



The Marks on Robin Bain's Hand **– Fingerprint Examination**

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Examination of Robin Bain's Fingerprints

On 13 August 2013, Principal Fingerprint Officer Eugene Wall, assisted by Fingerprint Officer Ian Harrison, conducted an assessment of the Operation Huia scene photographs of the right hand of Robin Bain and the post-mortem fingerprints taken from Robin Bain.

The focus of the examination was to determine if corresponding marks were present on the post-mortem fingerprints which would indicate that marks observed upon the right thumb and fore finger of Robin Bain in scene photographs were the result of superficial damage to the skin.

The examination was held at Christchurch Central Police Station in the presence of Detective Senior Sergeant Kallum Croudis, Detective Sergeant Kevin Holder, Mr Joseph Karam, Dr Anna Sandiford and Mr Peter Durrant.

Background to fingerprints

In simple terms, a fingerprint is the impression left by the raised friction ridges present upon the underside of the human hand. The raised ridges, coated in some transferable medium, will leave an image upon a receptive surface in exactly the same way that a rubber stamp coated with ink leaves an impression upon paper. The resulting impression is a mirror image of the raised areas as viewed directly upon the surface of the skin.

The individual friction ridges flow more or less continuously, and parallel to, their neighbouring ridges upon the surface of the skin. The flow of the ridges upon the fingers form patterns, which can be divided into three general fingerprint classifications: arches, loops and whorls.

A natural interruption to the path of an individual ridge, e.g. if the ridge ends or joins on to a neighbouring ridge, will be likewise represented in the resulting fingerprint and is termed a *ridge characteristic*. These characteristics are unique in their arrangement and form the basic identification features involved in the practice of fingerprint identification.

Once formed during foetal development, the arrangement of the ridges remains persistent throughout life unless the skin is permanently scarred.

Other features such as minor creases, wrinkles and superficial cuts, may be present upon the skin. Features such as these do not affect the overall arrangement of the friction ridges. The majority of these features will be narrow and near linear in nature and will be represented on the corresponding fingerprint as white lines, where the gap due to the folding or cutting of the ridge peaks has failed to contact the receptive surface. The extent to which these features are recorded upon the fingerprint depends upon (a) the initial depth, width and angle of the features, and (b) the pressure applied when the

fingerprint is deposited upon the surface as this can flatten the ridges and cause the gap to close.

Items examined:

Photographs

Operation Huia photographs A 008 and A 009 showing the right hand of Robin Bain (Figure 1). These photographs were received as 39MB .tif images.

The images, although not taken specifically to record such detail, have captured some of the ridge detail upon the right thumb and fore finger of the subject. Photograph A 009 is a closer view of the hand and the detail is therefore slightly sharper than in A 008. The thumb is partially obscured by the right middle finger of the subject in both A 008 and (to a greater extent) A 009.

The marks in question are visible in both photographs. There are two marks upon the right hand edge of the right thumb, and a mark near the left tip of the right fore finger.



A 008



A 009

Figure 1: Photographs A 008 and A 009 (cropped and resized) showing the marks upon thumb and fore finger.

For analysis purposes the photographs were printed to A3 size by a professional photography studio both as full images and cropped images to enlarge the right hand. The clarity of these prints is superior to the quality capable of being produced in this report.

Post-mortem fingerprints

For the purposes of this report and to enable easy interpretation for the readers, all images of the inked impressions - excluding the full form images in

Appendix A - have been mirrored to represent the orientation of the ridge detail as viewed on photographs A 008 and A 009.

Post-mortem fingerprints of Robin Bain were taken by Detective M. Lodge on 21 June 1994. These fingerprints were taken by inking the fingers and then placing the fingers onto a whole fingerprint form.

A further set of post-mortem fingerprints of Robin Bain were taken by Fingerprint Officer K. Jones on 22 June 1994. These fingerprints were taken by inking the fingers and then placing the fingers onto cut-out pieces of fingerprint form which had been placed in a post-mortem fingerprint spoon. The individual fingerprints were then glued on to a fingerprint form. The chief advantage in this method is the ability to record a rolled impression which captures the fingerprint detail towards the lateral edges of the fingerprint.

Prior to the date of this examination, images taken from photocopies of the post-mortem fingerprint forms were circulated and were the basis for some commentary. These images were poor reproductions of the original material. Areas of patchiness and white areas visible on these images are primarily the result of the photocopy process being unable to reproduce lighter low-contrast areas of the original recorded fingerprints. They are totally unreliable for the purpose of examination to identify visual artefacts which may, or may not support the presence of damage to the skin of the deceased (Figure 2).

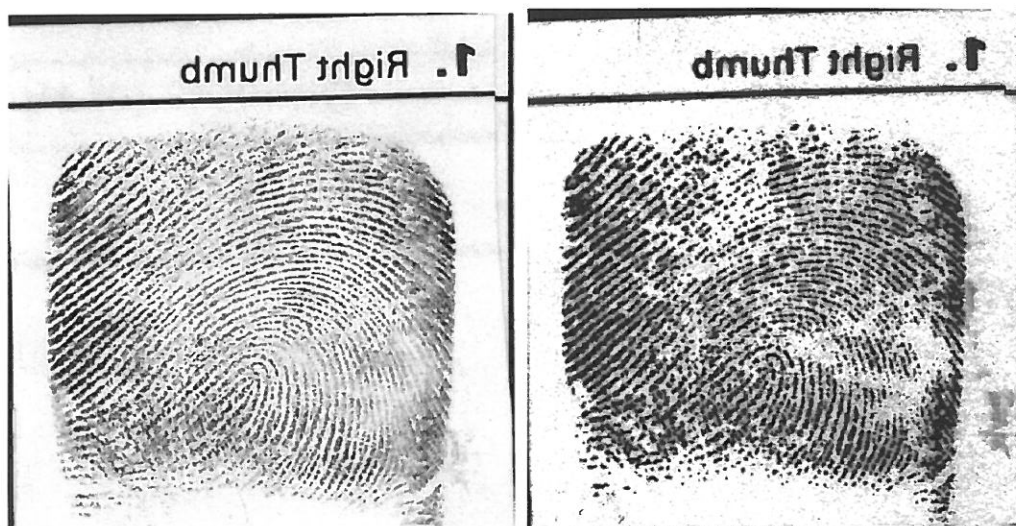


Figure 2: Scanned image taken from original vs photocopied image.

There was also comment regarding the use by Police of only one set of post-mortem fingerprints - those taken by Fingerprint Officer Jones. Upon scrutiny, it is apparent that the set recorded by Detective Lodge fails to record the right hand side of the thumb and the tip of the fore finger where the marks are located (Figure 3). They are consequently of no use whatsoever for the purposes of this examination.

No criticism of Detective Lodge's efforts to record the fingerprints of Robin Bain is intended or is justified in this case. It is one of the core duties of Fingerprint Officers to fingerprint cadavers for the purposes of establishing identity, and to secure elimination fingerprints for comparison at major crime scenes. The superior set of fingerprints obtained by Fingerprint Officer Jones is purely the result of his training, experience and possessing the correct equipment.

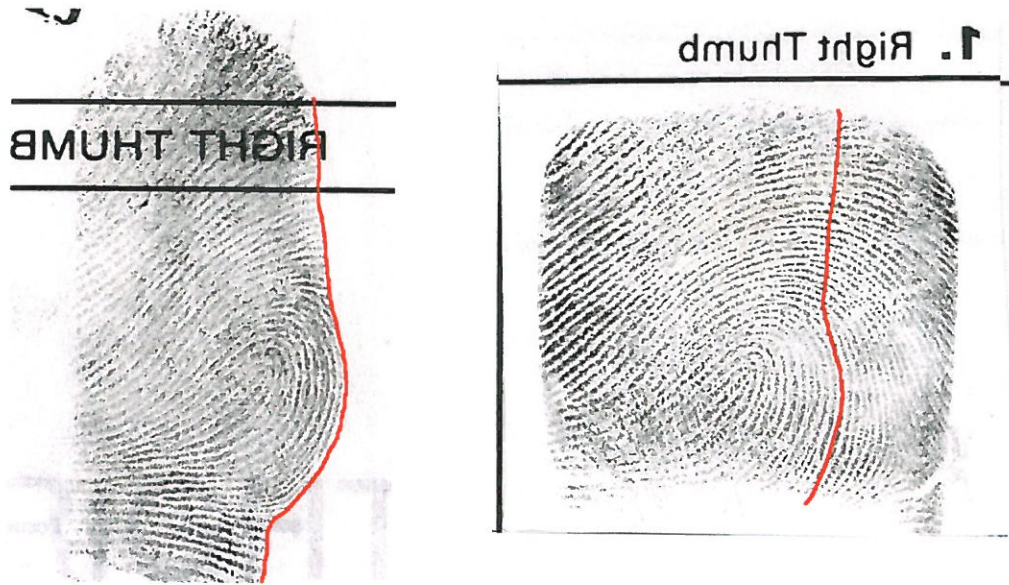


Figure 3: Post-mortem print taken by Det Lodge vs post-mortem rolled print taken by Fingerprint Officer Jones. The red line of the right hand border has been super-imposed to show the area of the rolled print not recorded.

Comparison of post-mortem prints to photographs

By examining the ridge flow of the right thumb and fore finger in the post-mortem thumbprint it is possible to identify features which will be useful to establish a fairly accurate position of the marks in A 008 and A 009 upon the thumbprint.

The right thumb

The right thumbprint of Robin Bain is a loop pattern (Figure 4). In a loop the ridges near the centre of the pattern flow in from one side of the fingerprint, recurve, and flow out on the same side that they entered the pattern. The top of the centremost recurving ridge is called the *core*. The collected group of recurving ridges form the *pattern area* of the fingerprint. The two innermost ridges which surround or tend to surround the pattern area are called *tyelines*. There is one tyeline which flows under the pattern area and one tyeline which flows over the pattern area. The point at or directly in front of where the tyelines diverge is called the *delta*.

Also noteworthy is a very strong white line which angles down towards the base of the thumb at the bottom right of the post-mortem print near the delta.

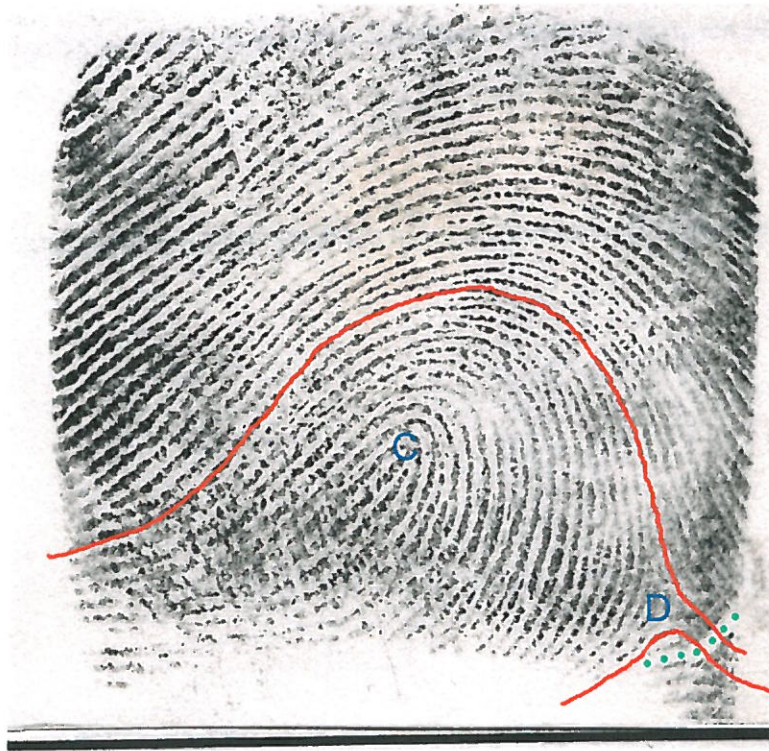


Figure 4: Right thumbprint.

C = core D = Delta Red lines = typelines Green dots = white line/crease

On both photographs A 008 and A 009 the core is obscured and is not available for orientation purposes.

On A 008 the delta area can just be seen, whilst in A 009 it is obscured.

In both photographs a crease can be seen at the right edge of the thumb angling down towards the base of the thumb.

Some ridge characteristics are present which can be used for the purposes of locating the marks, both by their proximity to the mark and by counting the number of ridges to areas of interest.

The right hand edge of the thumb, the general area where the marks are situated, is clearly recorded on the post-mortem print.

The right fore

The right fore fingerprint is also a loop pattern (Figure 5).

No core or delta is visible on either photograph A 008 or A 009 for the purposes of locating the mark on the post-mortem print of Robin Bain.

Some ridge characteristics are present on these photographs which can be used to locate the mark.

The top left tip of the finger, the general area where the mark is situated, is clearly recorded on the post-mortem print.



Figure 5: Right fore fingerprint.

The marks on A008 and A 009

For future reference the marks upon the right thumb and fore finger captured in the photographs have been named as follows (Figure 6):

TU – Thumb upper
TL – Thumb lower
F – Forefinger

Approximate measurements for the length of the marks have been estimated using the magazine in the photographs as a scale. Angular distortion in the photograph and the curved surface of the thumb and finger will affect the calculations. The figures quoted should not be considered to be exact measurements, particularly in the case of mark F due to the steep angle of the mark to the camera plane.

TU – 5.6mm
TL – 6.5mm
F – 3.3mm

All three marks are approximately equal in width to one fingerprint ridge. The ridges are on average between 0.5 – 0.6mm apart from peak to peak as measured on the rolled impression of Robin Bain.

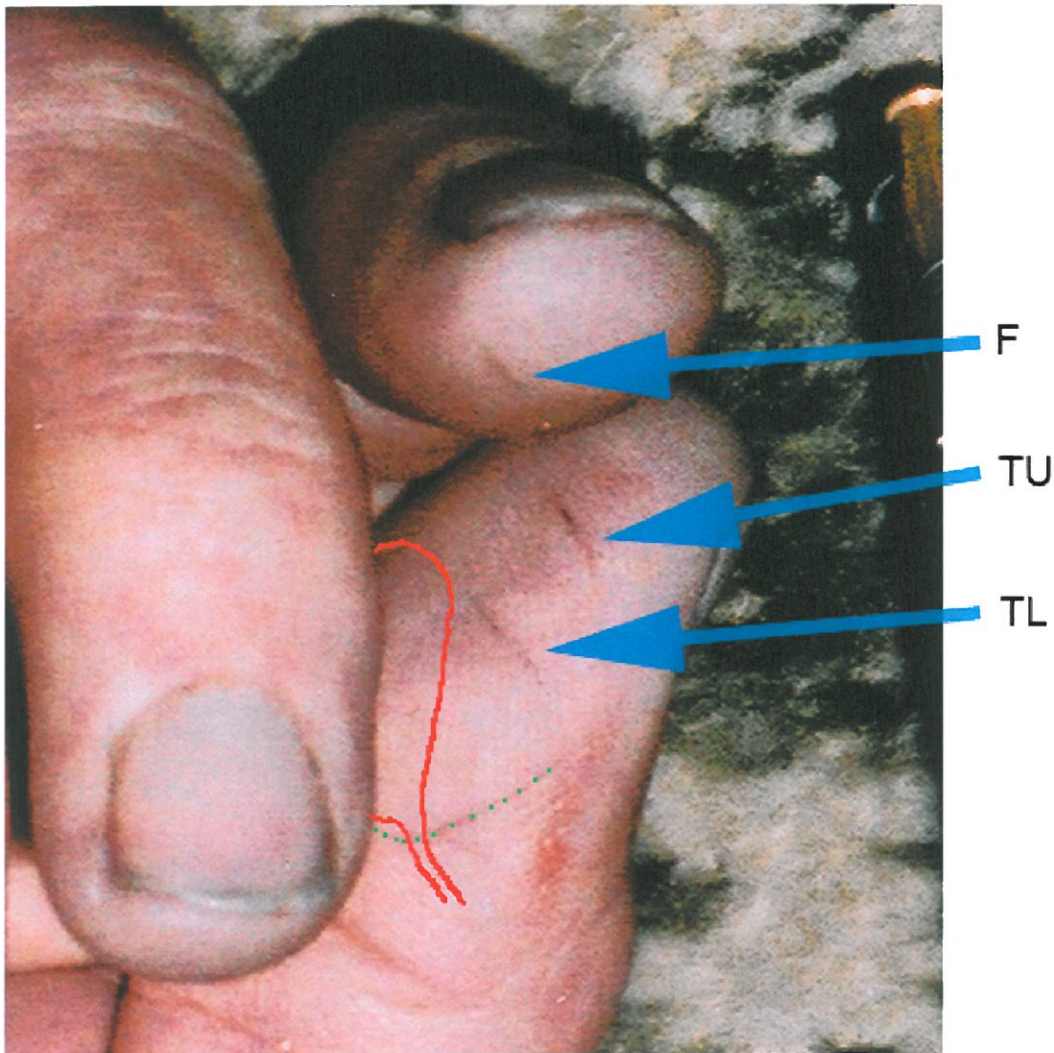


Figure 6: Photograph A 008 showing location of marks. Typelines and crease from Fig. 4 also indicated.

Locating the marks TU and TL on the post-mortem thumbprint

Analysis of the marks visible in photographs A 008 and A 009 reveals several factors which have enabled the location of the marks TU and TL to be found on the post-mortem thumb print (Figure 7).

Mark TL appears to begin one ridge out from a tangent to the upper typeline ridge and track across the thumb at a slightly downward angle. The mark cuts across 7 ridges and is approximately 6.5mm in length. The fingerprint ridges below the centre of this mark are at an angle of approximately 40° to the mark.

Along a straight line from the left hand end of mark TL to the left hand end of mark TU a count of 11 intervening ridges can be made. This straight line is approximately 8.0mm in length, and is at an angle slightly greater than 90° to mark TL.

Mark TU more or less follows the path of the ridges and is approximately 5.6mm in length.

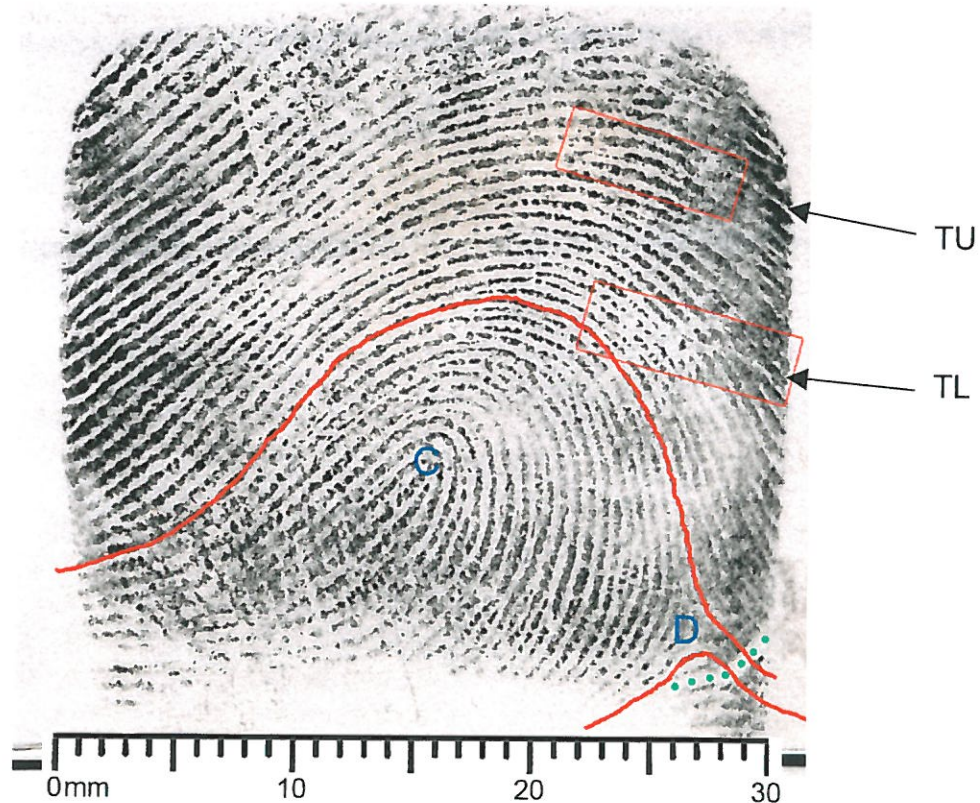


Figure 7: Location of marks TU and TL upon post-mortem thumbprint.

TU vs. post-mortem thumbprint

On photograph A 009 the mark TU appears to have a short ridge in the centre of the mark, with a dark coloured 'void' to its left, and a small break and a step down to what appears to be a continuation of the short ridge to its right (Figure 8).

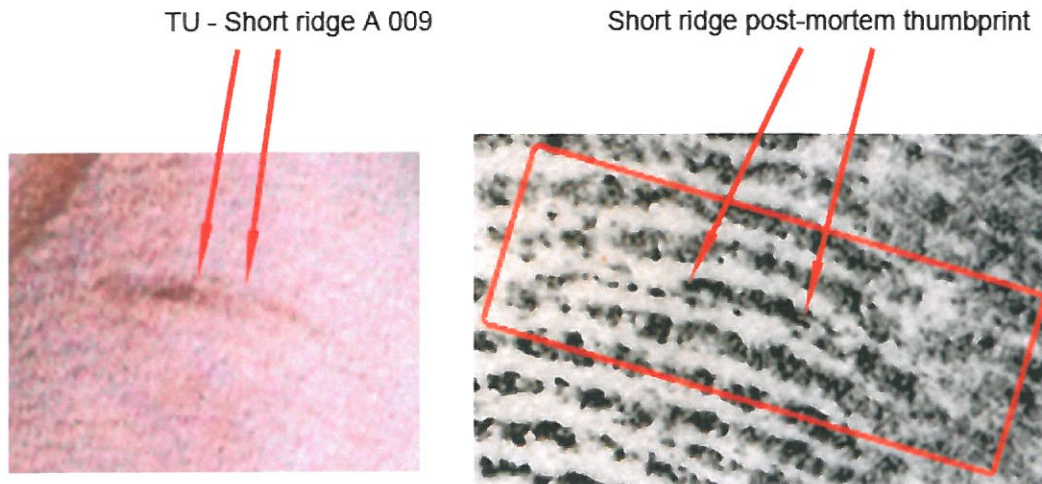


Figure 8: Close-up view of mark TU and corresponding area on post-mortem thumbprint (not to scale). Interpretation of mark path indicated by dotted line.

A similar arrangement is observed on the post-mortem thumbprint which is in agreement with mark TU in terms of location, length and orientation with distinguishable ridge features.

A short ridge with a small break to a continuation of the ridge on its right end is observed on the post-mortem thumbprint.

The fragmentary ridge detail recorded in the small break area reveals a slanting gap running through the ridge which can be interpreted as a ridge that has sustained damage at a low angle to the direction of the ridgeflow.

In the void area on the post-mortem print is a very narrow ridge which continues underneath the short ridge on its left end. The narrow ridge is too thin to be a properly formed primary ridge. Very fine ridges, known as *incipient ridges* do occur in fingerprints, however it is unusual for them to exist in isolation on a fingerprint as this narrow ridge does. Furthermore, incipient ridges do not cause the gap between the primary ridges to widen in order to accommodate them. In this case, the ridges above and below the narrow ridge do tend to diverge to surround the narrow ridge, suggesting that the narrow ridge may be a primary ridge which has sustained damage along its peak.

Using these features, TU's path can be plotted as a line on the post-mortem thumbprint. This line, approximately 6mm long, follows the narrow ridge, flows under the short ridge and through the slanted gap (Figure 9).

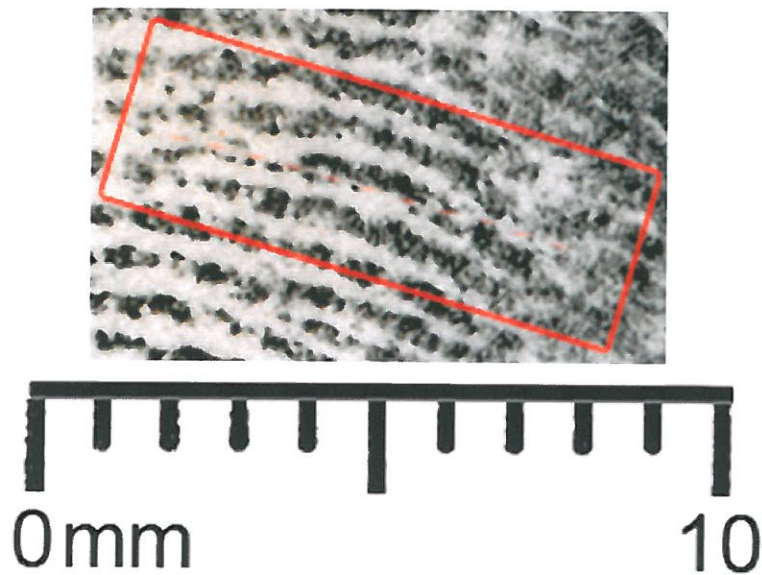


Figure 9: Interpretation of mark TU's path indicated by dotted line.

TL vs. post-mortem thumbprint

In photographs A 008 and A 009 the mark TL appears to be a darker shade on the left half of the mark, with a deeper coloured spot near the centre of the mark and slightly narrower and lighter colour on the right side (Figure 10).

A dark spot is recorded on the thumbprint which coincides with the deep coloured spot on TL in photographs A 008 and A 009. The exact cause of the spot is difficult to determine, however it is highly likely that it is biological in origin as opposed to being a piece of foreign matter stuck to the finger surface.

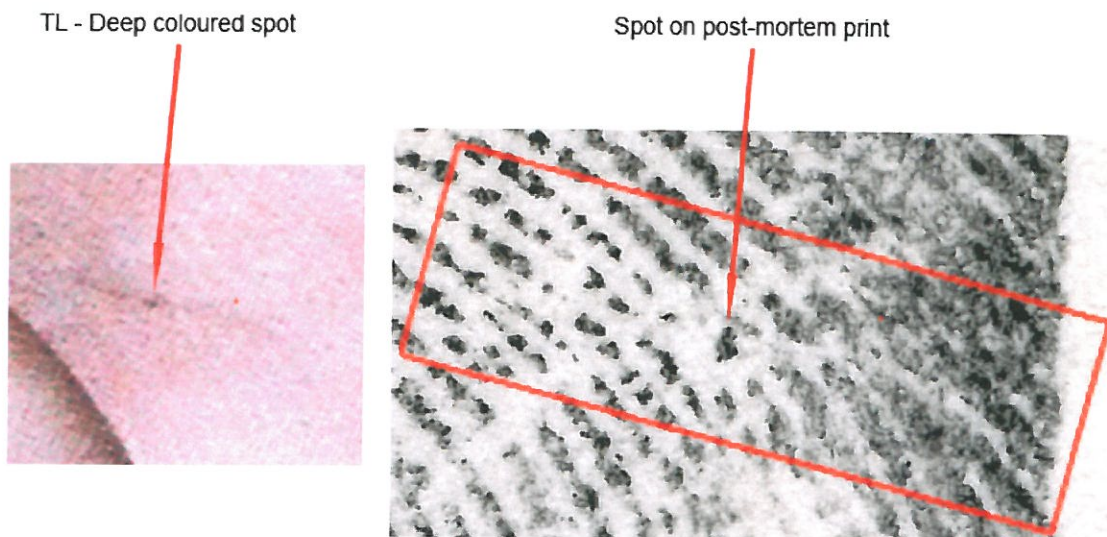


Figure 10: Close-up view of mark TL and corresponding area on post-mortem thumbprint (not to scale). Ridge ending indicated by red dot.

In both photographs, three ridges to the right of the spot, a ridge ending is observed a short distance above the right hand end of the mark. This is consistent with a ridge ending observed on the post-mortem thumbprint.

A narrow line can be observed on the post-mortem thumbprint that corresponds with mark TL in terms of location, length and orientation with distinguishable ridge features.

The gaps in the ridges which form the line on the post-mortem print are wider on the left side of the spot and narrower on the right side which correlates with the deeper colouring in the photographs.

Using these features, TL's path can be plotted as a line on the post-mortem thumbprint. This line is approximately 7mm long (Figure 11).

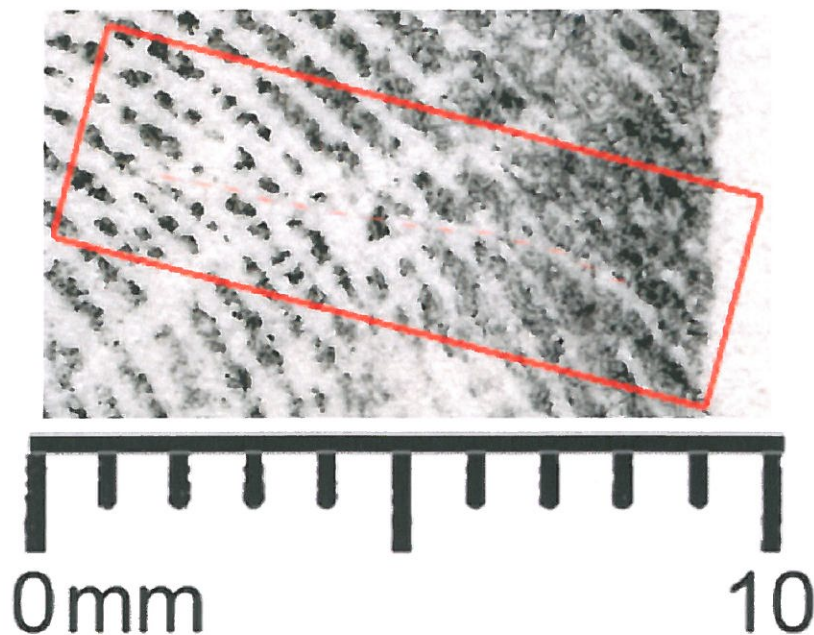


Figure 11: Interpretation of mark TL's path indicated by dotted line.

Locating mark F on the post-mortem fore fingerprint

The mark on the tip of the forefinger cannot be located using core, delta or typelines, however a number of reliable ridge characteristics are visible in A 009 which can be used to determine its location upon the post-mortem fingerprint (Figure 12)..



Figure 12: Location of mark F upon post-mortem thumbprint.

An obvious line can be observed within the area that corresponds with mark F in terms of location, length and orientation with distinguishable ridge features (Figure 13).



Figure 13: Close-up view of mark F and corresponding area on post-mortem fingerprint (not to scale). Interpretation of mark path indicated by dotted line.

Conclusion

The location of the marks visible upon the right thumb and fore finger of Robin Bain in Operation Huia photographs A 008 and A 009 have been identified on the post-mortem fingerprints taken by Fingerprint Officer Jones.

In these identified locations on the post-mortem prints, features are observed which correspond accurately with the marks observed in the photographs.

These corresponding features are strongly indicative that marks present on the right thumb and fore finger of Robin Bain as seen in Operation Huia scene photographs are the result of minor superficial damage to the skin surface.



Eugene Wall

13/9/13.



Ian Harrison

11/9/13

APPENDIX A:

Post-mortem fingerprint forms of Robin Bain

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INSTRUCTIONS

1. Police attending in the first instance should make every effort to obtain all elimination prints from persons with legitimate access to the scene. Consider palm prints also — use the rear of this form.
2. If the elimination prints *accompany* the lifts or exhibits, only the complainants name (and the donors name if not the complainant) needs to be filled in.
3. If the elimination prints are forwarded by themselves, complete all details.

DISTRICT and STATION DN

C.R.B. REFERENCE NUMBER

DISTRICT FILE NUMBER

VICTIM Robyn Irving BAIN
COMPLAINANT

ADDRESS 65 Every St, Dunedin

OFFENCE Deceased

DATE 21/08/94 MG Lodge Det.

DONORS NAME (if not comp.)

AN EXPLANATION TO THE DONOR

Finger or palm prints have been located at the scene of this offence. As you have had legitimate access to the scene, your prints may have been left there. This set of elimination prints will be compared with the scene prints and then destroyed at Police National Headquarters, Wellington.



LEFT THUMB

LEFT INDEX

LEFT MIDDLE

LEFT RING

LEFT LITTLE

RIGHT LITTLE

RIGHT RING

RIGHT MIDDLE

RIGHT INDEX

RIGHT THUMB

Impressions of Left Hand — Taken simultaneously.

Plain impressions of Thumbs

LEFT

RIGHT

Plain impressions of Right Hand — Taken simultaneously.

PALM PRINTS OVER



AFIS No.

Plain impressions of Right Hand Fingers –
Taken simultaneously