



# Multi-spectral analysis and the next generation of photo-scanning: a non-destructive method of reading the unreadable



Dr. Michael Lerche Nielsen, Institute for  
Name Research

Dr. Jens Michael Carstensen  
Videometer A/S

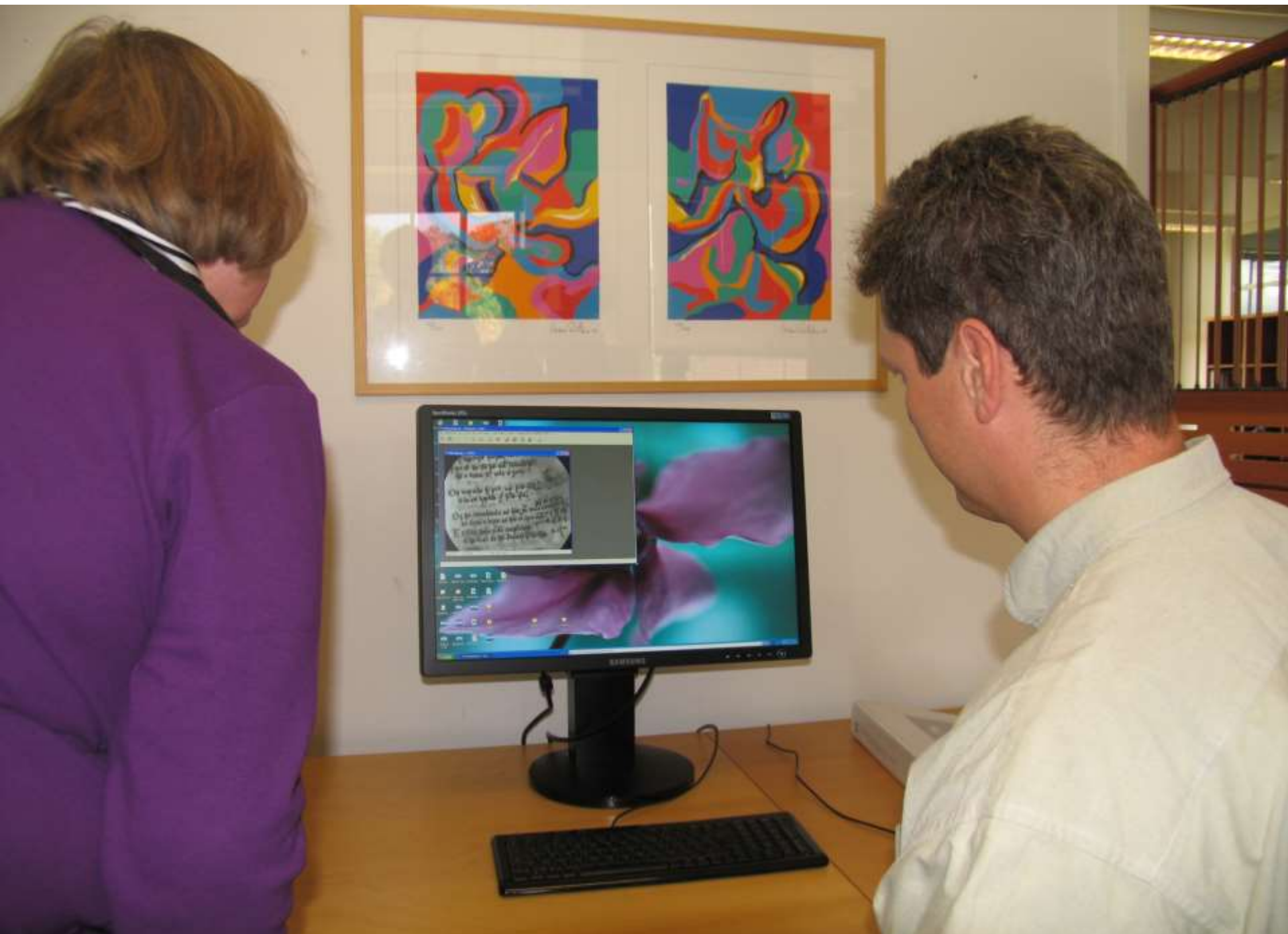




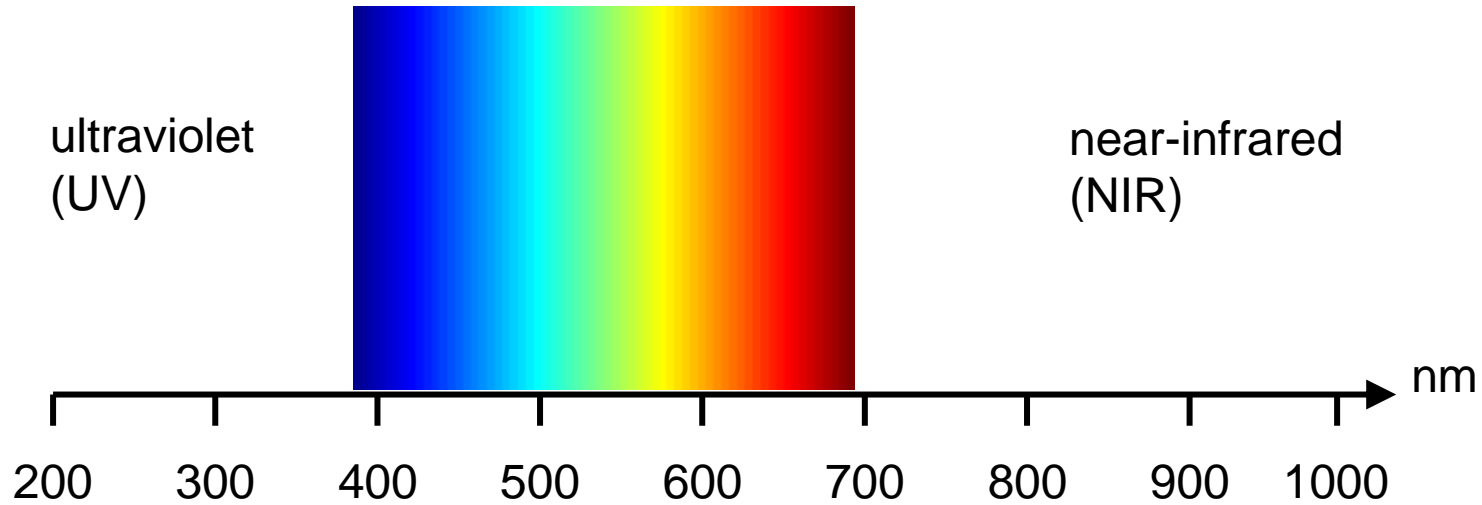








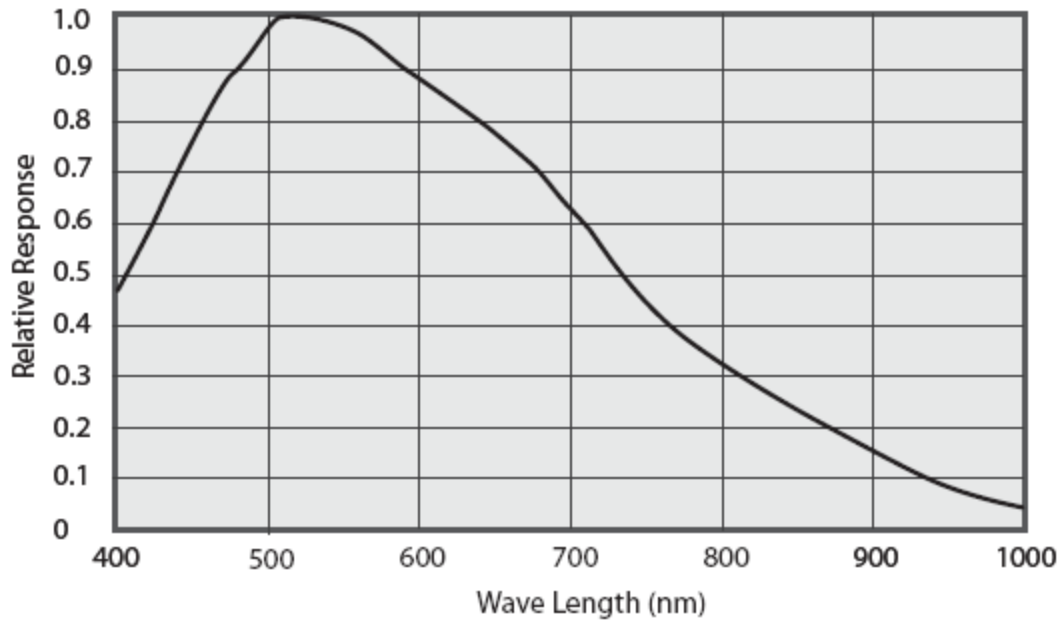
# Visible light



# Monochrome CCD Sensor

Spectral response

## Spectral Response BM-500 GE

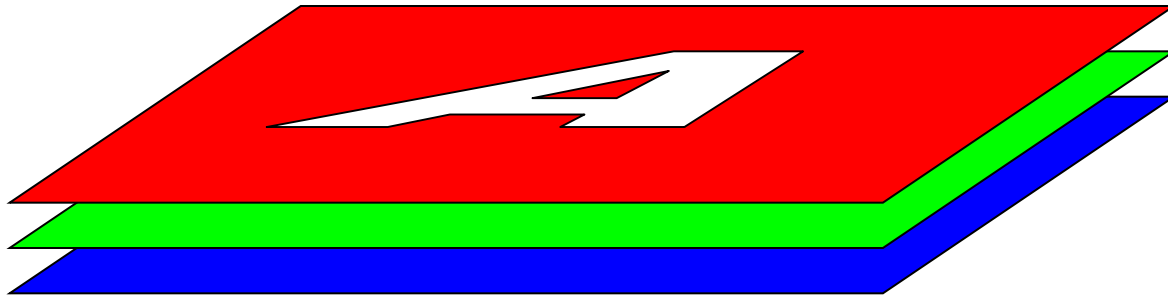




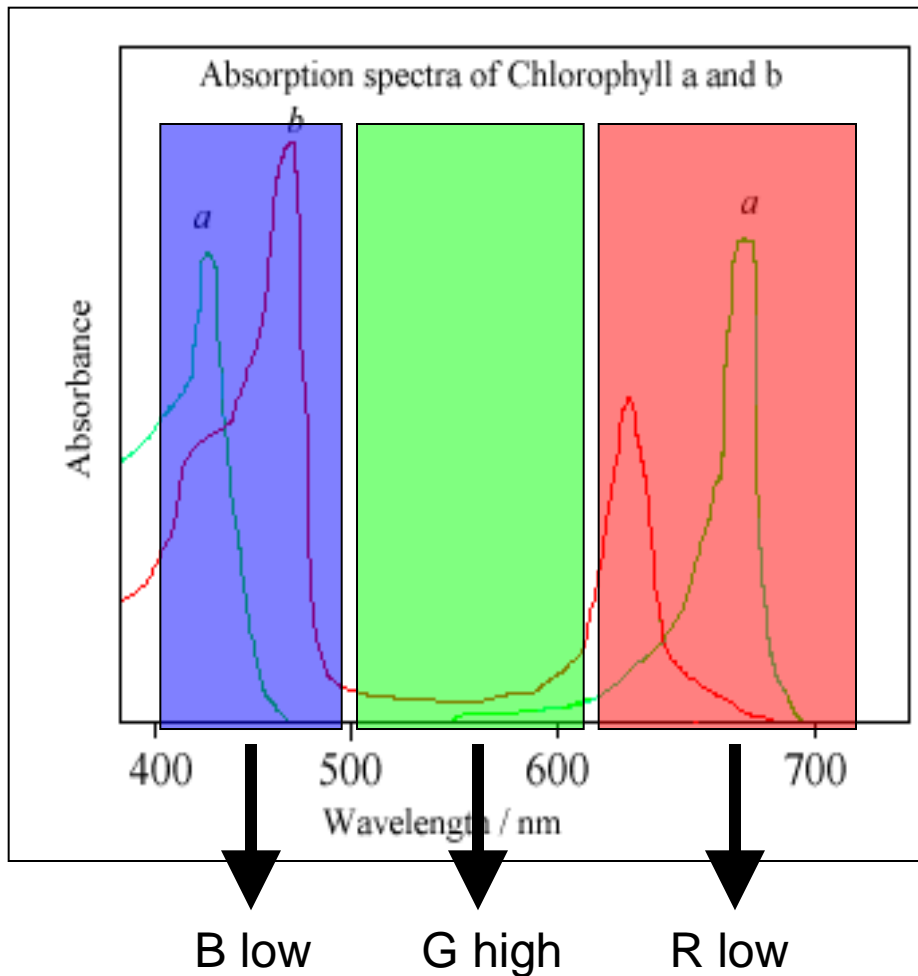
# Traditional Color Imaging

Uses 3 broadband filters for **R**ed, **G**reen and **B**lue

RGB Image



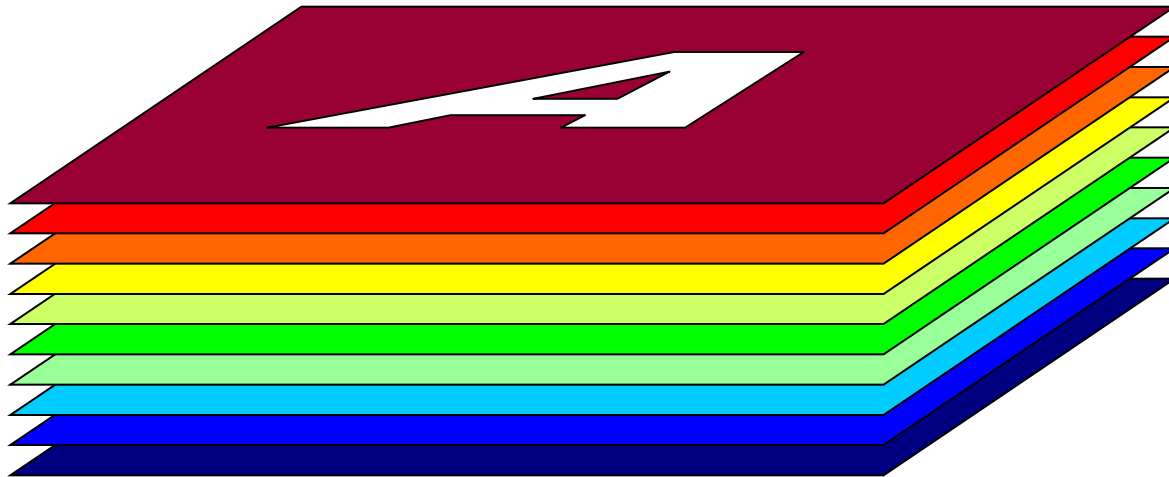
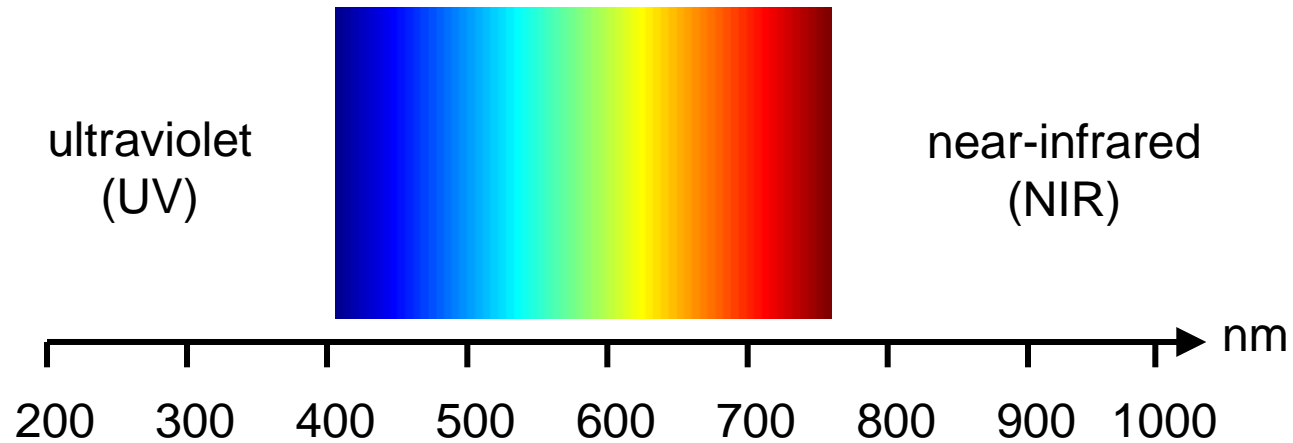
# Traditional Color Imaging



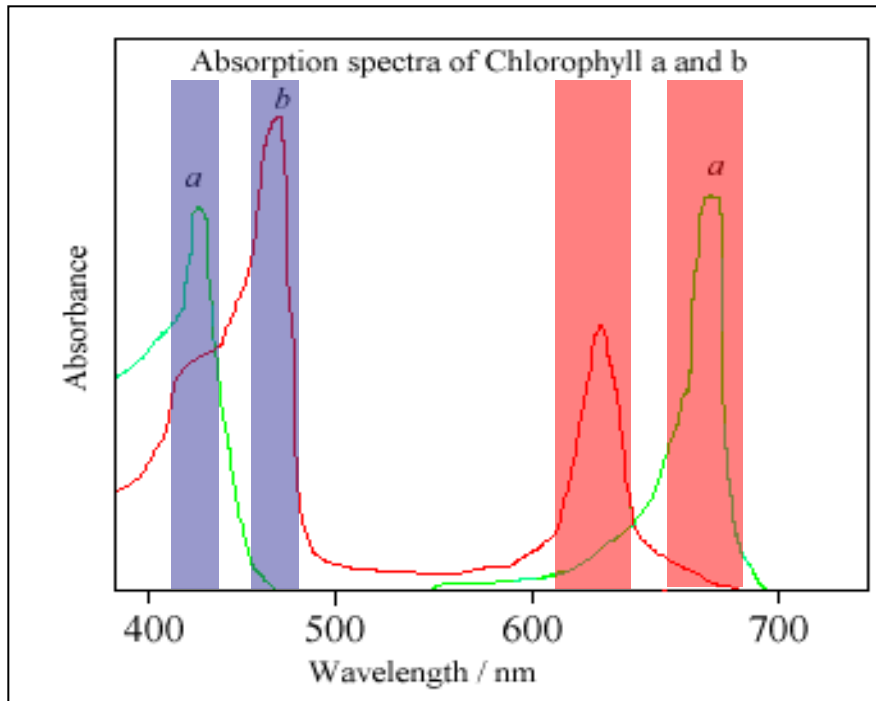
**Chlorophyll a og b give almost the same RGB signals**



# Multispectral Imaging

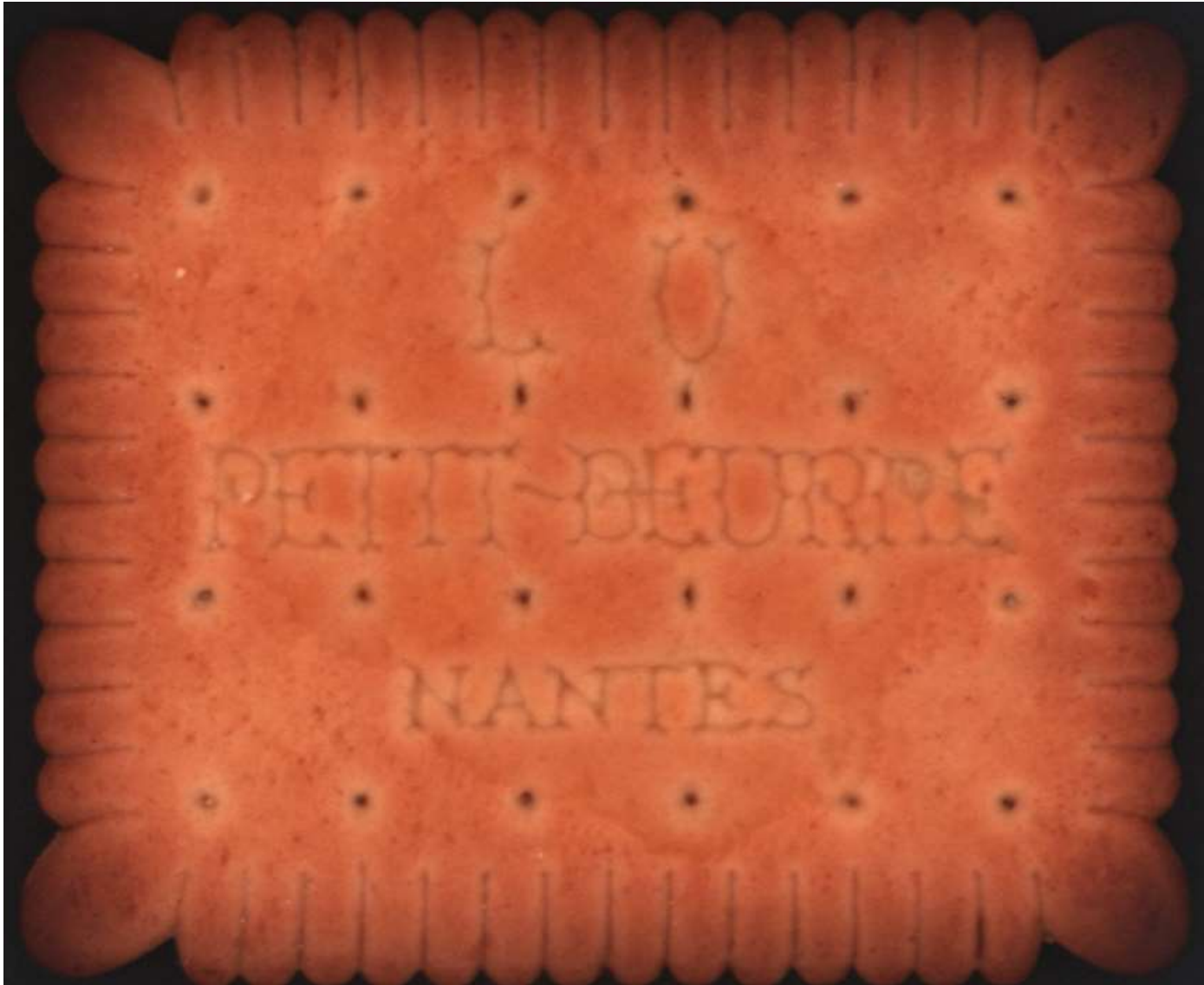


# Multispectral Imaging

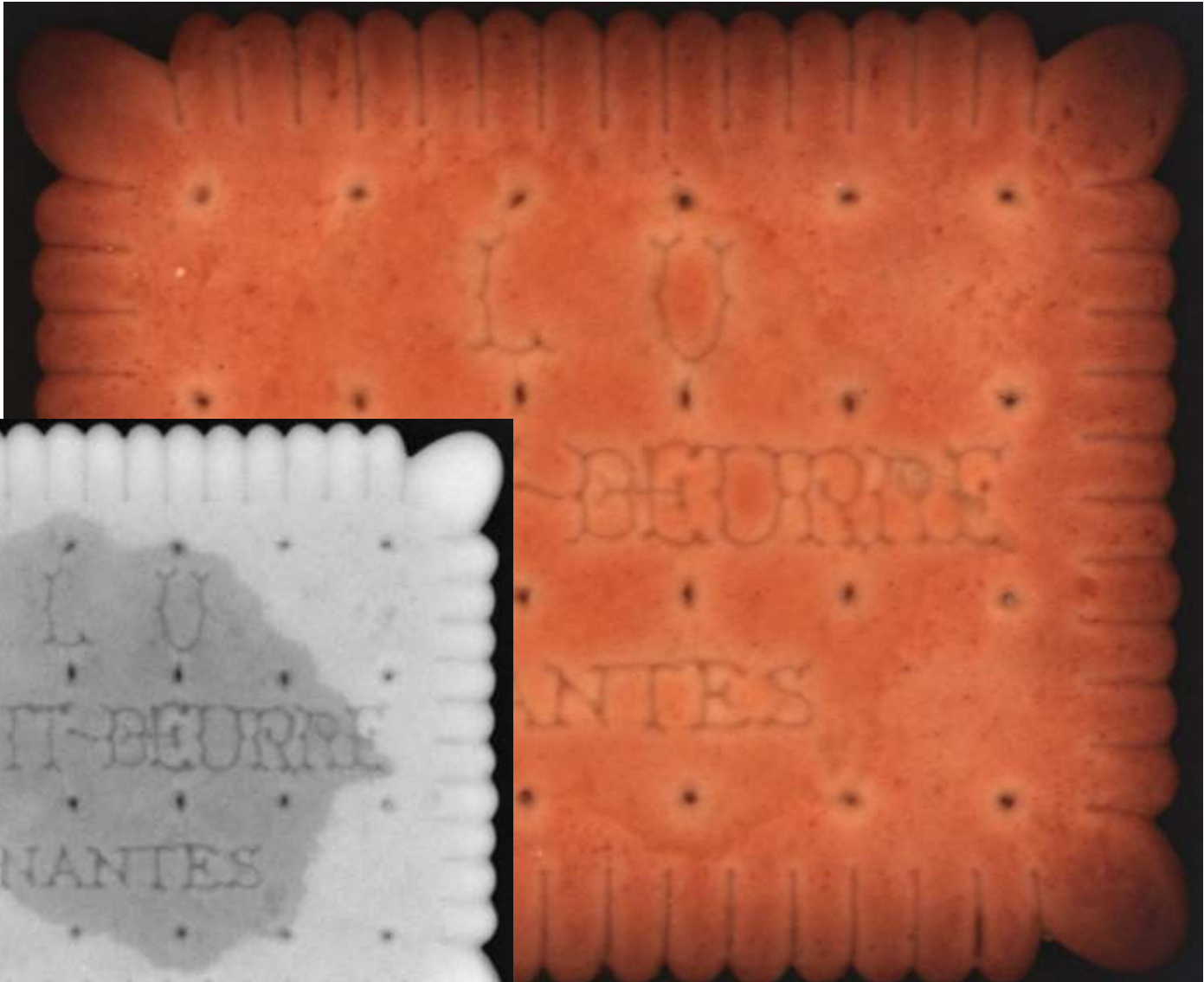


Chl.A	low	high	high	low
Chl.B	high	low	low	high

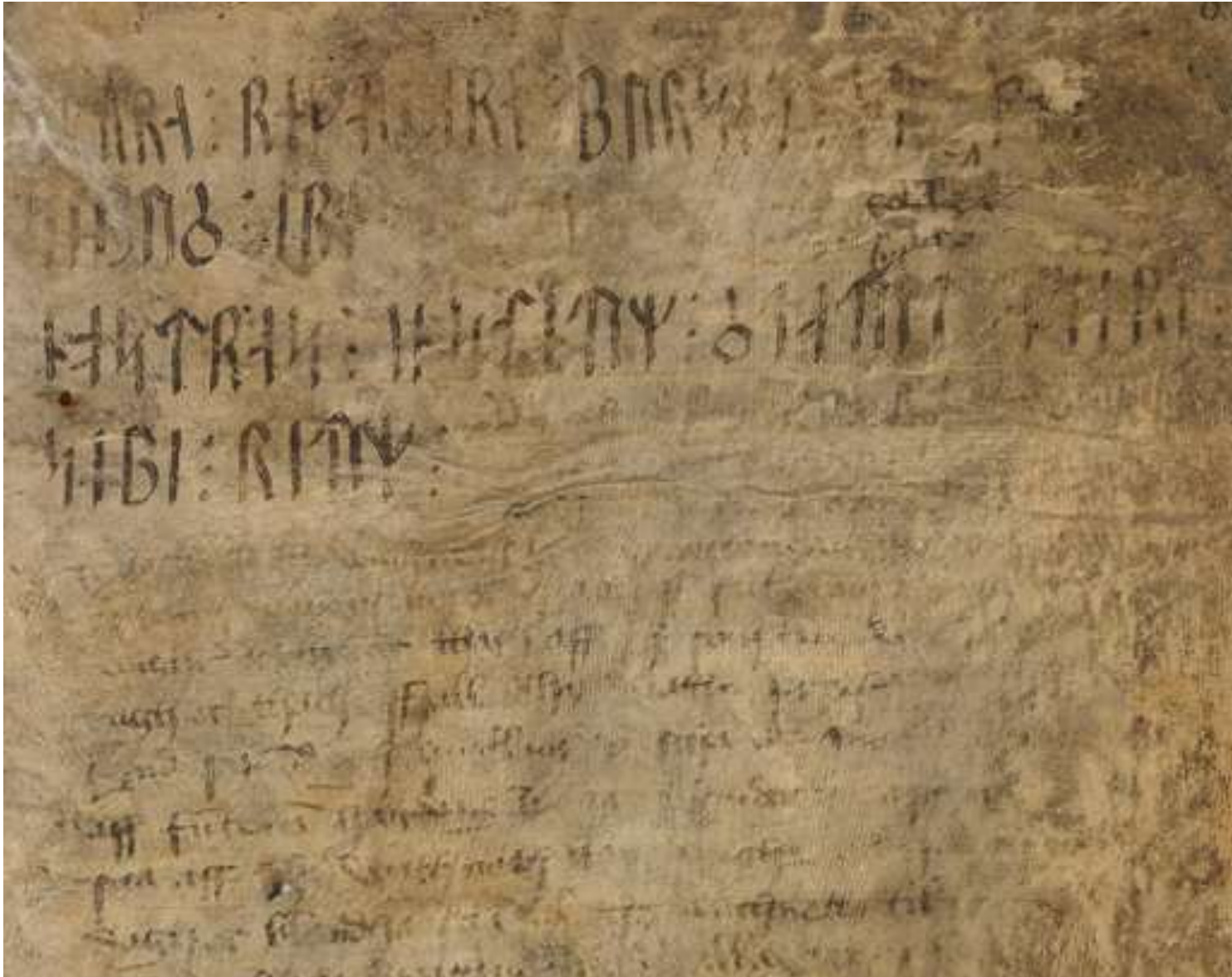
# Biscuit with wet spot



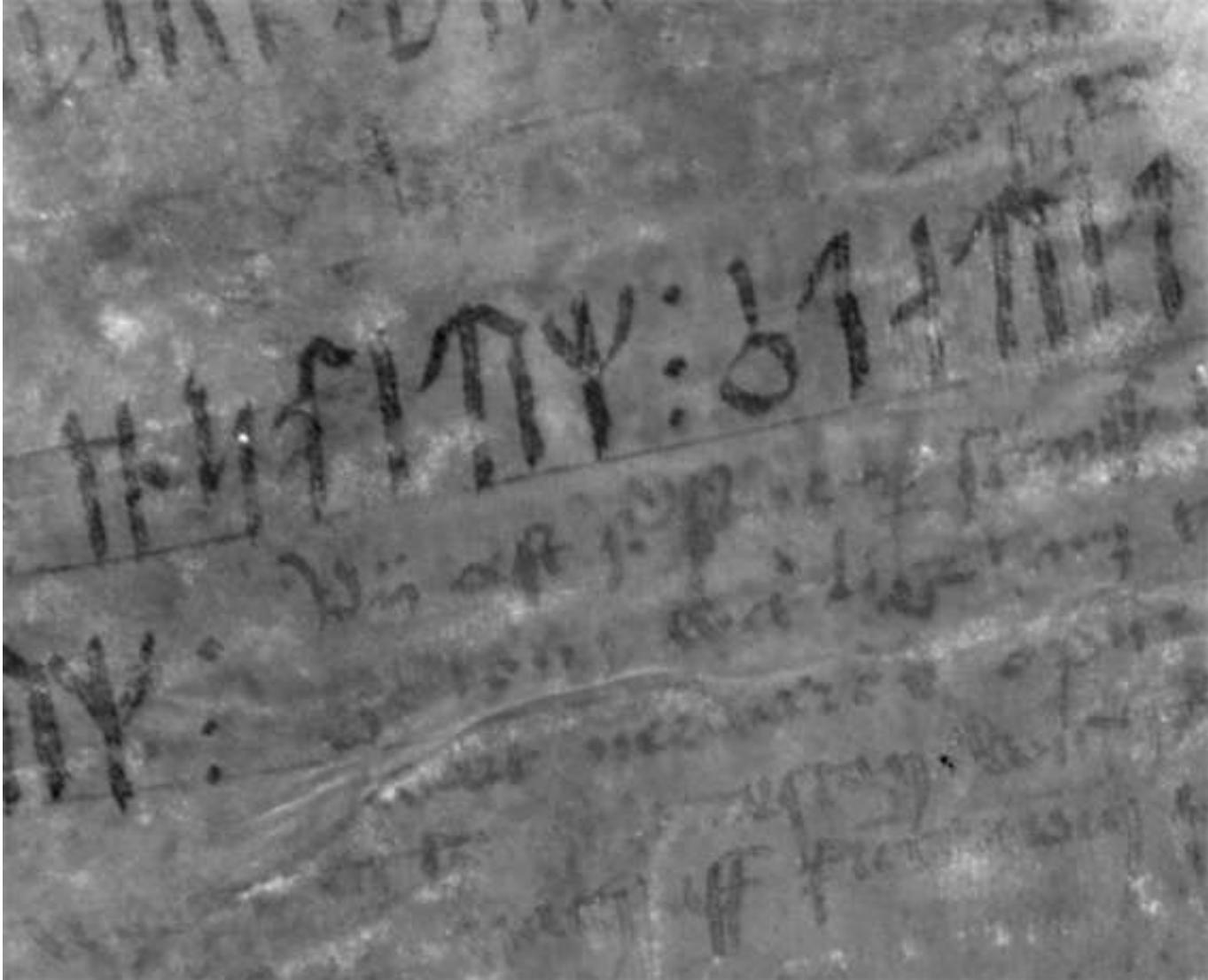
# Humidity detection on biscuit



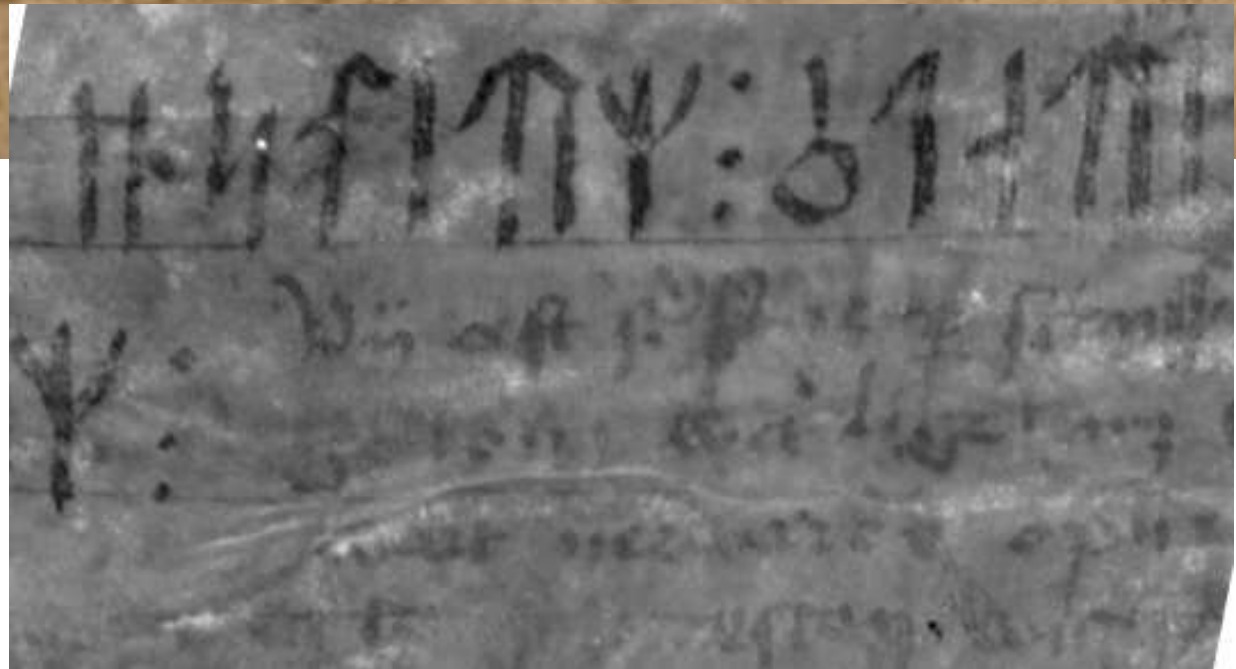
# Digital photo AM 53 4to, fol. 8 r.



# Multispectral imaging AM 53 4to, fol. 8 r



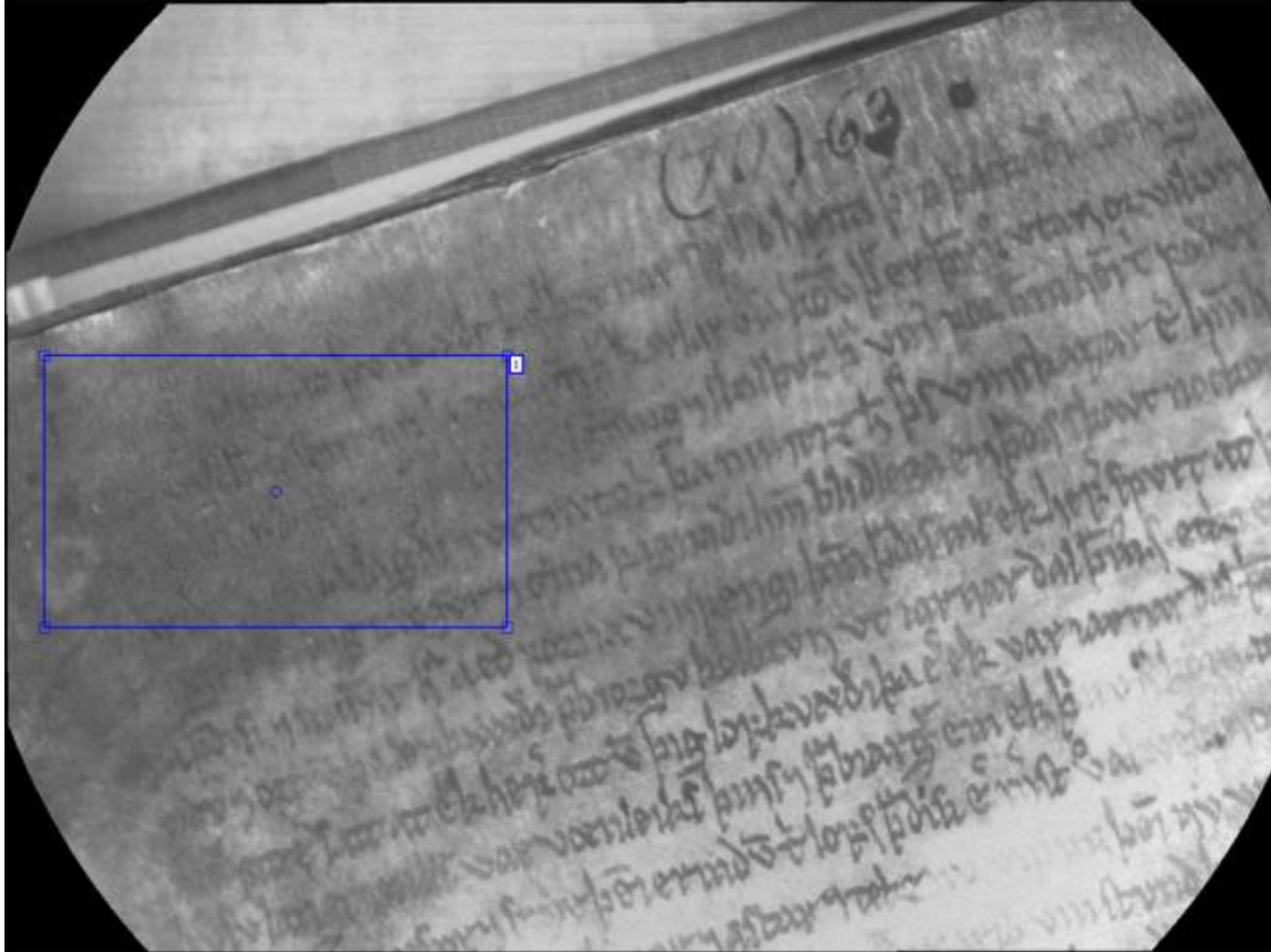




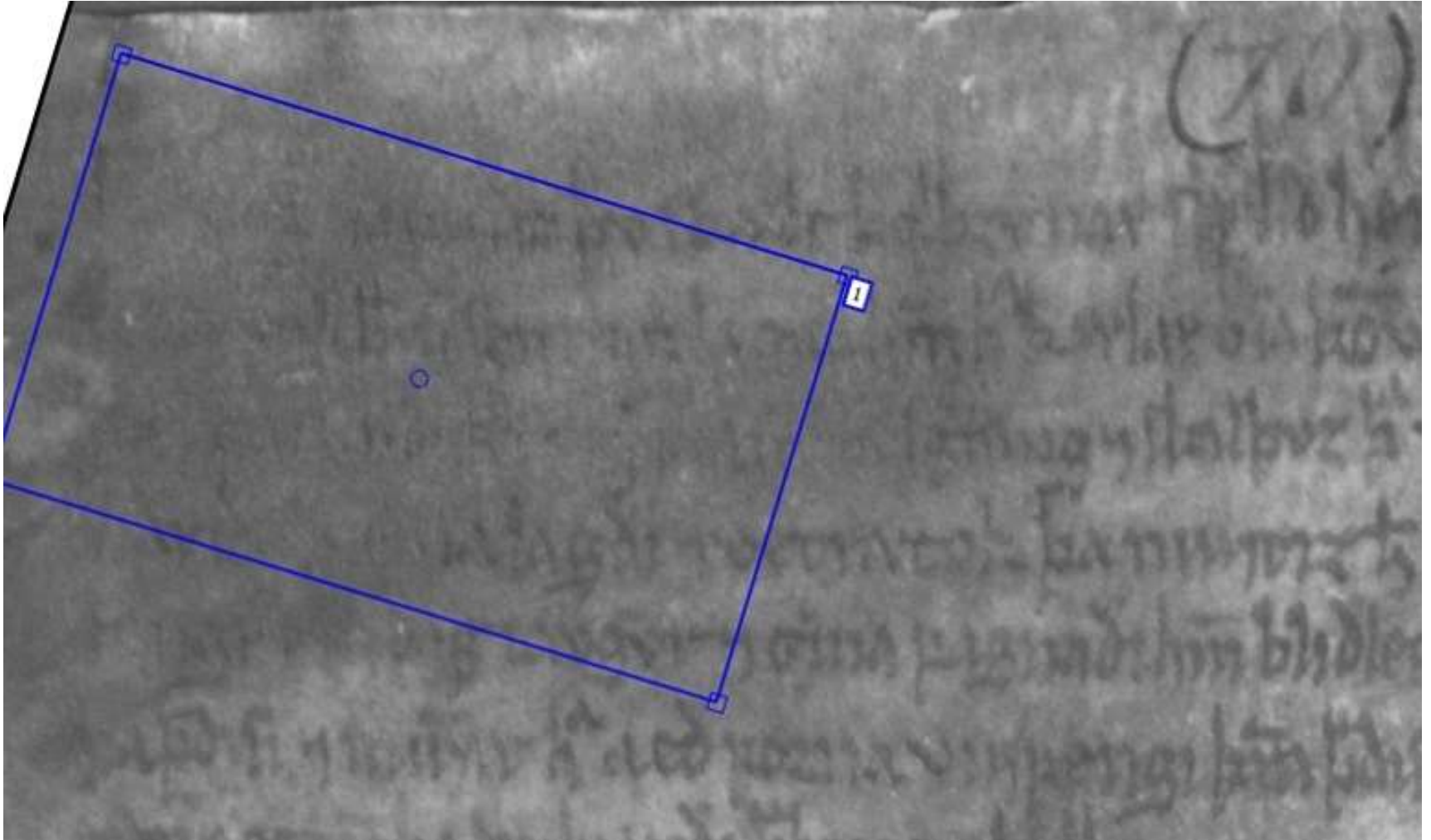
# Parchment AM 544 4to, Hauksbók



# Multispectral imaging of Hauksbók



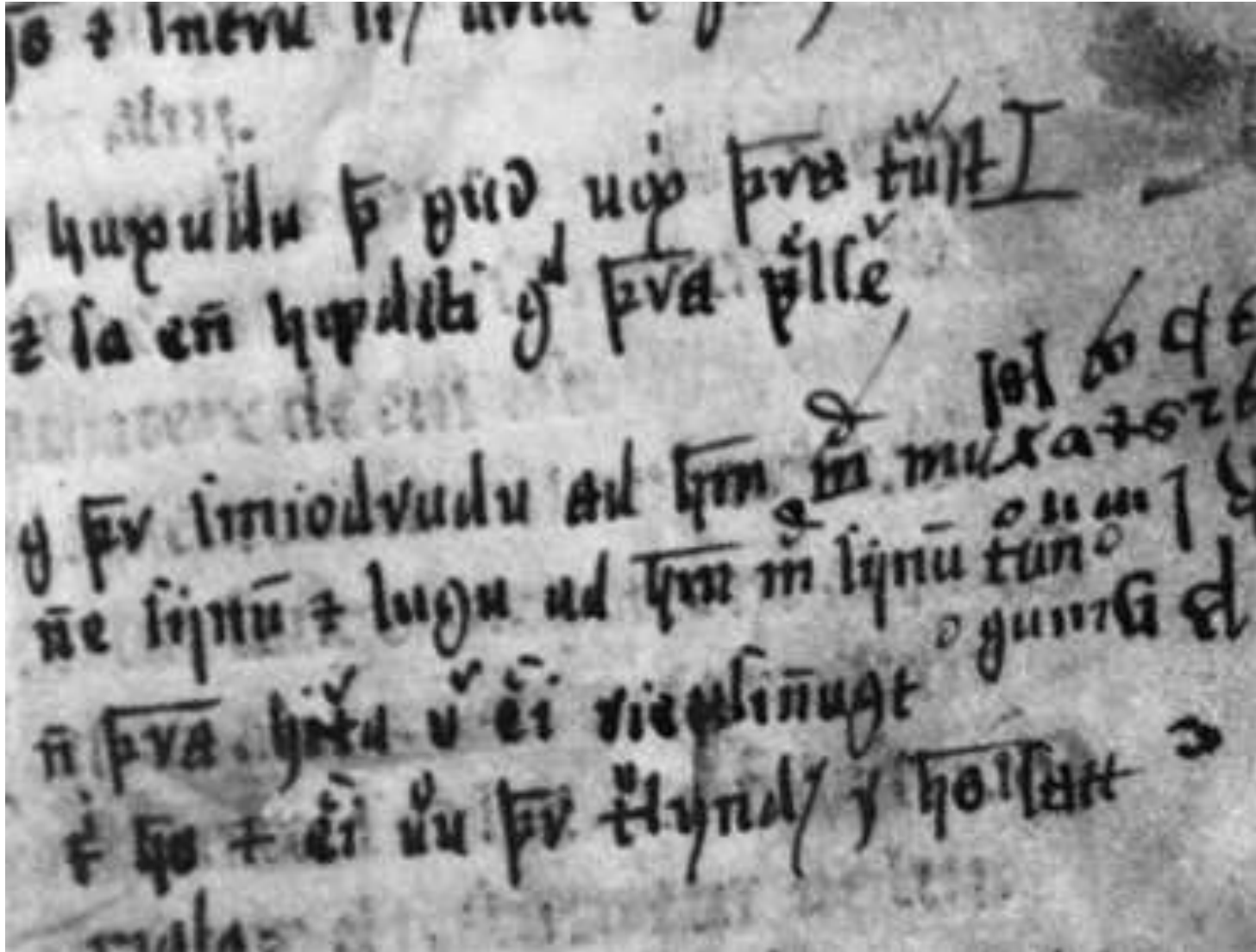
# Detail of the multispectral image



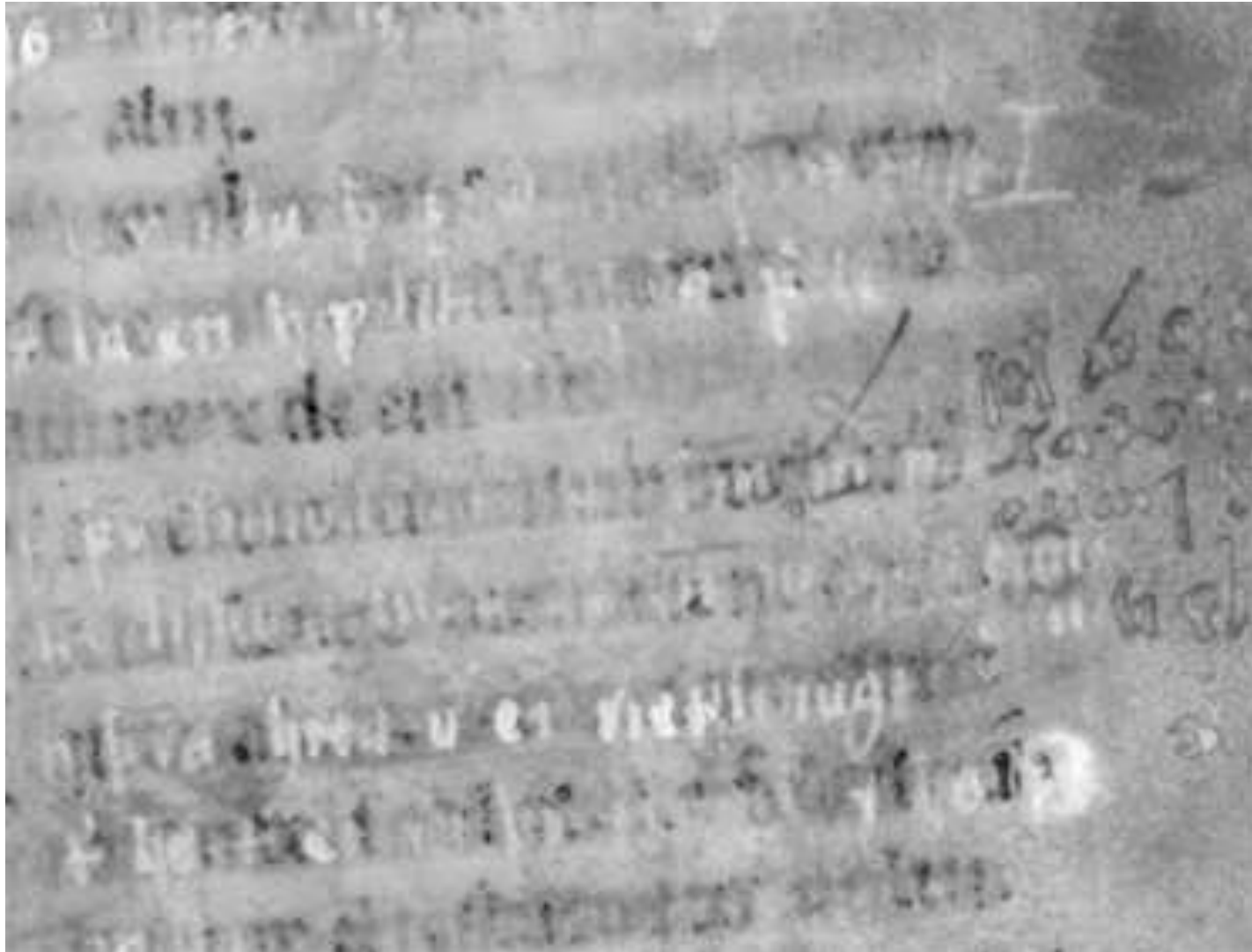
# AM 618 4to under the lamp



palimpsest AM 618 4to, text 1586



# AM 618 4to, removal of the ink from 1586 with multispectral imaging



# Suzanne Reitz inspects the charter





# Charter, Dipl.Dan. LXV no. 14

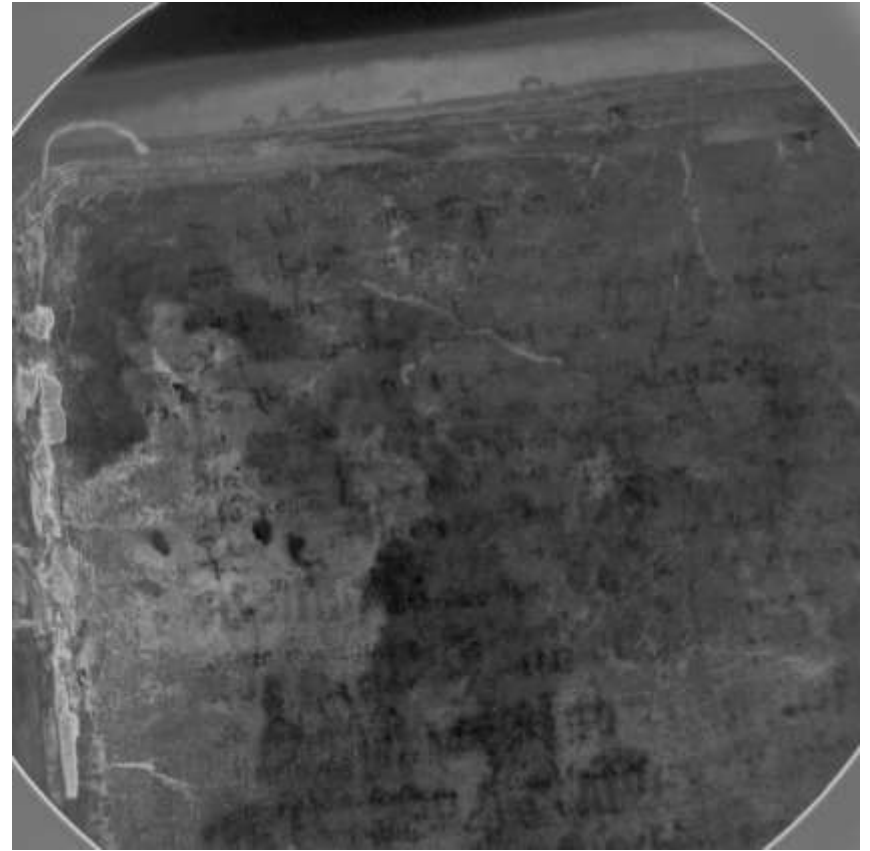


# The Elder Westrogothic Law

National Library of Sweden



Page 1 front, RGB



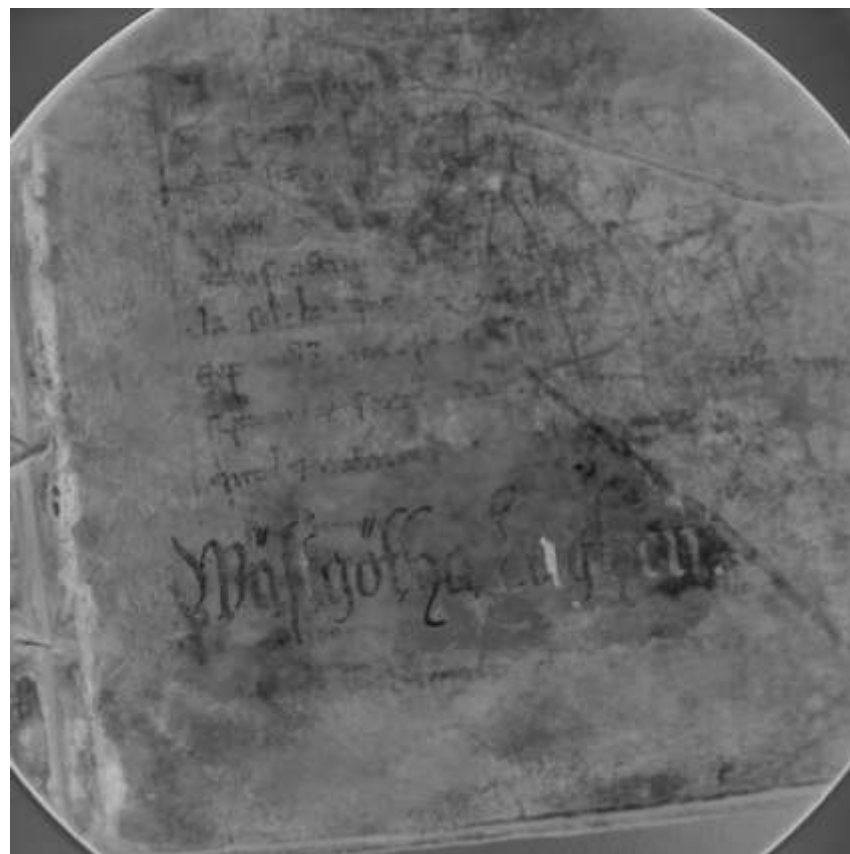
Page 1 front, spectrally enhanced

# The Elder Westrogothic Law

National Library of Sweden



Page 1 front, RGB



Page 1 front, spectrally enhanced

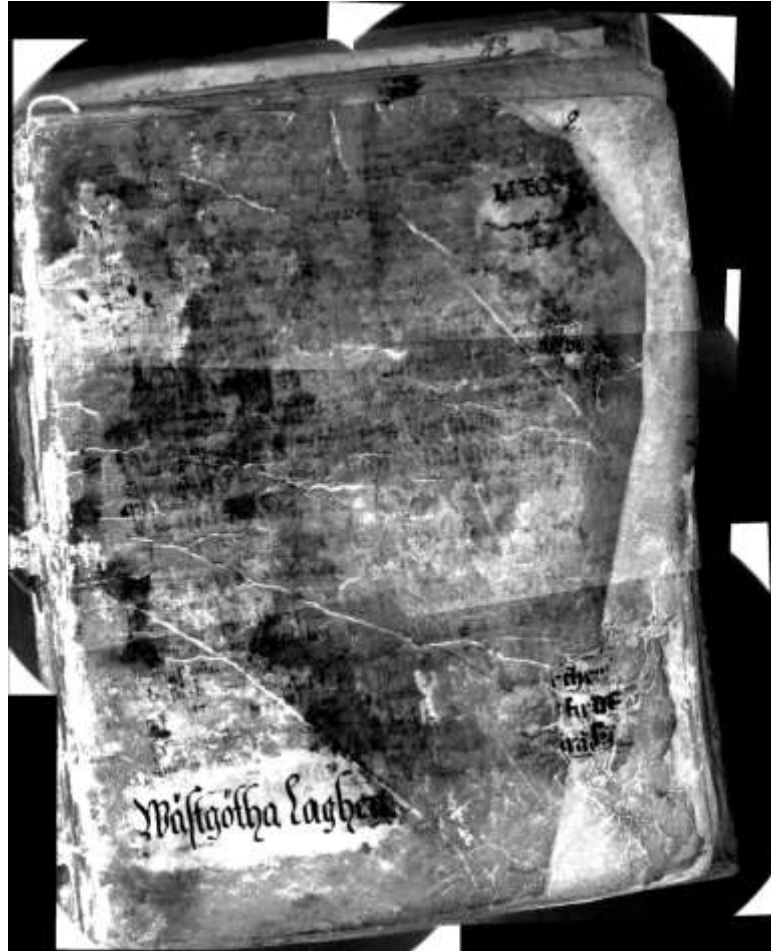
# Testimonial

During the work with [the Elder Westrogothic Law \(Äldre Västgötalagen\)](#) we used VideometerLab to make spectral imaging and analysis of four partially or largely unreadable pages. During this process we obtained valuable new information and VideometerLab proved to be a highly useful and efficient tool. Thanks to the Videometer images, we now know a lot more about the author, than we knew before.

Per-Axel Wiktorsson

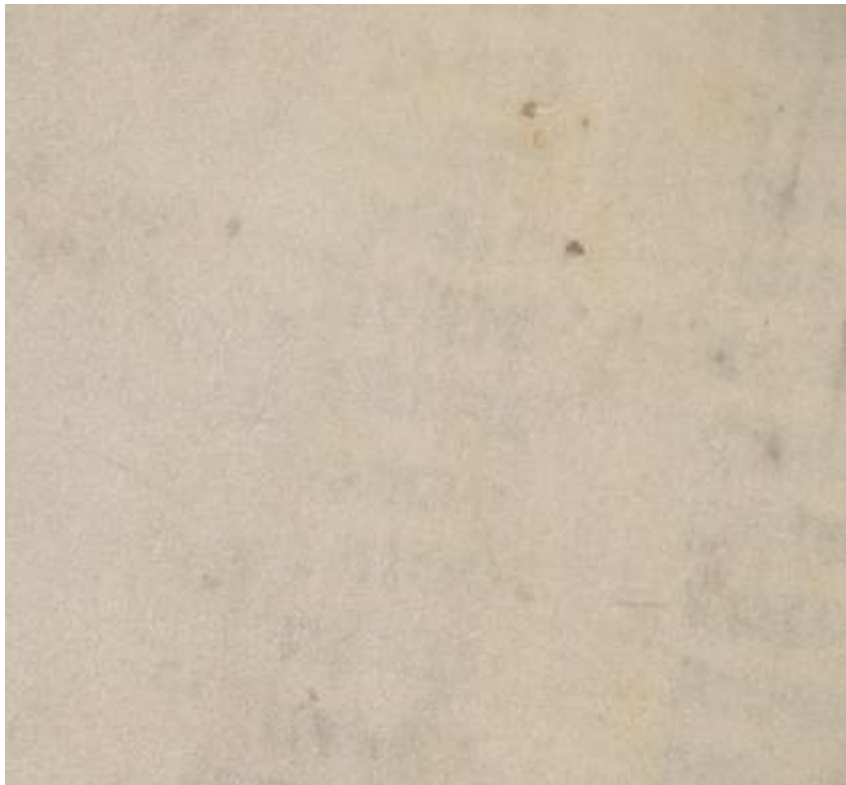
Professor emeritus in Swedish language, Örebro University

# Stitching one spectral component



# Reverse side of book cover

sRGB



Spectral enhancement



Manuscript from BNF, France

# Maps from the Danmark expedition 1906-1908

VideometerLab used to reveal the destiny of sledge team 1.



Berlingske tidende, Jan. 13, 2013

*Thank you for your attention:*

Dr. Jens Michael Carstensen

Videometer A/S, [www.videometer.com](http://www.videometer.com)



Dr. Michael Lerche Nielsen, Department of  
Scandinavian Research, University of  
Copenhagen, <http://nfi.ku.dk/english/>



VideometerLab

Laboratory instrument for multispectral  
imaging (360 nm to 1050 nm).

Specialist on color and texture measurements.

