

## ADDENDUM E

MEMORANDUM OF J. LAWRENCE ANGEL, ADDRESSED TO "JFK SKULL REVIEW COMMITTEE" OF THE FORENSIC PATHOLOGY PANEL, DATED OCTOBER 24, 1977

OPTIONAL FORM NO. 10  
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UNITED STATES GOVERNMENT

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*Memorandum*

TO : JFK skull review committee

DATE: October 24, 1977

FROM : J. Lawrence Angel

SUBJECT: Study of pictures and X-rays of bone fragments related to those of JFK

The writer of this report is Curator of Physical Anthropology at the Smithsonian Institution ( since 1962 ) and Professorial Lecturer in Anatomy and Anthropology Departments of the George Washington University and in Forensic Sciences Department of the Johns Hopkins School of Public Health (in connection with a seminar in Forensic Anthropology). He received his A.B. from Harvard in 1936 and his Ph.D. from Harvard University in 1942. He taught at the universities of California and Minnesota and from 1943-1962 taught in the Anatomy department at the Jefferson Medical College, Philadelphia, leaving as Professor of Anatomy and Physical Anthropology. For some years before leaving he served as consultant in Surgical Anatomy at the U.S. Naval Hospital in Philadelphia, specializing in the head and neck. He has studied hundreds of skeletons for law enforcement agencies in the past 15 years and thousands of archeological skeletons.

In order to approximate the position of 2 major loose fragments it is necessary to define the gap seen in X-rays (especially # 1 and 2) and photographs (especially #44 transparency and photograph) of the head and skull of JFK now kept at the National Archives. This gap where bone is missing along the top and right side of the skull vault extends from just behind obelion (area of the parietal foramina) forward almost to the frontal bosses anteriorly. From the radiopaque lump behind obelion which with cracks appears to mark the bullet entry the left margin of the gap goes forward just to the right of the sagittal suture to a region of major fracture just behind vertex where the margin moves about 1 cm to the left of the midline. From here the margin extends diagonally forward to the left to a curved area about 5 cm above the left orbit and about 5 cm from the midline. The anterior

edge of the gap crosses to the right, stepping down about the midline to a level 5 cm above nasion and then sloping down to an area where there is an almost semicircular lacuna about 35 mm above the middle of the right orbit. To the right of this a vertical crack extends down to the orbit (an area of discoloration, apparently subcutaneous, appears of the lateral photograph of JFK around the frontomalar angle of the right orbit). From a level about 4 cm above the frontomalar angle the bone margin extends backward on the right side, with another V-shaped crack in front of the coronal suture. Behind this point the whole antero-inferior quarter of the right parietal lies loose. Its upper border was about 5 cm above the squamous suture but in X-ray #2 it appears shifted downward about 1 cm. From the point where it met the posterior half of the right parietal a big crack extends back and down, and the posterior boundary of the gap goes backward and upward to the starting point just to the right of obelion.

X-rays 4, 5, and 6 show a large piece of skull vault, clearly frontal bone with an apparent jagged line indicating coronal suture, about 7 to 8 cm long. The apparent inferior (right) border is 6 cm long and at the irregular/<sup>right</sup> angle which it makes with the jagged (coronal) border are several radiopaque marks (part of bullet?). The third (anterior) edge of the fragment is curving. This large fragment appears to be the upper part of the frontal bone, extending more on the right than on the left, and leaving spaces both in front and to the right. The two smaller fragments in X-rays 4, 5, and 6 are insufficient to fill these gaps.

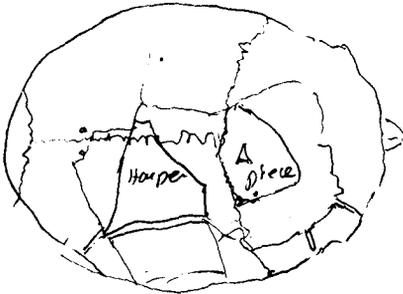
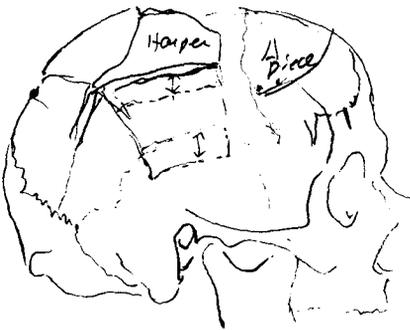
The Harper fragment photographs show it as a roughly trapezoidal piece, 7 x 5.5 cm in size, coming mainly from the upper middle third of the right parietal bone. Near its short upper edge vascular foramina on the inside and a faint irregular line on the outside indicate sagittal suture. Its postero-inferior pointed angle appears to fit the crack in the posterior section of the right parietal and its slightly wavy lower border can fit the upper edge of the loose lower section of right parietal. Its upper short border, on the left of the midline near vertex, may meet the left margin of the gap. Behind it there appears to be a large gap and in front a narrow one.

The entrance of the bullet appears to have been just below obelion and 18 mm to the right of the midline (X-rays 1 and 2). From here radiopaque fragments appear along an expanding track almost parallel to Frankfort and sagittal planes. The exit area through the right frontal above the boss can account for the small semicircular notch 35 mm above the right orbit, the radiopaque mark near this, and at the upper right part of the track can explain the radiopaque markings on the triangular frontal fragment just in front of the coronal suture above stephanion.

The two big loose fragments of skull vault, from upper frontal and parietal areas, more on the right than the left side, do not articulate with each other and leave three appreciable gaps unfilled.

To Lawrence Angel

----- = position in X-ray



← Top view sketch is dorsal, not observed