

# Vinegar Syndrome

(On Problems of Film Preservation)

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There would be no cinema if it wasn't for the  
existence of plastic materials.



Nitrate vault fire

celluloid carrier is a sheet of transparent plastic film base covered on one side with a gelatin emulsion containing light-sensitive silver halide crystals

nitrocellulose was used as the first flexible film base until 1951, when Kodak announced the discontinuation of nitrate manufacture due to its extremely high flammability

film manufacturers introduced "safety film" with a cellulose triacetate plastic base as a substitute for nitrate – triacetate will last longer

“Cinema is the art of moving image destruction.”

*Paolo Cherchi Usai*

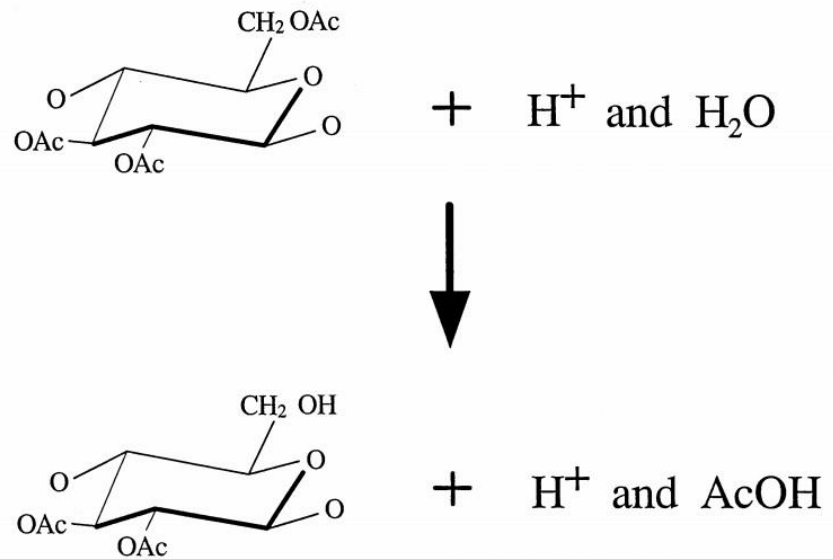


cellulose triacetate: much more resistant to fire, no signs of degradation, low production cost

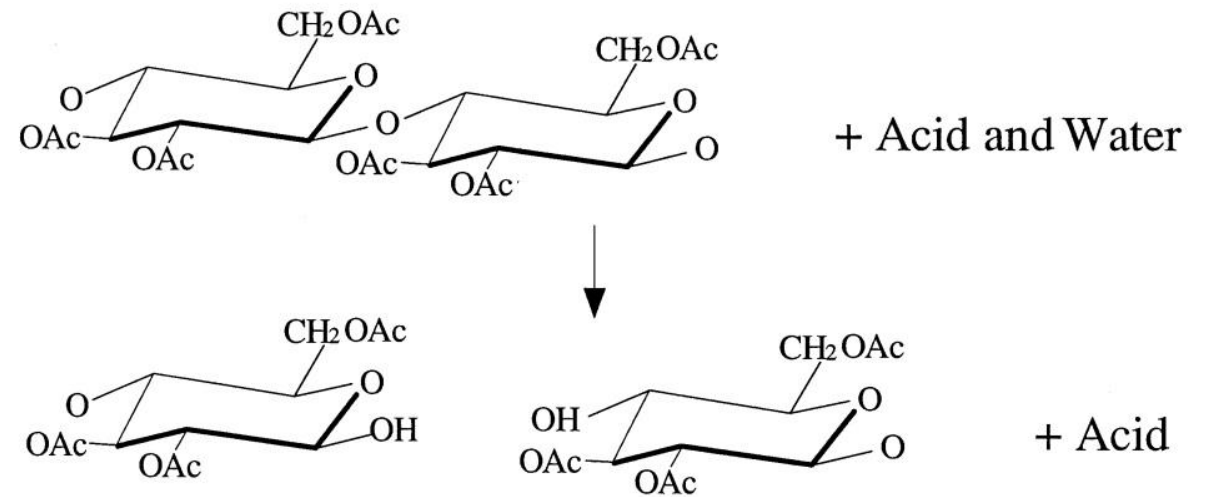


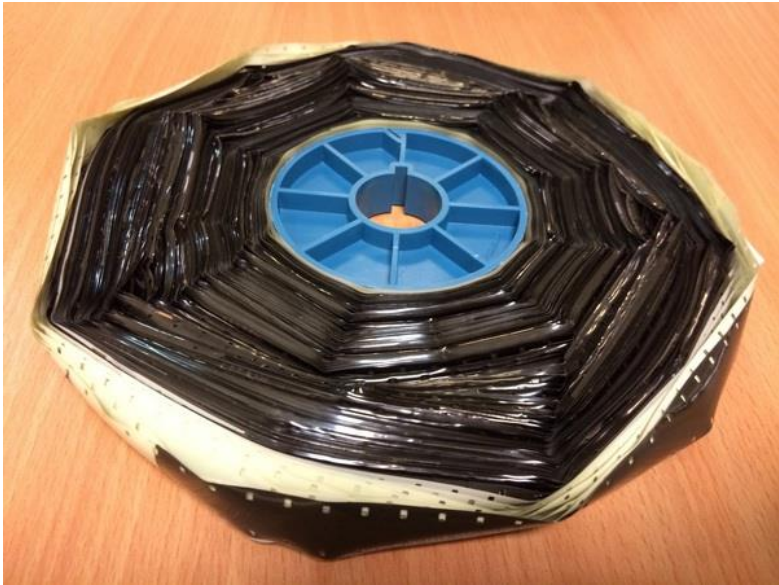
Triacetate celluloid degradation

## 1. Acid Catalysed Hydrolysis



## 2. Glycosidic Cleavage by Hydrolysis





shrinkage, warping, dye fading and brittleness

Nowadays, when celluloid film on triacetate base represents the large-scale portion of moving image collections, the vinegar syndrome is a critical issue that is affecting a great deal of audiovisual heritage institutions.



irreversible and inevitable damage of triacetate film

# Methodology for approaching the vinegar syndrome problem within film collections

(1) evaluation of the condition of film collections



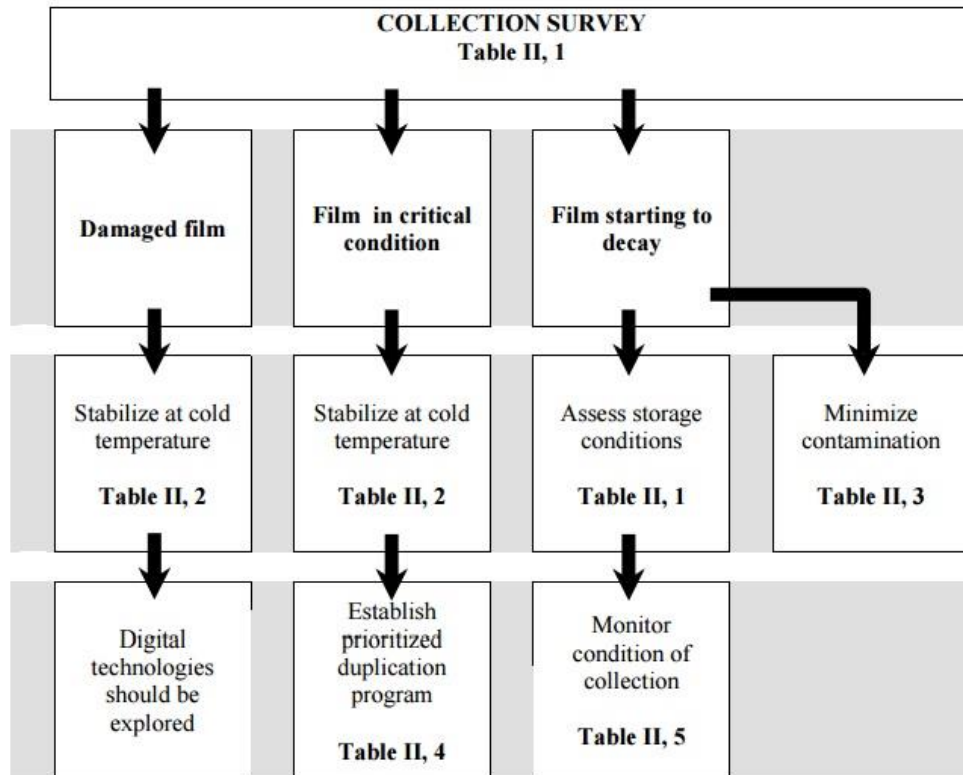
A-D Strips

(2) assessment of storage conditions



Stable temperature and relative humidity





urgent action on individual elements according to the level of degradation:

- (1) optimization of storage conditions and
- (2) plan for digitization

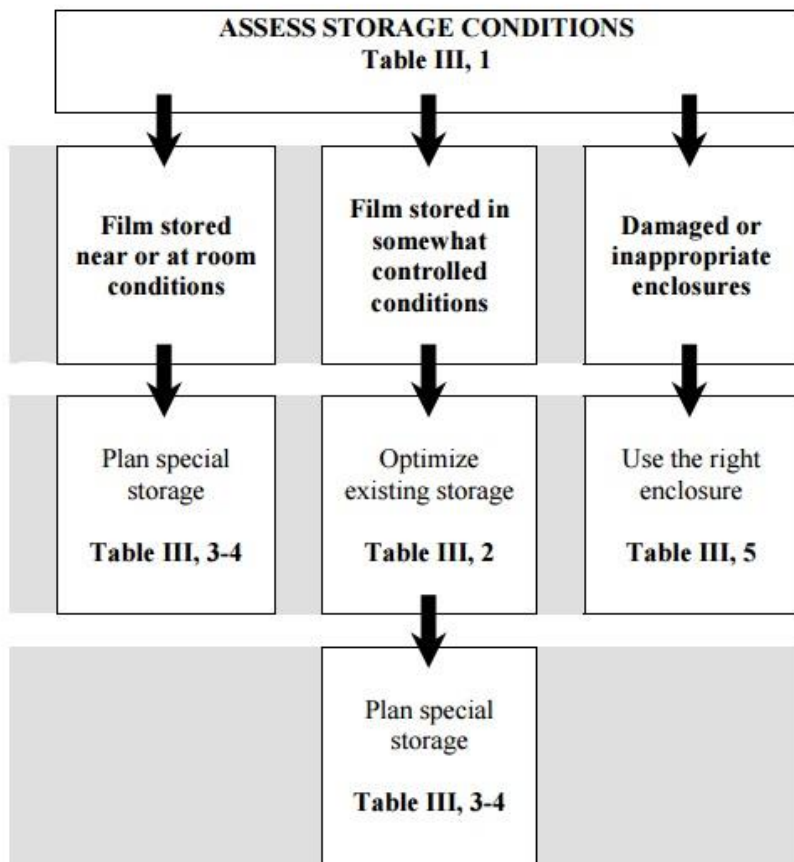
Lowering the temperature and humidity can notably extend the life span of triacetate film and reduce the risk of further chemical and physical decay.



It is essential to plan digitization of those elements in precarious state.



Film should be prioritized for duplication based on its condition and the resources available.



to minimize the risk of contamination within the collection

Since the acid emissions from decaying films can affect undegraded films kept in the same storage vault, those should be separated.

air quality control - in order to limit the exchange of acidic vapors in the storage space

periodical monitoring and regular assessment of the storage conditions

# The storage issues in the Slovenska Kinoteka



central vaults - Metelkova

the storage for films heavily affected by vinegar  
syndrome - the suburbs of Ljubljana

Gotenica (the underground former military  
tunnels)

the main issue: the maintainance of suitable  
climate conditions (spaces built for other  
purposes)

lack of resources for the establishment of  
digitization workstation

# Bibliography:

Image Permanence Institute

[https://www.imagepermanenceinstitute.org/webfm\\_send/308](https://www.imagepermanenceinstitute.org/webfm_send/308)

[https://www.imagepermanenceinstitute.org/webfm\\_send/299](https://www.imagepermanenceinstitute.org/webfm_send/299)

[https://www.imagepermanenceinstitute.org/webfm\\_send/309](https://www.imagepermanenceinstitute.org/webfm_send/309)

Reto Kromer, *Vinegar Syndrome*, Archives in Motion: [http://www.archivesinmotion.org/wp-content/uploads/2016/11/2016-10-18\\_Vinegar.pdf](http://www.archivesinmotion.org/wp-content/uploads/2016/11/2016-10-18_Vinegar.pdf)

Paolo Cherchi Usai, 2001. *The Death of Cinema. History, Cultural Memory and the Digital Dark Age*. London: British Film Institute.

Read, Paul, and Mark-Paul Meyer, eds. 2000. *Restoration of Motion Picture Film*. Newton, MA: Butterworth-Heinemann.