent with a lower entry site. The pathologists suggested that the bullet which entered from the rear headed toward an area well above the right eye. But these dense metal objects are so far from this path that they are impossible to explain without invoking a second bullet near the top of the skull. This was exactly the dilemma that the HSCA tried to resolve by elevating the entry site on the back of the head by nearly 4 inches. Since I could not find an entry site at this location in my measurements, the HSCA entry site is quite unlikely. The pathologists' much lower site then becomes that much more likely. On this point, my work is in rare agreement with JAMA. The numerous bullet fragments near the top of the skull, however, would then require a second bullet for their explanation. This is clearly not in agreement with JAMA. This obvious conflict has never been addressed by the pathologists -- no one has even asked them about it! JAMA refused to publish a jointly authored letter to the editor when we raised this question. Jerroll Custer, the radiology technologist who took the X-rays, and who is here today, has confirmed to me that this collection of metal debris was indeed present on the original X-rays.

The Chest X-Ray

I also found some surprising results based on the chest X-ray. I made accurate measurements of the width of the spine directly on the X-ray. The front to back thickness of the body at this site (14 cm) as well as the distance of the back wound from the midline (4.5 to 5.0 cm) were supplied by the HSCA. Since this latter distance can be measured independently on photographs of the back, I also did this. The so-called exit site at the front of throat was described by the Parkland doctors as being very near the midline. When I placed these measurements onto a cross section of the body and then connected the bullet entry and exit sites by a straight line, I immediately saw that the "magic" bullet had to go right through the spine. This path would have caused major damage to the spine and would have been very obvious on the chest X-ray. In fact, there is no major trauma like this anywhere in the spine. Because of the impenetrable vertical barrier produced by the transverse processes up and down the entire cervical spine and because of the total width of the cervical spine, there is no place for the bullet to pass through anywhere in the neck and still exit through the midline of the throat. If, instead, the upper chest is considered as a possible bullet trajectory site, then another problem arises. The bullet would have to go right through the lung. But no lung damage of this type was seen by the pathologists and none is seen on the X-rays either. This "magic" bullet simply cannot enter through the back wound and then exit through the throat wound without

hitting the spine -- or else causing major lung trauma! It is odd that this rather simple reconstruction with exact measurements has never been done before. Its very simplicity, however, provides direct evidence that the object which entered the back could not have exited at the front of the throat. This throat wound, which looked like an entrance wound to the Parkland physicians when they first described it, may indeed have been an entrance wound.

Summary

This work has demonstrated singular features in the JFK autopsy X-rays. The range and number of these is so great that there can be only one satisfactory explanation -- these images are composites. Even to the unaided eye they appear to be composites. Now optical density measurements have added further confirmation for this view.

In addition, strong evidence is cited to demonstrate that two shots struck the skull. Finally, a simple anatomic reconstruction shows that the "magic" bullet truly had to be magical to pass through the spine without leaving a trace of serious trauma.

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