

Gelatine lifting

A novel technique for the examination of indented writing

Jan de Koeijer
Netherlands Forensic Institute

27 September 2002

Introduction

Current methods for the examination of indented writing:

- ESDA
- Oblique lighting
- Silicon rubber casting

Limitations of current methods

- ESDA: limited range of substrates
- Oblique lighting: limited sensitivity
- Casting: limited sensitivity, slow

3

The solution: Gelatine lifting

- Black slab of gelatine with a rubber or polyester backing
- surface is flexible and slightly tacky
- used to lift (powdered) fingerprints from smooth surfaces

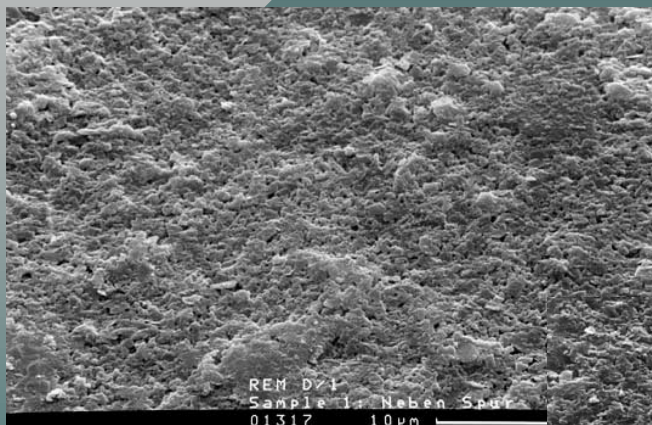
4

Mechanism

- Pressure and friction from writing breaks up the paper surface in the indentations
- Dust from broken up paper filler resides in indentation grooves
- Dust particles are lifted by the tacky gelatine foil

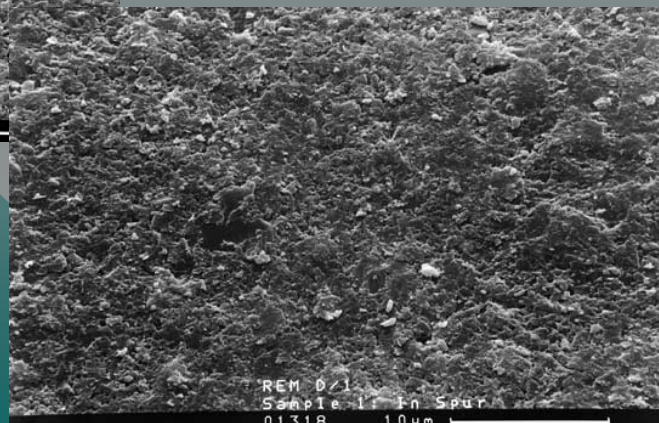
5

SEM photographs



← Paper surface outside writing groove

Paper surface inside writing groove →



6

SEM photographs



← Surface Gelatine lifter
outside writing groove

Surface Gelatine lifter →
inside writing groove



7

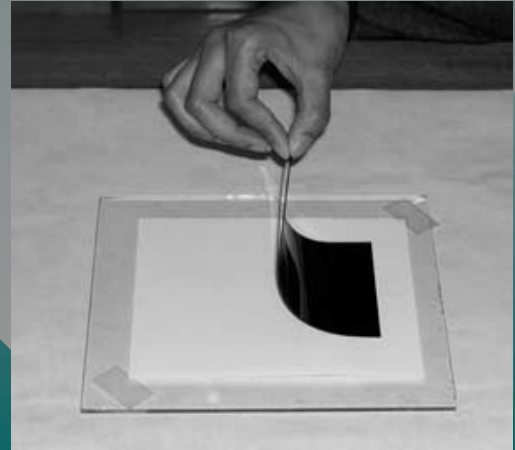
Experimental set-up

- examine 35 paper types (9 classes) with:
 - ESDA
 - oblique lighting
 - gelatine lifters
- other variables examined:
 - order of methods
 - sensitivity of GL method

8

Method for gelatine lifting

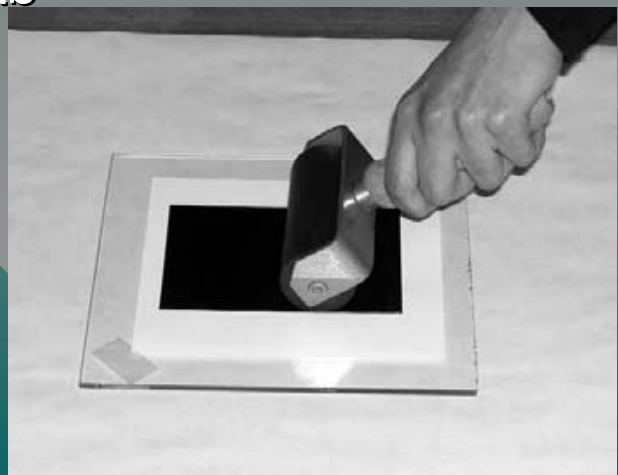
- lay paper on a flat surface
- peel off protective layer from slab
- apply gelatine slab



9

Method for gelatine lifting

- apply slight pressure with a roller
- peel off gelatine slab
- photograph slab



0

Imaging set-up

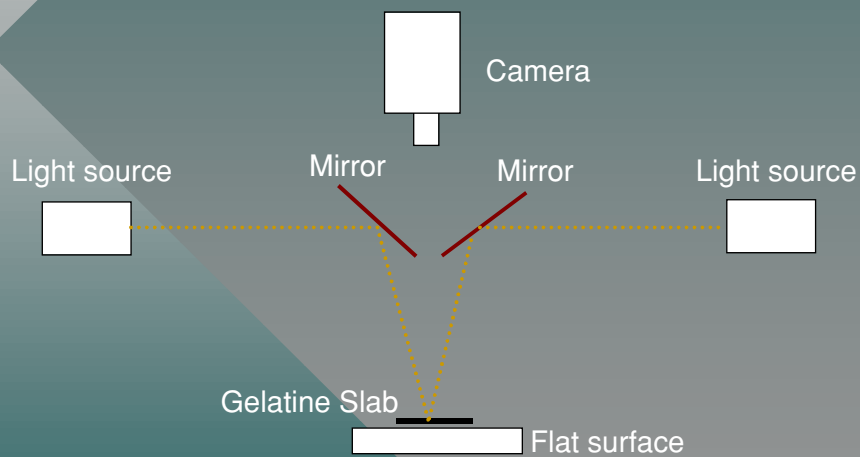
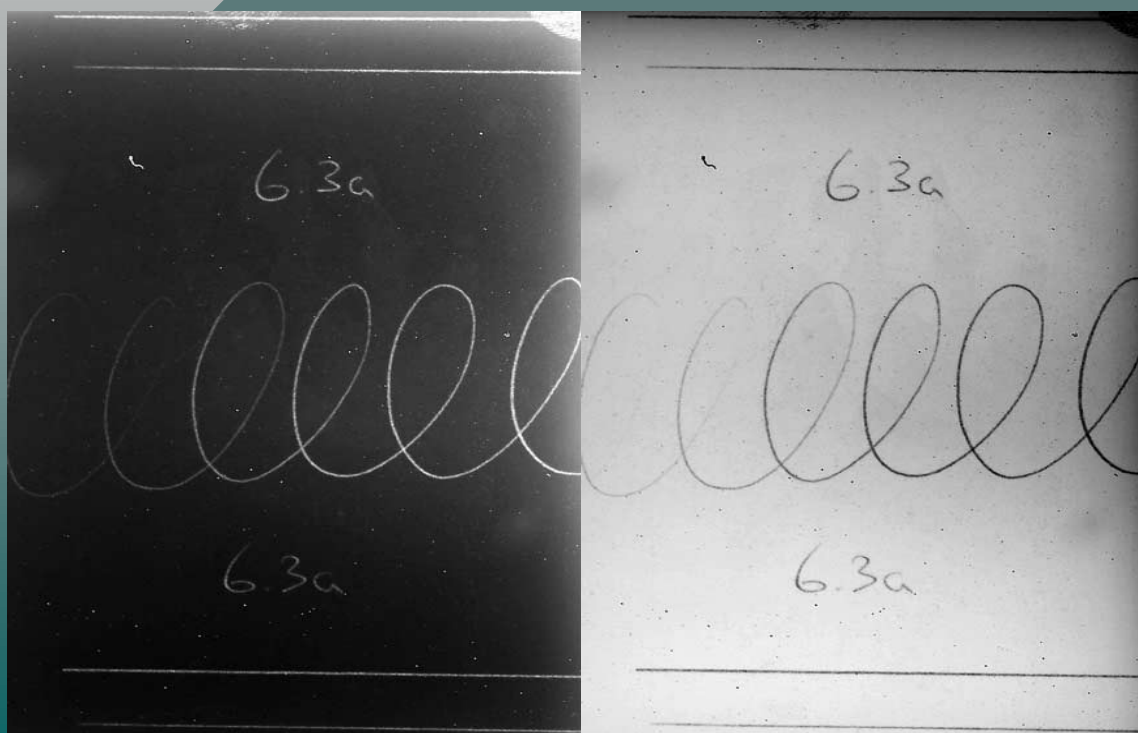


Image from gelatine lift



Comparison of methods

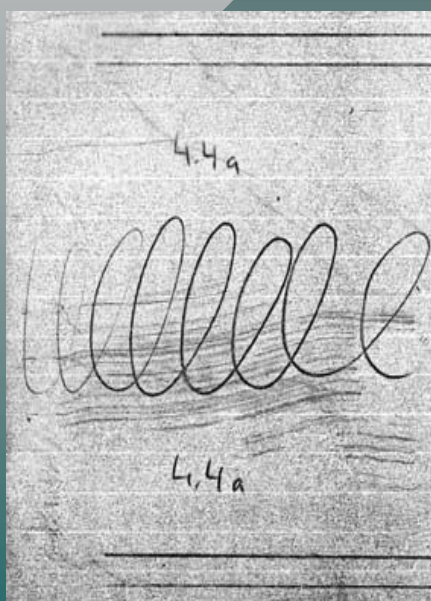
Class	Basis weight	ESDA	GL front	GL back	Obl. light
laser copier paper	80-90	++	+	+	+ -
Coated inkjet paper	90-100	++	+	+ -	+ -
Inkjet photo paper	130-220	-	- *	++	+++
A4 Writing pad paper	80	+++	++	+	+ -
Cover sheet writing pad	180-200	+ -	+++	+	+ -
Glossy paper	90-100	+ -	++	+	+ -
Cheap print	60-100	+	+++	++	+ -
Glossy quality print	140-250	+ -	++	++	+ -
Airmail paper	22	+++	+++	++	+

* The adhesive force of the gelatine foil destroyed the paper coating.

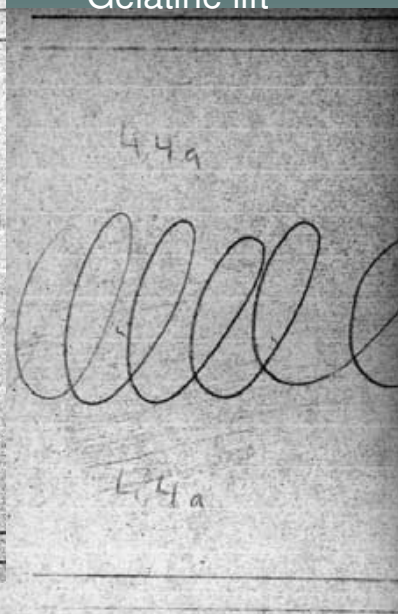
13

Example I (ESDA > GL > OL)

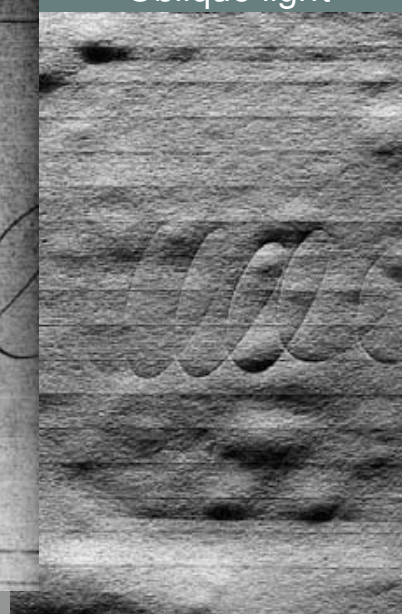
ESDA



Gelatine lift



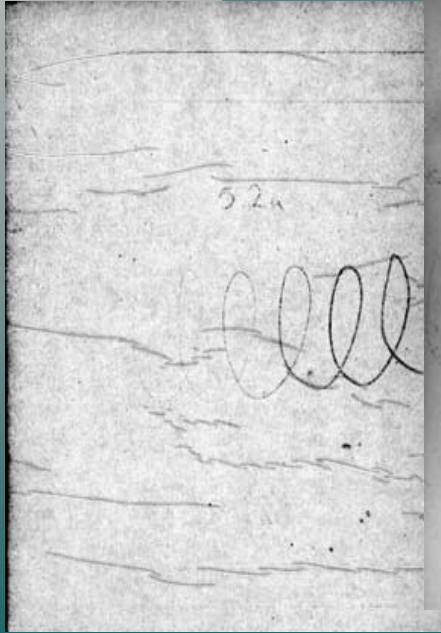
Oblique light



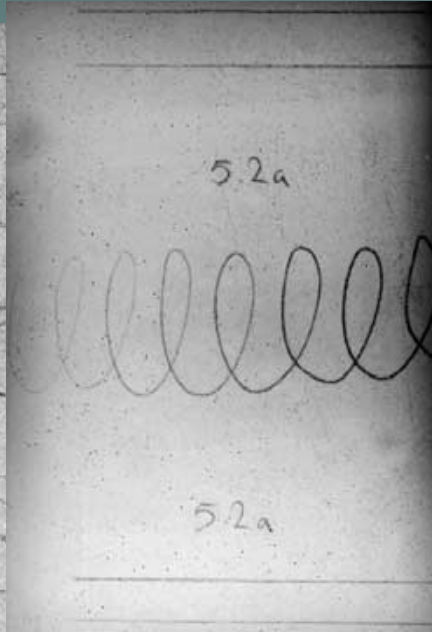
14

Example II (GL>ESDA>OL)

ESDA



Gelatine lift

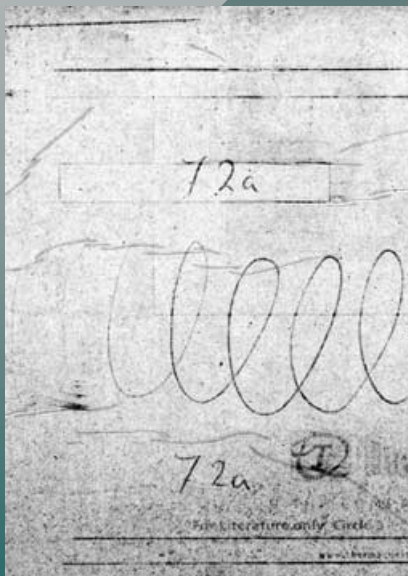


Oblique light

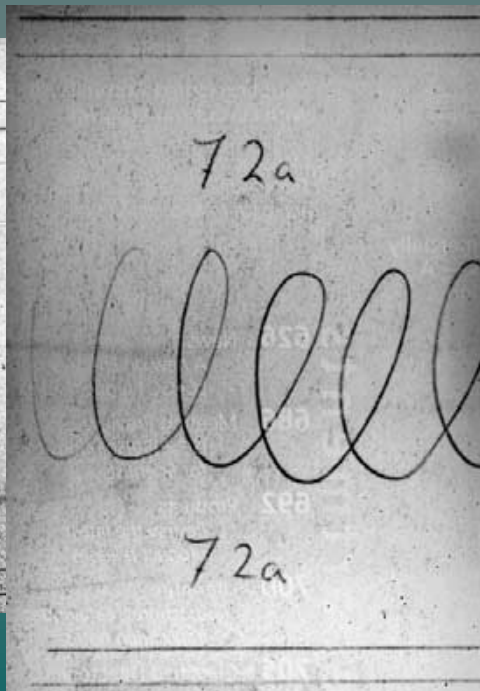


Example III (GL>ESDA>OL)

ESDA



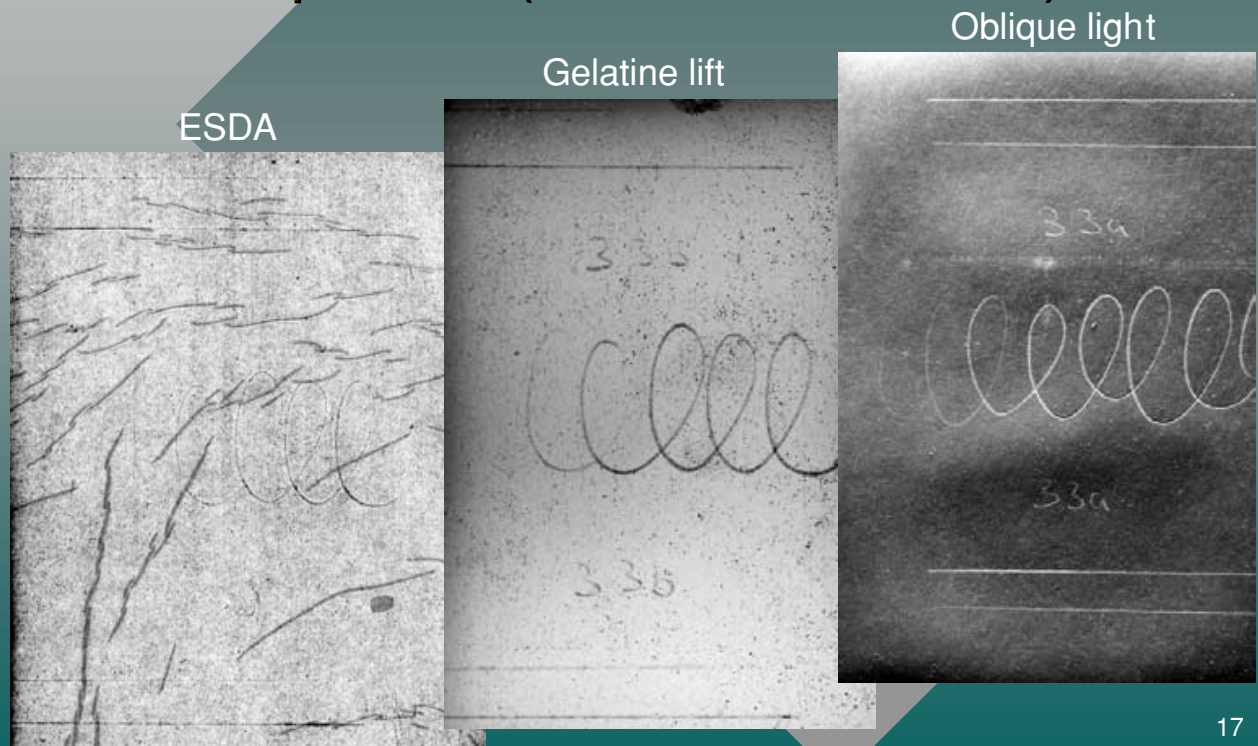
Gelatine lift



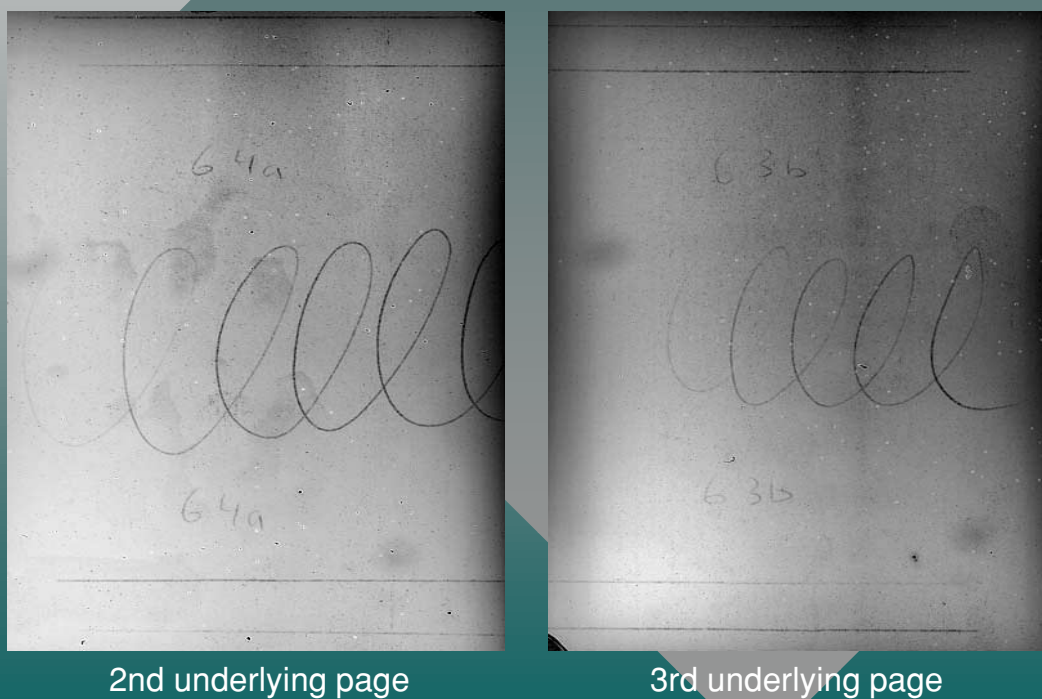
Oblique light



Example IV (OL>GL>ESDA)



Sensitivity of Gelatine lifting

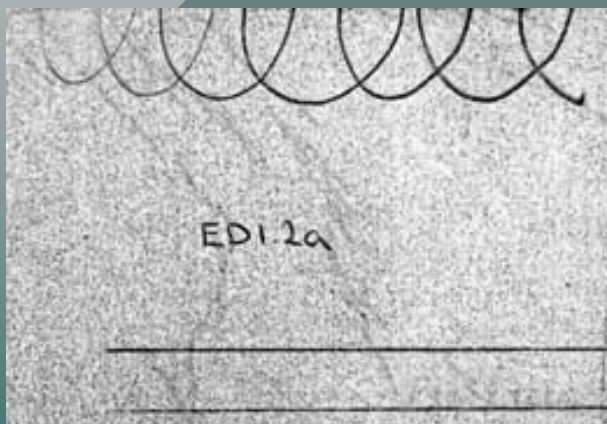


Order of ESDA and GL

- ESDA followed by gelatine lifting
 - no deterioration of image quality identified
- Gelatine lifting followed by ESDA
 - most often deterioration in image quality

19

Example I



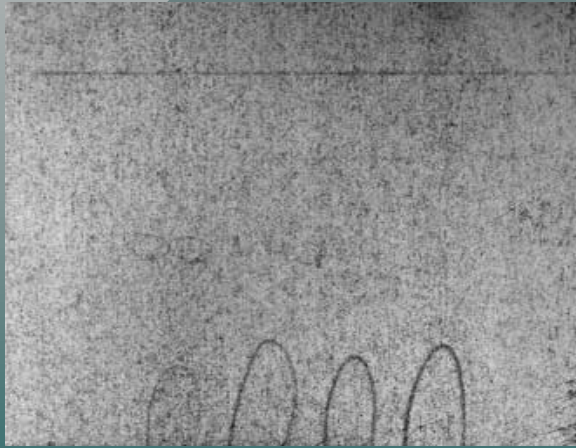
ESDA before GL



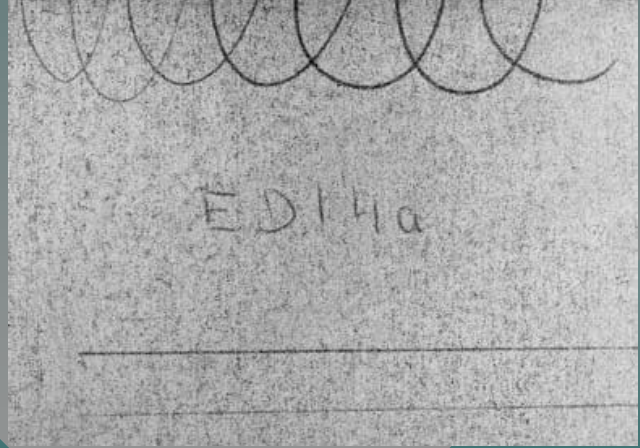
ESDA after GL

20

Example II



GL before ESDA



GL after ESDA

21

Conclusion

- Gelatine lifting is an all-round method for the examination of indented impressions
- Gelatine lifting outperforms the ESDA on coated and printed paper and paper of high basis weight
- Gelatine lifting should be performed after electrostatic lifting

22

Precaution

- Gelatine lifting is partially detrimental to the examination of latent prints, depending on the paper surface and the method for latent print examination applied.

23

Future research

- The effects of document storage conditions on gelatine lifting

24

Acknowledgements

- Rolf Hofer, Zurich Canton Police
- Henk van den Heuvel, NFI (retired)