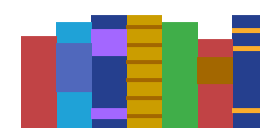
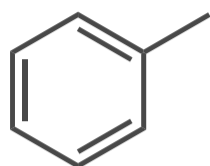


## THE AROMA OF BOOKS

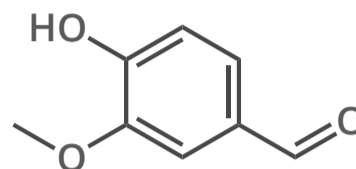


Books, both old and new, give off several hundred volatile compounds, or VOCs. These compounds have a variety of origins - some are products of degradation, whilst others originate from the type of paper, binding adhesive and printing ink used in the book's manufacture.

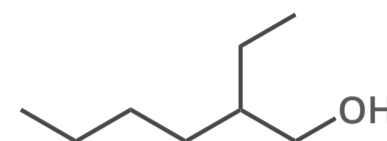
### OLD BOOKS



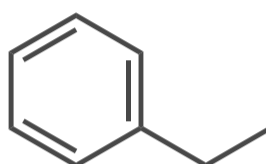
**TOLUENE**  
Sweet odour



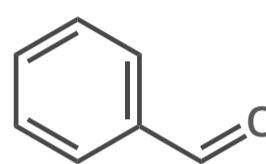
**VANILLIN**  
Vanilla-like



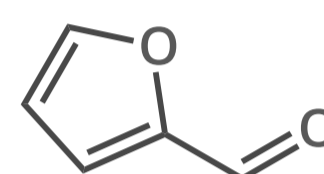
**2-ETHYL HEXANOL**  
Slightly floral



**ETHYL BENZENE**  
Sweet odour



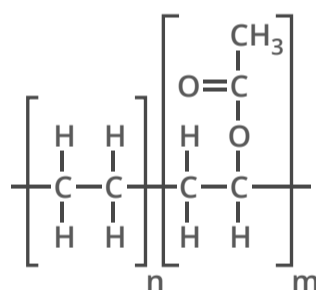
**BENZALDEHYDE**  
Almond-like



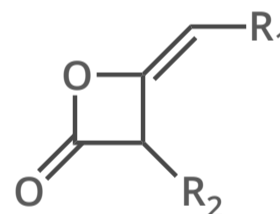
**FURFURAL**  
Almond-like

Over time, gradual breakdown of cellulose and lignin in paper produces a large number of organic compounds. Type of paper and age of the book affect the compounds produced and their concentrations; for instance, very old books contain more lignin than modern books.

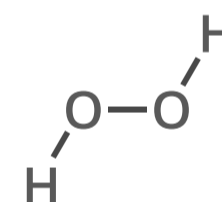
### NEW BOOKS



**VINYL ACETATE ETHYLENE**



**ALKYL KETENE DIMER**  
(aids water resistance)



**HYDROGEN PEROXIDE**  
(bleaching agent)

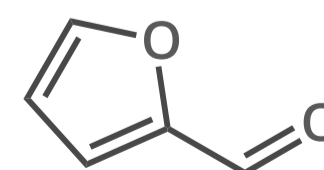
#### ADHESIVES

#### PAPER & INKS

The aroma of new books is highly variable; the compounds that cause it originate from the adhesive, ink, and the chemicals used for paper treatment.

Modern binding adhesives are often based on co-polymers, such as vinyl acetate ethylene. In the paper-making process, paper is treated with a variety of chemicals, to achieve desired properties. Whilst some of these chemicals are odourless themselves, they can react & contribute to release of VOCs. Petrochemicals used as solvents for inks can also be contributors.

In short, no single chemical causes the odour of books. It's a result of a complex mix of volatile chemicals produced by chemicals used in their manufacture, as well as the gradual degradation of the chemicals within the paper. Some of the compounds produced, such as furfural, can even be used to gauge the age and condition of the book in question.



**FURFURAL**

