and be able to explain to the court what exactly had happened, have the negative in my pocket as a protection if necessary. There is no need to spot pictures and forensic photographers in this country will just not resort to any form of retouching of any picture.

INTERROGATOR. Is there any possibility in your view that those photographs are genuine?

MAN. There is no possibility in my view that they are genuine, they have been retouched and I consider the picture to be the result of a montage.

INTERROGATOR. Thank you.

2. AUTHENTICATION OF THE KENNEDY AUTOPSY PHOTOGRAPHS AND X-RAYS

(*a*) *Introduction*

(512) Authentication of the autopsy photographs allegedly taken of President Kennedy was considered essential because of the discrepant descriptions that have been given of the wounds incurred by the President. The description of the size and location of the President's head wounds, for example, by eyewitnesses at Parkland Hospital differed dramatically from the testimony of the autopsy doctors and the account set forth in the Warren Report. (*195*) More recently, the panel of medical experts convened by then-Acting Attorney General Ramsey Clark described Kennedy's head entrance wound as approximately 10 centimeters higher than the location reported by the Warren Commission. (*196*) As a result of these discrepancies, it was essential to verify that the autopsy photographs and X-rays did, in fact, depict Kennedy, and that these materials had not been altered in any way.

(*b*) *Issues*

(513) 1. Do the postmortem photographs and X-rays in the custody of the National Archives purporting to depict President Kennedy, in fact, depict him?

(514) 2. Is there any evidence that either President Kennedy's autopsy photographs or X-rays have been altered?

(*c*) *Materials examined*

(515) Twenty-seven original color transparencies and the twenty-five original black and white negatives were examined. These depicted the subject's head and upper torso from various positions.* In addition, 8″ x 10″ color and black and white photographic prints generated from these transparencies were evaluated.

(516) The X-ray materials consisted of the following items:

(517) 1. An attempted anteroposterior projection of a skull identified as:

21296 (numbers upside down).
U.S. Naval Hospital.
NNMC Bethesda, Md.
November 22, 1963.

*A more detailed description of these photographs is provided in pars. 570–571, 583–595 infra.

(518) 2. Right lateral projection of a skull with the same identification symbols.
(519) 3. Left lateral projection of a skull with the same identification symbols.
(520) 4. Three radiographs of three fragments of bone unidentified by symbols.
(521) 5. An anteroposterior projection of a chest with the same identification symbols as Nos. 1–3 above. This radiograph was obtained with the thoracic cage intact, that is, before autopsy.
(522) 6. An anteroposterior projection of a chest with the same identification as No. 5 above. This radiograph was obtained after the thorax had been opened and the lungs and mediastinal contents had been removed.

(d) Procedures

(523) Independent of the panel's analysis, the photographs and X-rays were reviewed by the three physicians who performed the autopsy, the leader of the X-ray team that took the postmortem X-rays, and by the photographer who took the autopsy pictures. These individuals indicated that the photographs and X-rays accurately portrayed Kennedy's various wounds.(*197*).
(524) The panel's board of consulting forensic anthropologists and a forensic ondontologist compared the photographs and X-rays with premortem photographs and X-rays of Kennedy. Premortem materials were studied for the purpose of discerning unique anatomic features whose presence in the postmortem photographs and X-rays would verify that the individual depicted was, in fact, Kennedy.
(525) The photographic materials and X-rays were examined visually by the panel.[1] This review included both miscroscopic examination and viewing relevant photographs in a stereoscope, a special device that allows pairs of photographs to be viewed in three dimensions. Because stereoscopy provides an excellent means by which altered or doctored photographs can be detected,[2] primary reliance was placed upon this analytical technique.[3]
(526) Finally, the autopsy X-rays, in addition to being reviewed by the panel, were analyzed for evidence of fakery by a radiologist who had particular expertise in the area of image enhancement.

(e) Conclusion

(527) 1. The postmortem photographs and X-rays in the custody of the National Archives purporting to depict Kennedy do, in fact, depict him.

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[1] Because the Department of Defense was unable to locate the camera and lens that were used to take these photographs, the panel was unable to engage in an analysis similar to the one undertaken with the Oswald backyard pictures that was designed to determine whether a particular camera in issue had been used to take the photographs that were the subject of inquiry.

[2] The principle of stereoscopy is discussed in detail in pars. 75–79. 434–36 supra.

[3] While several of the autopsy photographs and X-days were enhanced through the use of digital image processing, the resulting enhanced photographs and X-rays were used exclusively by the autopsy panel for determining the nature and cause of wounds. They were found to be unnecessary in the analysis to detect possible fakery, since the original materials, when viewed stereoscopically, were of sufficient quality to resolve this issue.

(528) 2. There is no evidence that either the Kennedy autopsy photographs or X-rays have been altered.

(f) Analysis

(529) This section will deal primarily with the panel's visual examination. Separate reports have been filed setting forth the detailed analysis of the panel's board of consulting forensic anthropologists and the forensic odontologist.

(530) Visual inspection of the autopsy photographs and transparencies revealed no evidence of retouching, compositing, or other evidence of fakery. Because all of the relevant photographs were studied stereoscopically, it is extremely unlikely that evidence of fakery would have escaped detection.

(531) Stereoscopic viewing is made possible when two photographs of a subject are taken from a slightly different position in space (that is, a few centimeter movement of the camera or a similar degree of movement by the subject photographed). This was made possible in the present case because the autopsy photographer, in an apparent effort to insure a good final result, took two or more pictures of each relevant view.

(532) Because pairs of stereo pictures may be seen in three dimensions, such photographs add depth to the perception of the photographed scene in much the same way as a pair of human eyes, separated from one another in space, can perceive depth.

In viewing stereo pairs of photographs through a stereoscope, one eye views one picture and the other eye views the second picture. As a result, the eyes, coupled with the visual image processes of the brain, are able very readily to perceive any differences between the two pictures. Such differences in the scene between the two pictures tend literally to "pop out at you." No differences of this kind were observed by the panel in stereo pairs depicting the back of Kennedy's head, the top of his head, the large skull defect, the right front of the head, the back wound or the anterior neck wound. In this way, photographs of each of Kennedy's wounds were effectively authenticated.

(533) It is theoretically possible to alter photographs that comprise a stereo pair. To avoid detection of such alteration, however, requires that each picture comprising the pair be altered slightly different, in a systematic way. This is extremely difficult because each picture of a stereo pair is a picture of the scene from a slightly different but directly comparable, point of view. Such alteration is virtually impossible when, as in the case of Kennedy's head, the image photographed contains considerable detail.

(534) The examination of the postmortem X-rays focused primarily on the following possible indicia of fakery:

(*1*) observation of a difference in density of the images;

(*2*) discontinuity of anatomical structures;

(*3*) alteration of continuity of an abnormal pattern; or

(*4*) production of an image which is not anatomical or an image of an impossible pathologic process.

(535) No such evidence of fakery was discerned.(*198*) The X-ray images have not been altered in any fashion except for:

(536) 1. Two small areas of thermal damage resulting from a light source that was once held too close to the "anteroposterior" image. These were reported to be present on an observation report dated November 1, 1966, and validated by signature November 10, 1966. This report is in the National Archives.
(537) 2. In addition, the panel observed minor "staining" or discoloration of the images due to incomplete processing of the film in the developing process. This discoloration will continue to be more prominent with the passage of time. (*199*)
(538) Finally, the linear opacities associated with the postmortem X-rays have been said to be the result of manipulation. These opacities are normal grid lines from the grid used to eliminate "scatter fogging" of the images at the time of exposure of the films, and, therefore, represent normal images rather than evidence of manipulation.

3. FORENSIC ANTHROPOLOGICAL ISSUES

(*a*) *Introductory statement of approach*

(539) In the course of its investigation of the death of President Kennedy, the committee encountered several problems concerning the photographic identification of certain individuals either known or alleged to have been involved in the assassination. Upon the advice of other scientific consultants, it was determined that some of these problems fall within the purview of forensic anthropology, a relatively new discipline of the forensic sciences.
(540) Forensic anthropology is defined as the application of the physical anthropologist's knowledge of human variation to problems of legal medicine. As implied in this definition, forensic anthropologists, of whom there are fewer than 30 in the United States, are physical anthropologists who, by training and experience, are qualified experts in the medicolegal aspects of their science. The parent field, physical anthropology, is the study of man's biological variation in space and time. Any physical or physiological difference between human individuals and populations is of interest to physical anthropologists. Applications of their expertise range from the search and study of man's remotest fossil ancestors to helping design space suits for astronauts.
(541) For over a century physical anthropologists have measured the distances between specific anatomical landmarks of the human body in order to describe mathematically its variation in size and shape. To minimize error and insure repeatability, the measurements are made by trained anthropometrists with the subject positioned in a standardized pose. Size differences in body dimensions are reflected in the measurements themselves. Shape differences are defined by simple indices or by more complex multivariate methods. An index is ordinarily computed by dividing the smaller of two measurements by the larger and multiplying the result by 100 to eliminate the decimal. For example, the nasal index is computed as follows:

$$\text{Nasal Index} = \frac{\text{nose width}}{\text{nose length}} \times 100$$