Does the Shroud Encode 3D Information?

By Craig Paardekooper

The dark areas of the shroud that make up the image of Christ are made of fibers that have been discolored on their surface, not by the addition of any material to the cloth, but by the transformation of the existing material from Carbon single bonds to carbon double bonds. This means that the image was formed by the reception of energy, rather than by the addition of material. The carbon double bonds absorb more light, producing a darker shade of yellow.

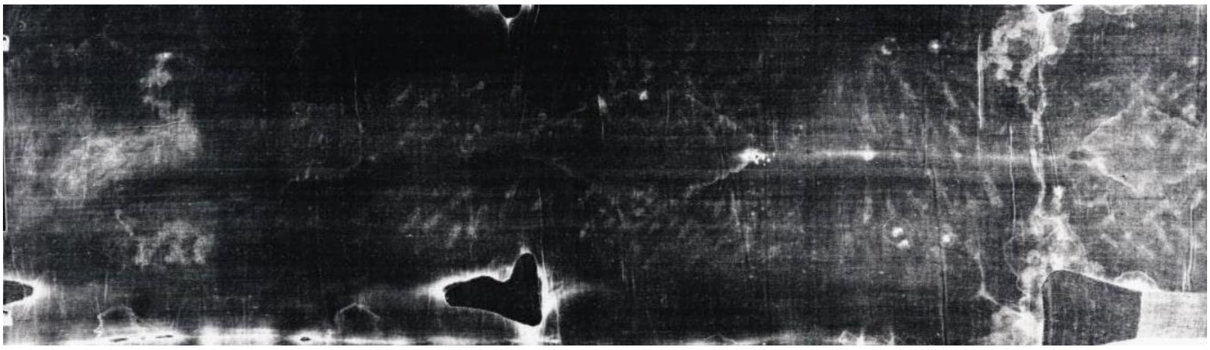
It has also been observed that the density of dark fibers is greater where areas of the body were nearer to the cloth, which demonstrates action over a distance. This indicates that the image was produced by radiant energy.

In this monograph, I use inverted images of the shroud, and investigate whether nearer surfaces are brighter and whether more distance surfaces are darker.

Testing Spot Brightness

A dorsal image was used. In order for the right foot to have been nailed on top of the left foot, the right leg was bent at the knee. Consequently, the knee of the right leg was more distant from the cloth compared to the calves of the right leg, and the right leg was more distant from the cloth than the left leg.

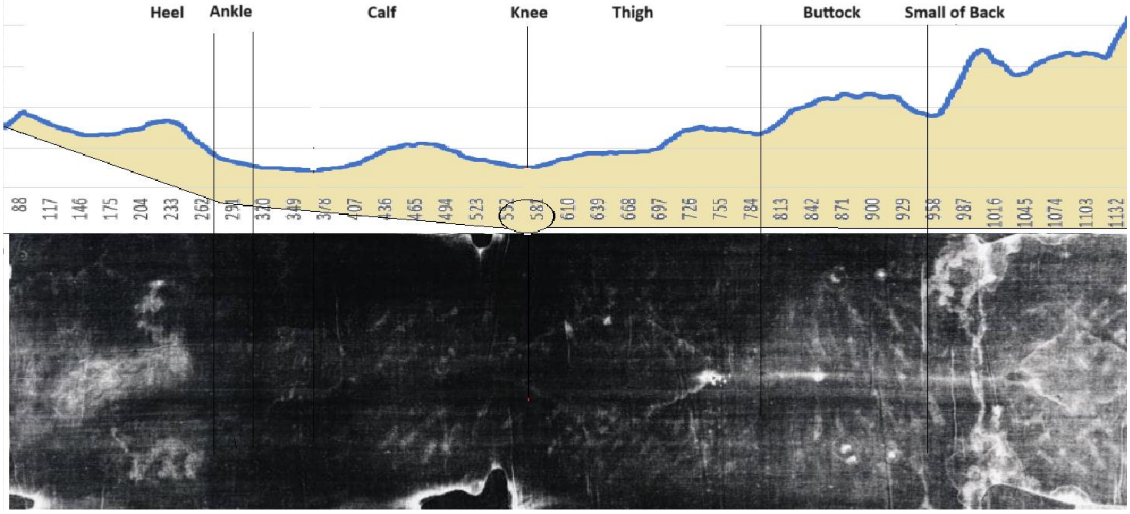
I used this dorsal image (1280 x 960 pixels) –



A horizontal cross section was selected running along the center of the right leg over a distance of 1280 pixels. At each pixel point, the brightness of 20 pixels on either side on either side of the horizontal cross section was averaged.

The resulting cross section was further smoothed using a 40-point moving average.

Results



The knee and lower calf were the most distant from the cloth, so appear dimmest. From the ankle there is a progressive brightening of the image, since the foot is inclined downwards, so the heel is much nearer to the cloth.

Above the knee, the thigh gets progressively closer to the cloth, so gets brighter. The buttocks are nearer to the cloth than the thighs, so show as brighter still. The rippling of the buttocks is due to the scourge marks.

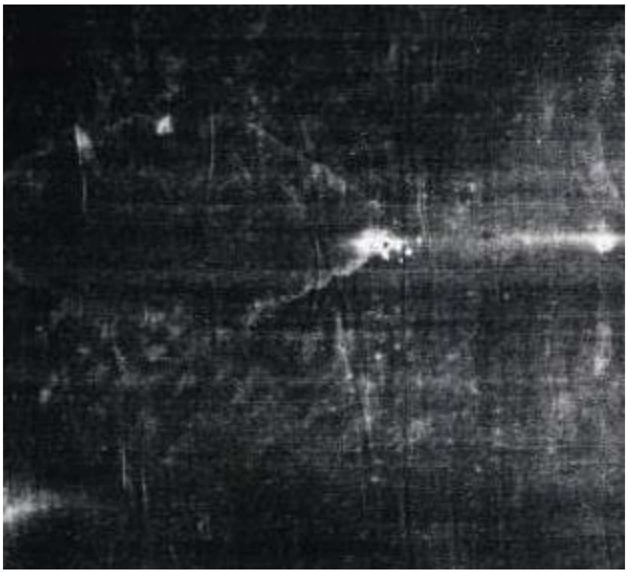
The small of the back is darkened relative to the buttocks and upper back, since the small of the back is slightly more distant. Notre that the darkened area on either side of the spine, shows that the waist is narrower.

Discussion

Radiant Energy: Anatomical features that are more distant from the cloth are dimmer, and features that are closer to the cloth are brighter. This indicates action at a distance – which is the hallmark of radiant energy. Brightness is inversely proportional to distance because intensity of radiation decreases with distance. Therefore, the Shroud image was produced by a burst of radiant energy acting over a distance.

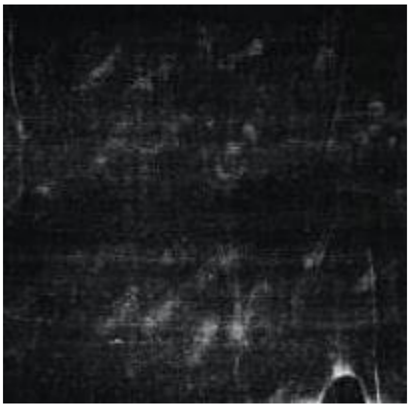
Resolution: The preservation of scourge marks on anatomy that was distant from the cloth indicates that the burst of energy was collimated, since such marks would not be preserved if the energy was radiating in diffuse directions. For example, the calves were more distant than the upper back or buttocks, as evidenced by the reduced brightness of the calves compared to the back and buttocks, but the resolution of the scourge marks was the same. The dumbbell shape of the scourge marks on the calves are still apparent, even though the calves could not have been in contact with the cloth.

The sides of the thighs are dimmer because the thighs are curved, and so the sides are more distant. Yet the scourge marks – the pairs of dots produced by the dumbbell scourge are still distinct.



Scourge marks on the sides of the thighs

Therefore, whilst intensity was dependent on distance, resolution was not diminished. We might expect reduced resolution if the radiation was diffuse and in all directions. It therefore seems that the radiation emitted by the man in the shroud, whilst attenuated by distance, was not diffuse but collimated (in parallel lines).



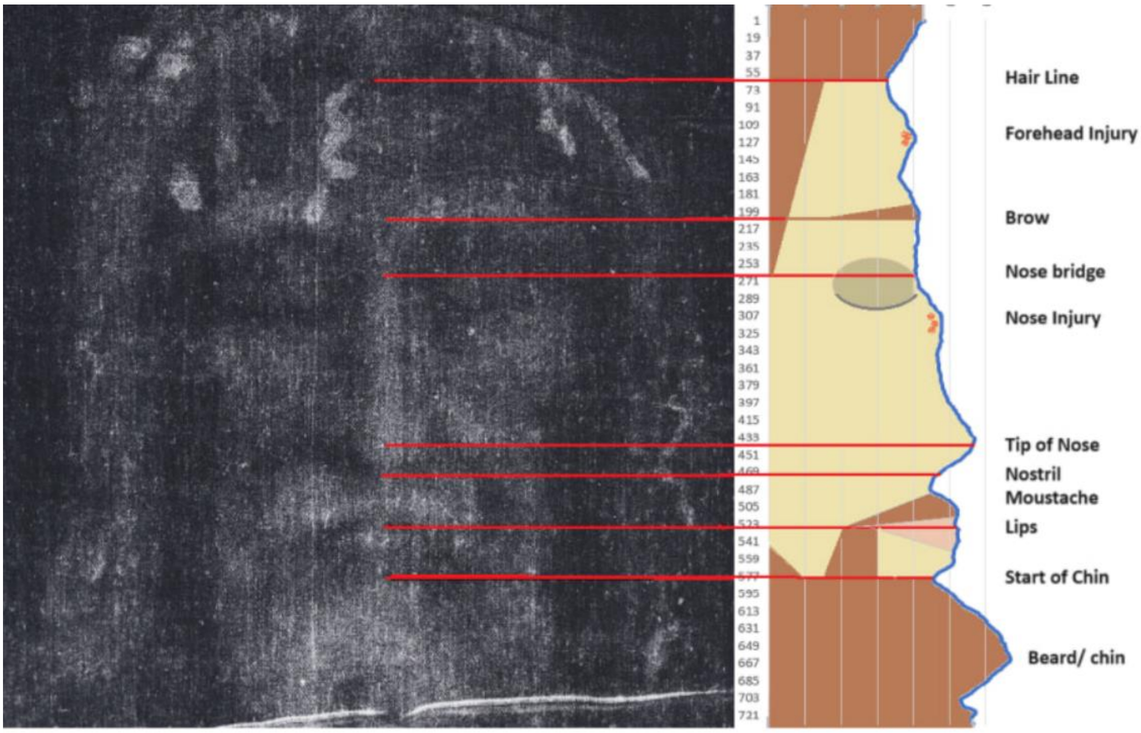
Scourge marks on calves. Notice that the scourge marks on the periphery (more distant due to calf circularity) are still distinct.

Scourge marks on the upper back. Notice that the scourge marks in the darker regions are still distinct.

Frontal Projection: Another feature of the image is that it is a frontal projection ONLY. There is a complete absence of a side projection. If the energy were being emitted in all directions from a three-dimensional body, then we would expect a side projection and this should have produced a distorted image of the legs and face. But there is no distortion. The image could only be produced by energy transmitted in one direction – up and down.

So, the maintenance of resolution over distance suggests collimation, and frontal projection also suggests collimation. We can see a similar phenomenon when lasers are used to project an image onto a sidewalk – a gimmick sometimes used to advertise a shop to passers-by. The resolution is maintained over distance, but will attenuate over larger distances. And it is a frontal projection, because the energy is only moving in one direction.

Face



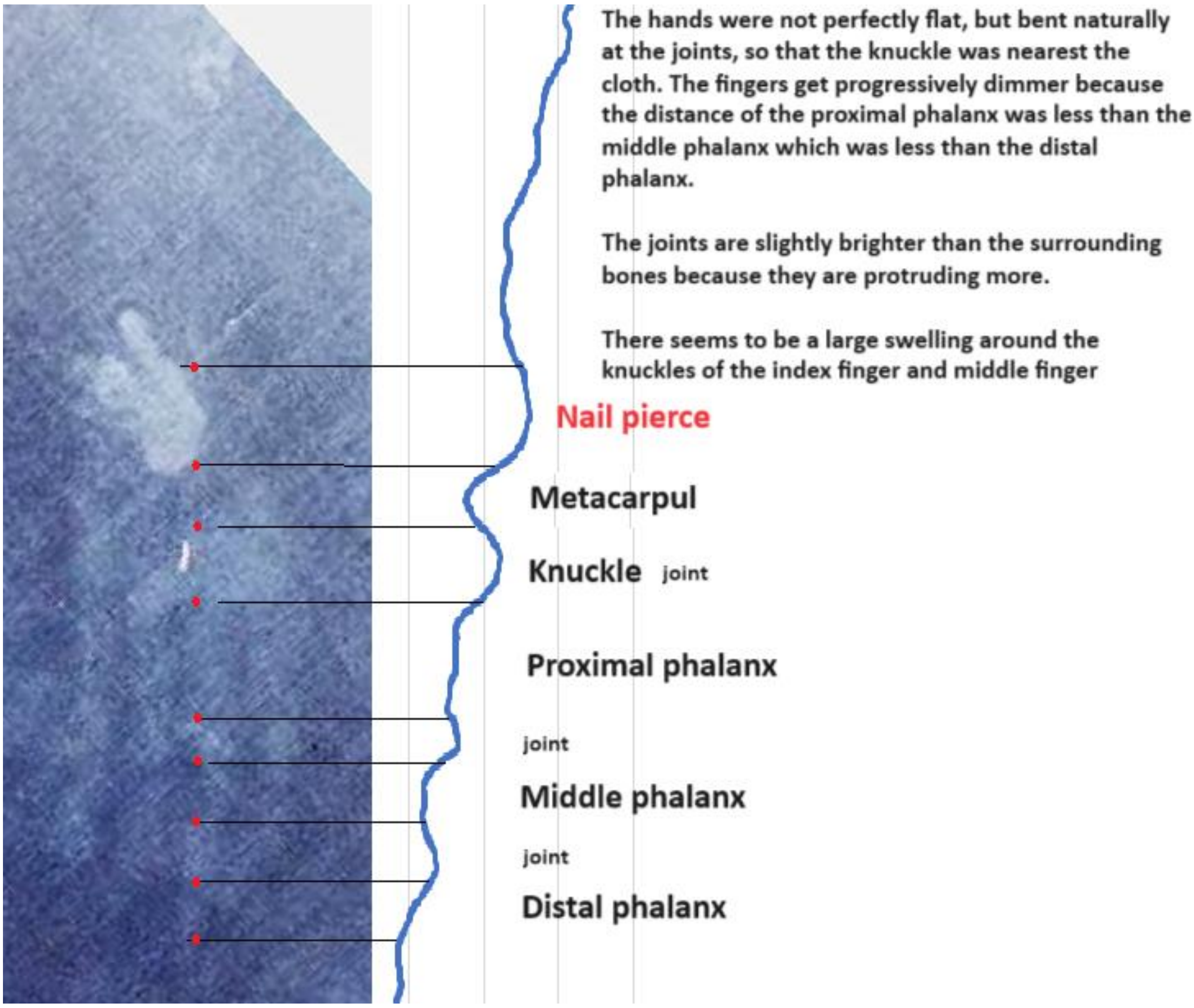
Face in the Shroud | Elevation based on pixel brightness

Here is a face topography that I generated by taking the brightness of the picture as elevation. The average brightness of 40 horizontal pixels was taken at each point along a vertical line through the nose. These values were then smoothed using a 40 vertical point moving average.

I have colored in the face with the basic features so you can see the contours more clearly. It is interesting that the cloth was not touching the eyes and lips or the areas to the sides of the nose, yet these are well defined in resolution.

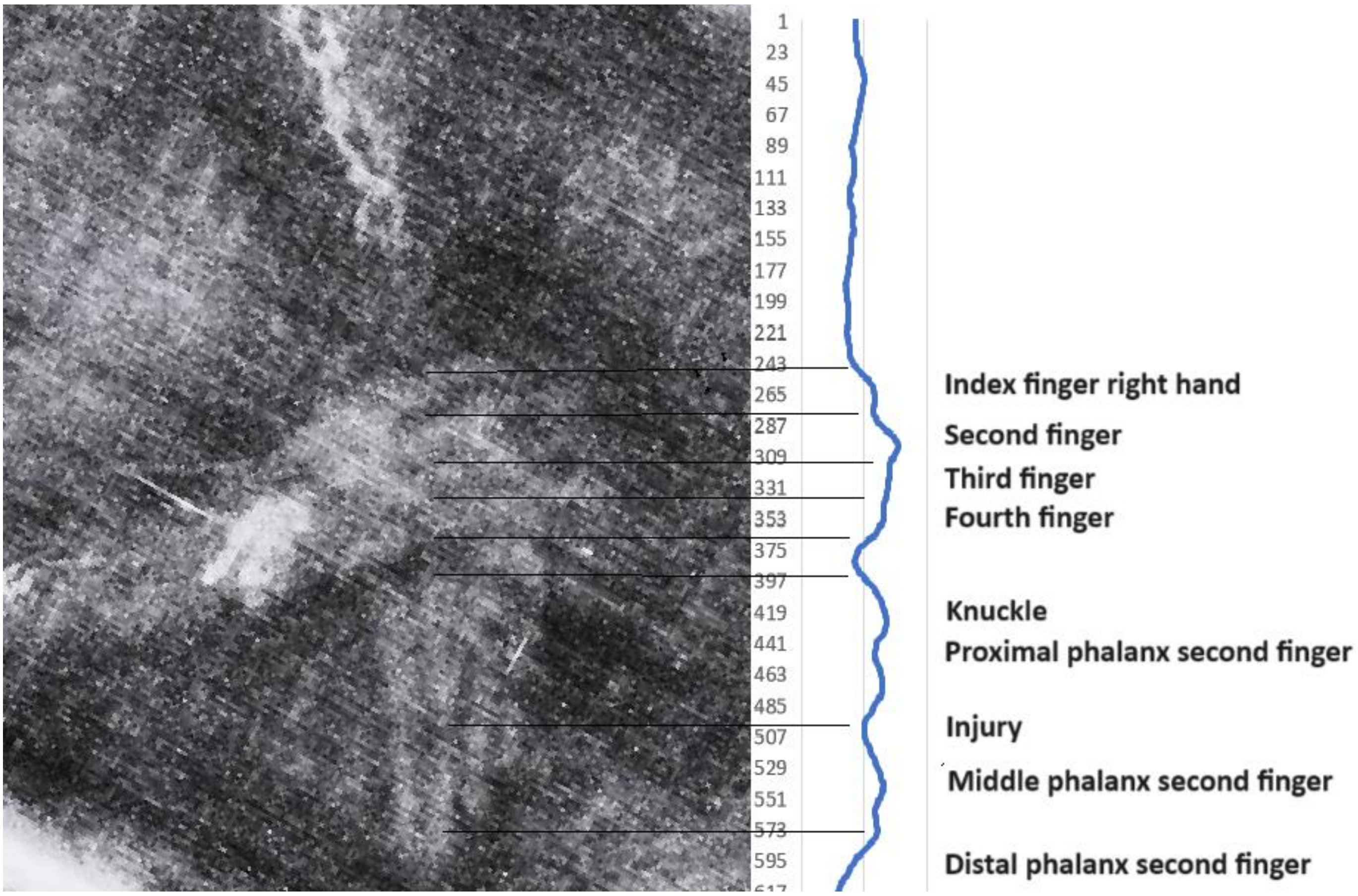
The face gets brighter as you move down the central line, so it is interesting to consider if the higher brightness of the head is a halo or another effect. To see if it is a halo I could compare different brightness cross-sections of the head taken horizontally with different cross sections of the body.

Right Hand (Rotated to get vertical section)



Once again, more distant features are dimmer, and nearer features, such as the joints and knuckles, are brighter

Left Hand (Rotated to get vertical section)



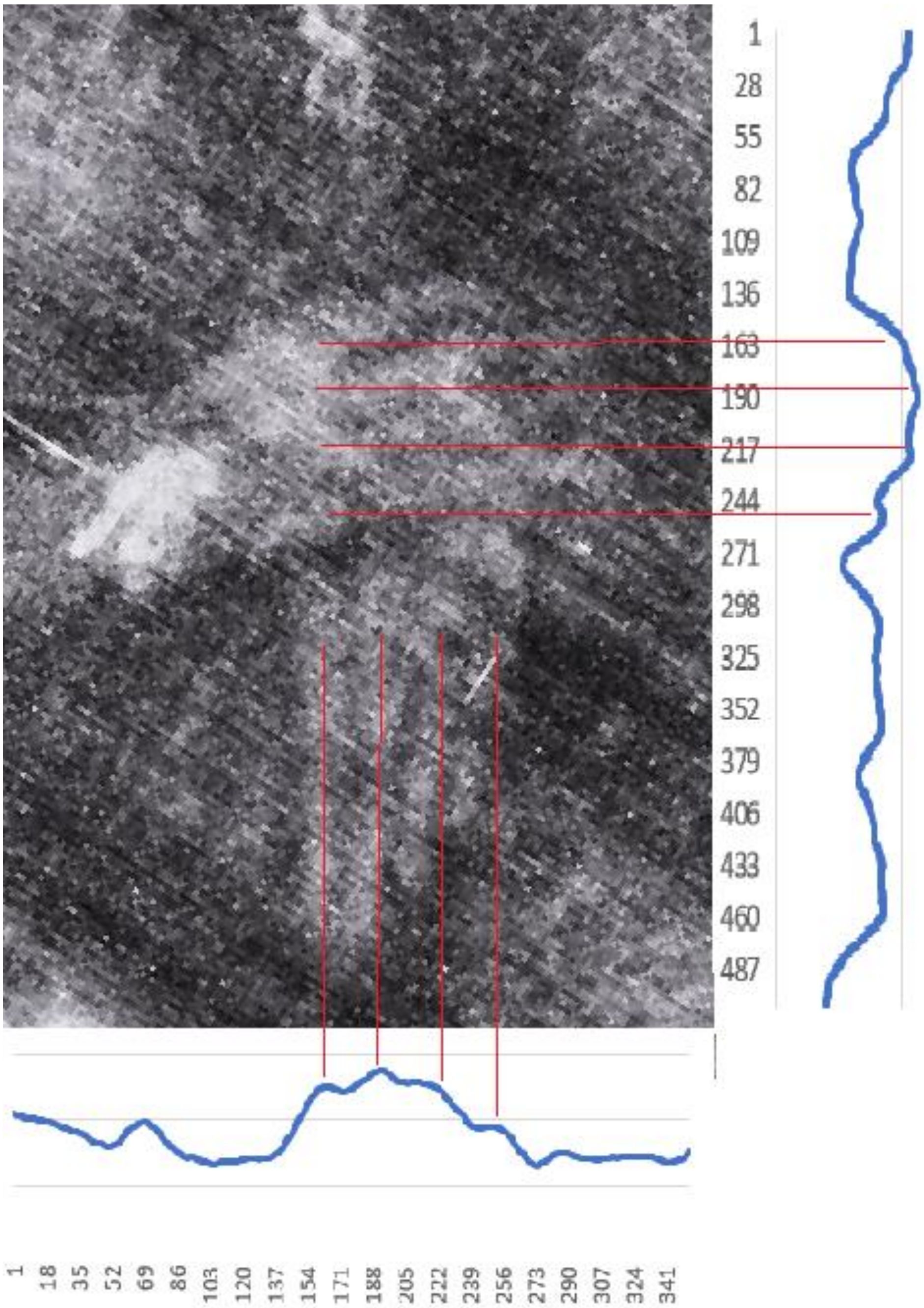
Note that the righthand has greater brightness than the left hand, due to it being at a higher elevation. Similarly, the right forearm is brighter than the left forearm, for the reason that it is more elevated.

Note also that the second finger of the right hand has a slightly higher elevation than the other fingers, which is anatomically correct.

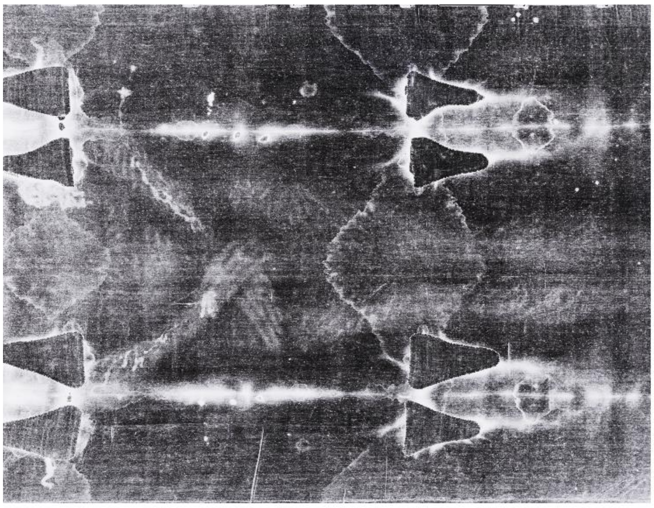
After rotating the image, I took a horizontal section through the knuckles of the left hand. The knuckles of the left hand are distinct despite their distance from the shroud – and you can see that the highest knuckle is that of the second finger.

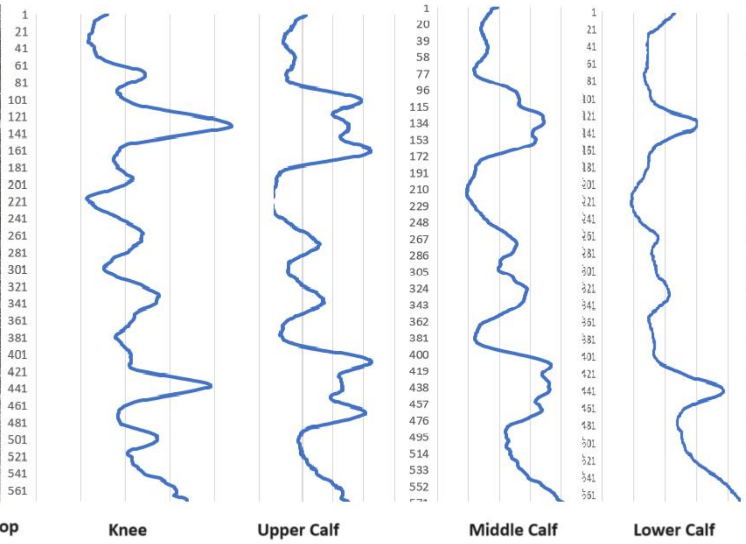
Three of the knuckles were captured in the horizontal section and their elevations (brightness) exactly corresponds to the relative heights of the knuckles of the first, second and third fingers.

I also took a vertical section through the knuckles of the right hand. Remarkably, the highest knuckle again was for the knuckle of the second finger.



Front of Legs





The right leg was raised higher **than** the left, because the right foot was nailed on top of the left foot. This is evident from cross sections taken through the legs.

A vertical cross-section taken at the lower calf shows that the right lower calf is elevated above the left. This was because the right foot was nailed on top of the left foot during crucifixion.

A vertical section taken through the middle calf, still shows the right middle calf is elevated above the left, but the difference in elevation, based on brightness, is slightly less.

A vertical section taken through the upper calf, shows that the right upper calf is now only very slightly elevated compared to the left.

A vertical section through the knees, shows that the right knee is elevated above the left.

The right leg is consistently brighter than the left, showing that it is elevated compared to the left.

Both legs have a curved cross section, so their edges are more distant than their centers. Therefore, the images of the limbs become dimmer as we move from center to edge. The gradation from bright to dim is constant, as can be seen from the brightness profiles to the right of the picture above. Since this gradation is caused by a progressively lower density of discolored fibers, it would be impossible to paint. It is a radiation effect that would be totally impossible to even see in Medieval times. The density of discolored fibers decreases in direct proportion to the distance from the center! (Besides, the discoloration is known to be caused by the linen material receiving energy rather than the addition of any new material.)

Conclusion

It seems quite certain that the Shroud image was produced by a radiation acting over a distance. The question is what type of radiation.

The radiation was collimated enough to produce a clear image for body parts at a distance, and create a shadow on underlying fibers. It was brief enough to only color surface fibers, but all the fibers were colored to the same degree, which suggests that the energy received by each individual fiber was the same.

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Is Heat Ruled Out as a Cause?

1. **Absence of intense discoloration**: Heat would produce intense discoloration at contact points due to conduction, and barely any discoloration at distant points. For distant points to be discolored it would require very high temperatures that would burn areas in contact.
2. **Absence of combustion**: The marks making up the image are not burn marks due to combustion or oxidation. Rather they are marks due to carbon double bond formation, with each fiber being discolored to an equal intensity.
3. **Surface Fibers only**: Heat would also permeate beyond the surface fibers, but the image is very superficial.
4. **Shadow Effect**: A discoloration is not found where one fiber shields another – which indicates a sharp shadow effect that would not be produced by a heat source
5. **Higher resolution**: The resolution of distant parts is greater than what we would expect from heat. Heat is non-directional – radiating in all directions, and heats the air inbetween, uniformly by convection. It would be expected to produce only a faint blurry outline.
6. **Monochromatic**: The discoloration is monochromatic – meaning that all discolored fibers are discolored equally – none are discolored more than others.

Software Code Used to Analyze Brightness

Image Source: Images were obtained from shroudphotos.com : **Image Inversion**: Photopea.com was used to invert and rotate images.

Image Upload: The image was uploaded with this code

```
Dim OpenFileDialog As New OpenFileDialog

OpenFileDialog1.Filter = "Picture Files (*)|*.bmp;*.gif;*.jpg"

If OpenFileDialog1.ShowDialog = Windows.Forms.DialogResult.OK Then
    PictureBox1.Image = Image.FromFile(OpenFileDialog1.FileName)
End If
```

```
Label4.Text = PictureBox1.Image.Width
Label3.Text = PictureBox1.Image.Height
```

Selection of Cross-section: (defines x1 and y1)

```
Private Sub PictureBox1_MouseDown(sender As Object, e As MouseEventArgs) Handles PictureBox1.MouseDown
    If n = 0 Then
        Label5.Text = e.X
        x1 = e.X
        Label6.Text = e.Y
        y1 = e.Y
        n = 1
        GetBrightnessVerticalSection()
    ElseIf n = 1 Then
        Label7.Text = e.X
        x2 = e.X
        Label8.Text = e.Y
        y2 = e.Y
        n = 0
    End If
```

Image Brightness (vertical section)

```
Sub GetBrightnessVerticalSection()  'Gets brightness of a single pixel.
    Dim brightnesstotal As Integer = 0
    Dim sourcebmp2 As New Bitmap(PictureBox1.Image)
    Dim pixelColor As Color = sourcebmp2.GetPixel(x1, y1)
    Dim brightness As Integer = (CInt(pixelColor.R) + CInt(pixelColor.G) + CInt(pixelColor.B)) / 3
    Label9.Text = brightness

    For q As Integer = 0 To PictureBox1.Image.Height - 1
        For r As Integer = x1 - 20 To x1 + 20
            pixelColor = sourcebmp2.GetPixel(r, q)
            brightness = (CInt(pixelColor.R) + CInt(pixelColor.G) + CInt(pixelColor.B)) / 3
            brightnesstotal += brightness

        Next
        TextBox1.Text &= brightnesstotal / 40 & vbCrLf
        brightnesstotal = 0
    Next
```

Image Brightness (horizontal section)

```
Sub GetBrightnessHorizontalSection()  'Gets brightness of a single pixel.
    Dim brightnesstotal As Integer = 0
    Dim sourcebmp2 As New Bitmap(PictureBox1.Image)
    Dim pixelColor As Color = sourcebmp2.GetPixel(x1, y1)
    Dim brightness As Integer = (CInt(pixelColor.R) + CInt(pixelColor.G) + CInt(pixelColor.B)) / 3
    Label9.Text = brightness

    For q As Integer = 0 To PictureBox1.Image.Width - 1
        For r As Integer = y1 - 20 To y1 + 20
            pixelColor = sourcebmp2.GetPixel(q, r)
            brightness = (CInt(pixelColor.R) + CInt(pixelColor.G) + CInt(pixelColor.B)) / 3
            brightnesstotal += brightness

        Next
        TextBox1.Text &= brightnesstotal / 40 & vbCrLf
        brightnesstotal = 0
    Next

End Sub
```

The Output

The mean brightness at every pixel point (horizontally or vertically) was out put to Textbox1, and then copied into excel. Excel was then used to smooth the output using either a 20 point moving average or a 40 point moving average. Excel was then used to generate a line graph, which was superimposed upon the shroud photo, so I could see how brightness (elevation) corresponded to anatomical features.