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Stack Odour Sampling Plus

Quentin Hurt

A few thoughts about odour

Consideration for regulation

Odour

a distinctive smell, especially
an unpleasant one

a lingering quality or
impression attaching to
something

Google Books Ngram Viewer

Graph these comma-separated phrases: odour case-insensitive

between 1800 and 2008 from the corpus: English with smoothing of 7 [Search sets of books](#)



Odour vs frangrance



WE LIKE FRAGRANCES



WE GENERALLY REGARD
ODOURS AS UNPLEASANT
AND UNDESIRABLE

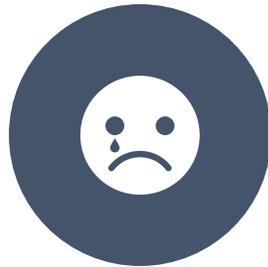


TOO MUCH OF A GOOD
THING CAN BECOME BAD

Why do we have such a visceral response to *bad* odours



DANGER



DEATH



ILLNESS



SOCIALLY
UNACCEPTABLE

Malaria

mid 18th century: from Italian, from *mal'aria*, contracted form of *mala aria* 'bad air'. The term originally denoted the unwholesome atmosphere caused by the exhalations of marshes, to which the disease was formerly attributed

Case study: London odour control

1600: About 100'000 inhabitants

1811: Over 1'000'000, unsewered

1854: Dr John Snow finds the source of cholera- it's not the smell.

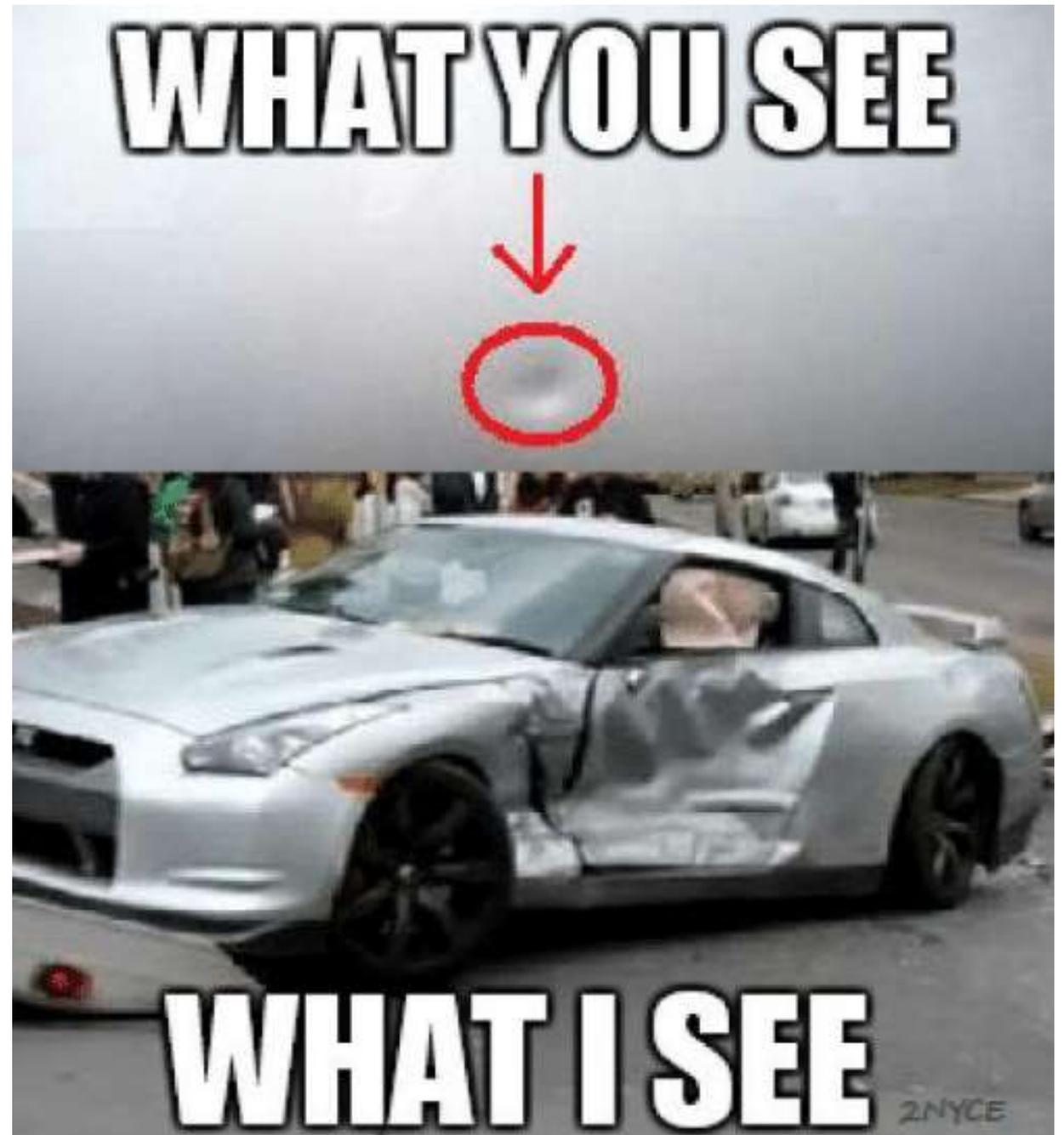
1858: The Big Stink: curtains in Houses of Parliament treated with "chloride of lime"

Leads to the creation of sewers parallel to the Thames.

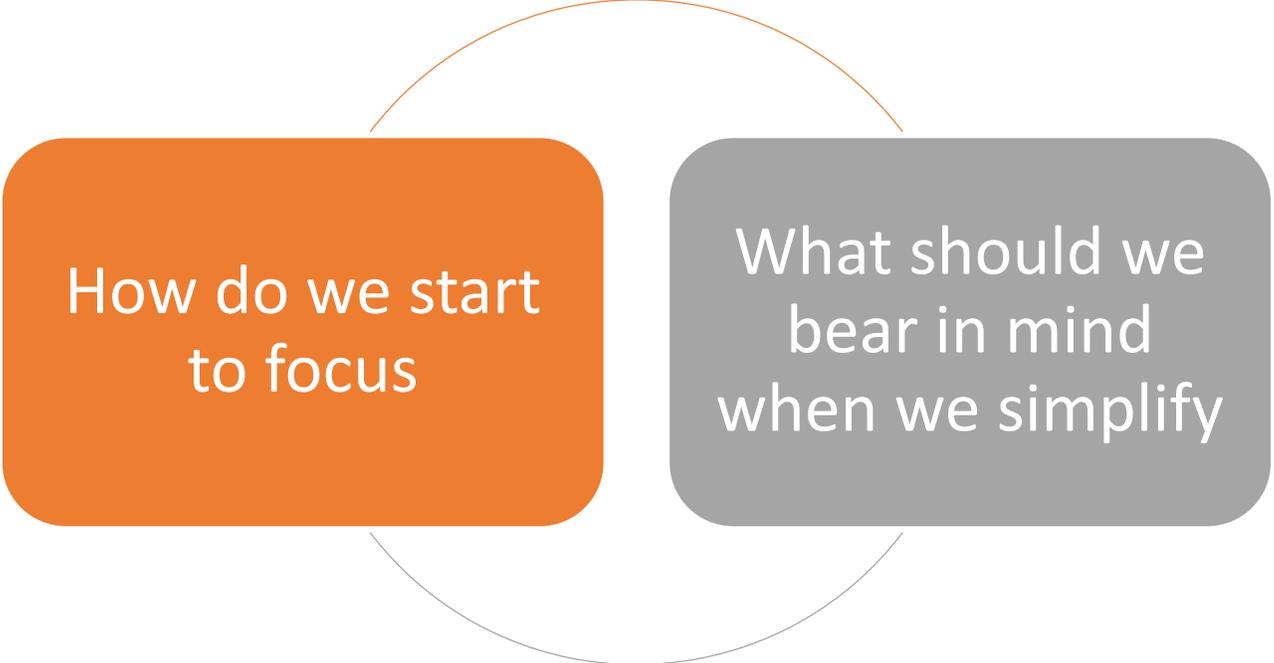


John Snow

How do we
match a
complaint and
a complainant



Odour is
complicated



How do we start
to focus

What should we
bear in mind
when we simplify

Japanese- specified odorous substances

Acetaldehyde, Ammonia, Butyraldehyde, Butyric acid, Dimethyl disulfide, Dimethyl sulfide, Ethyl acetate, Hydrogen sulphide, Isobutyraldehyde, Isobutyl alcohol, Isovaleraldehyde, Isovaleric acid, Methyl isobutyl ketone, Methyl mercaptan, Propion aldehyde, Propionic acid, Styrene, Toluene, Trimethylamine, Valeraldehyde, Valeric acid, Xylene

Hydrogen sulphide

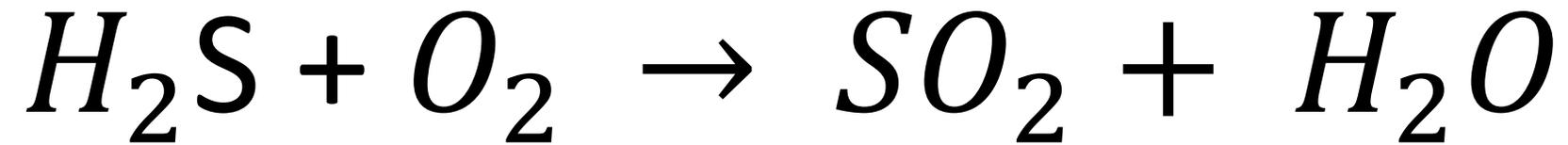


MAKE IT INTO
SOMETHING WE KNOW



MEASURE IT

Transforming the target



Stoichiometric: one molecule of H_2S becomes one molecule of SO_2 .

Oxidising
 H_2S

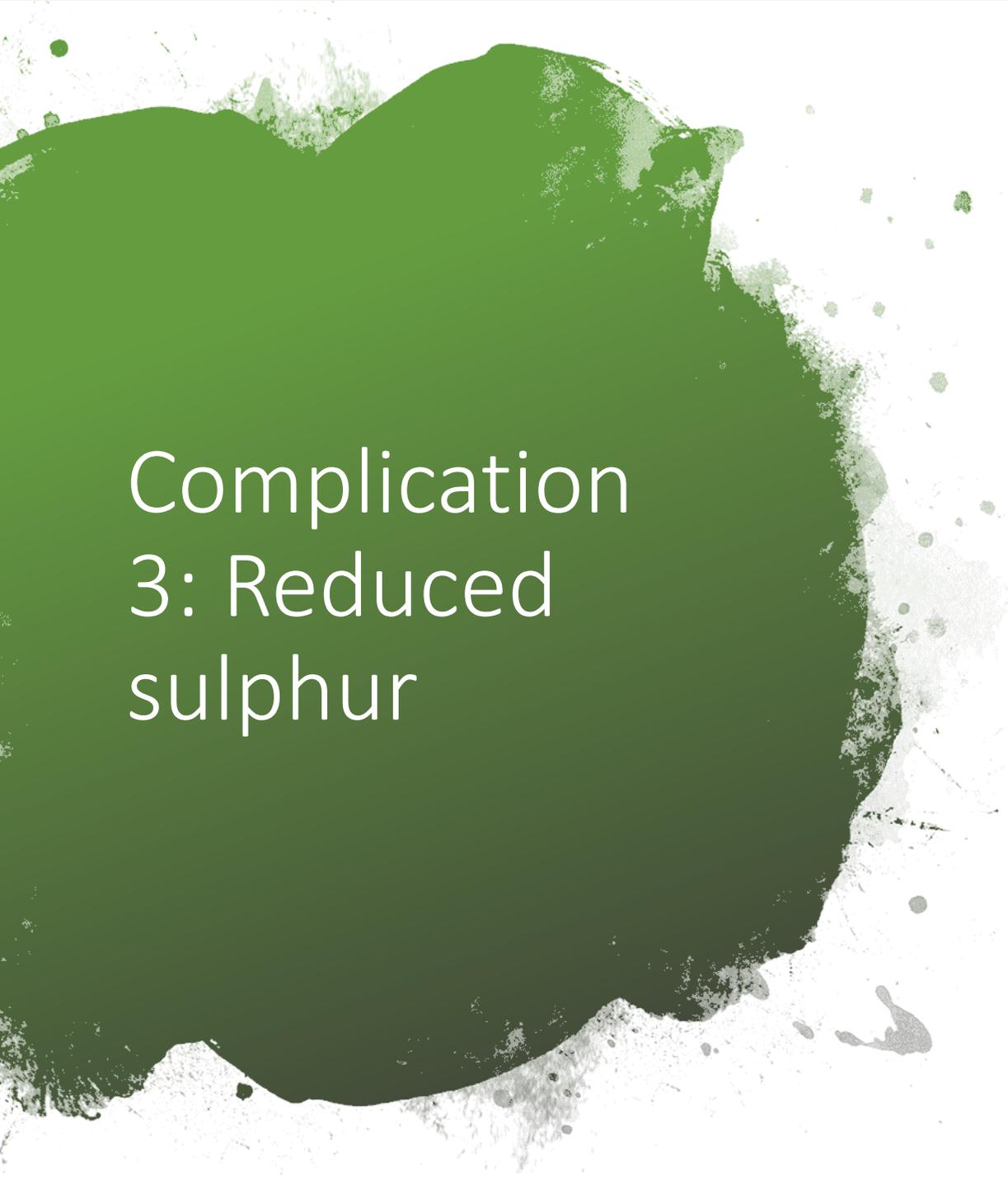


Complication 1: Stickiness

- H₂S is “sticky”
 - Needs Teflon probe
 - Teflon heated filter
 - Teflon sample lines

Complication 2: SO₂

- If SO₂ is present in the sample gas
 - It will be measured as H₂S
 - We need to scrub it out
 - Teflon scrubber
 - Citrate buffer scrubbing solution
 - Condition the solution before starting



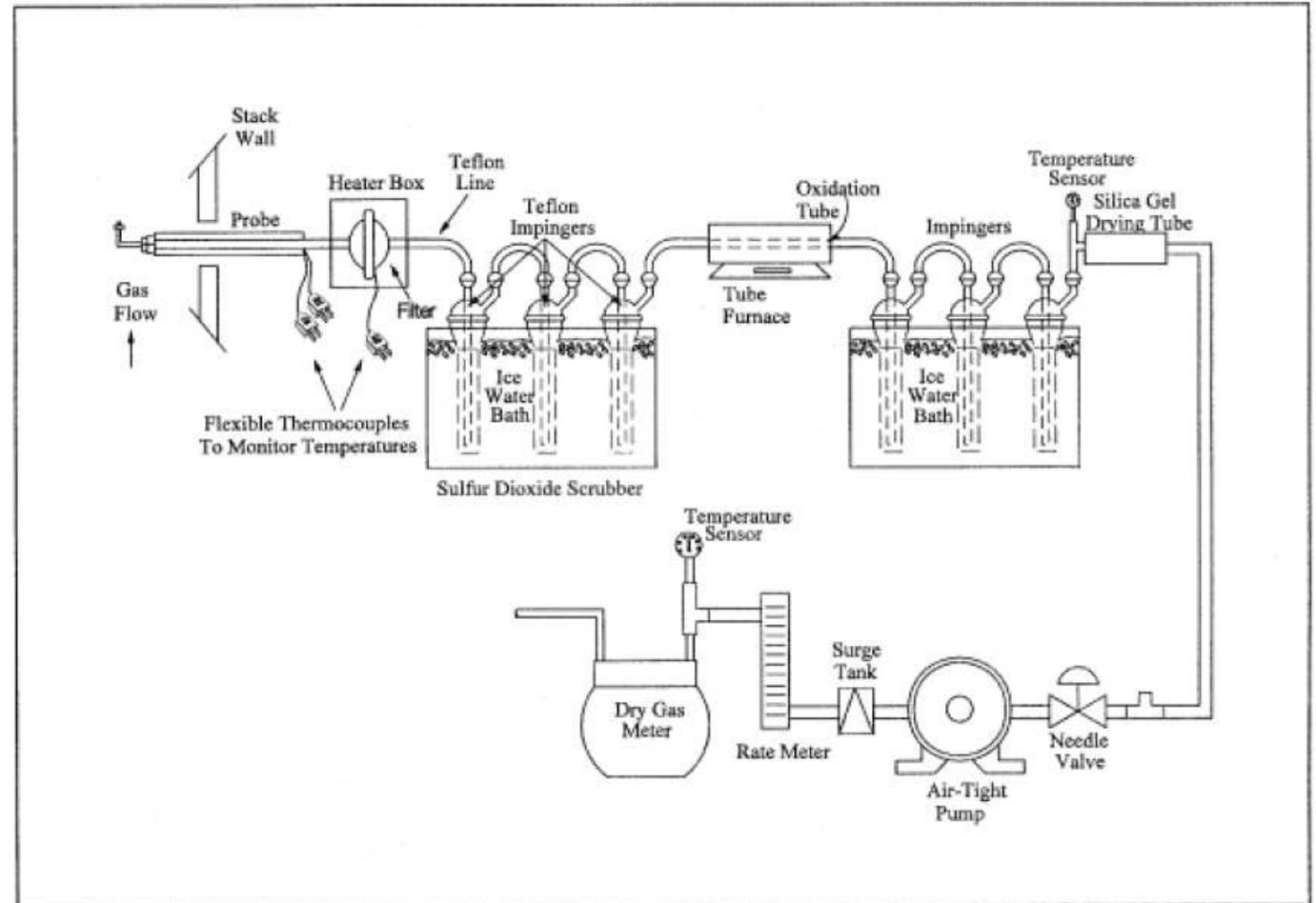
Complication 3: Reduced sulphur

- All reduced sulphur may oxidise
 - Mercaptans: multiple S

Complication 4: Calibration

- Instrument calibrated for SO₂
- Furnace conversion efficiency to be determined
 - (System conversion)
- H₂S in air standard?

Sampling train





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What if H₂S is
not the issue



Chemical test

Ammonia
Formaldehyde



Organoleptic test

Direct smell
Diluted smell



LISTED ACTIVITIES AND ASSOCIATED MINIMUM EMISSION STANDARDS IDENTIFIED IN TERMS OF SECTION 21 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004)

Category 10: Animal Matter Processing

Description:	Processes for the rendering cooking, drying, dehydrating, digesting, evaporating or protein concentrating of any animal matter not intended for human consumption.
Application:	All installations handling more than 1 ton of raw materials per day.

- (a) The following special arrangement shall apply –
Best practice measures intended to minimize or avoid offensive odours must be implemented by all installations. These measures must be documented to the satisfaction of the Licensing Authority.

Take a fresh look at odour



Identify the active agent if possible



Measure it



If not, consider measuring the odour units



This type of analysis is not available in SA



Requires planning and transport

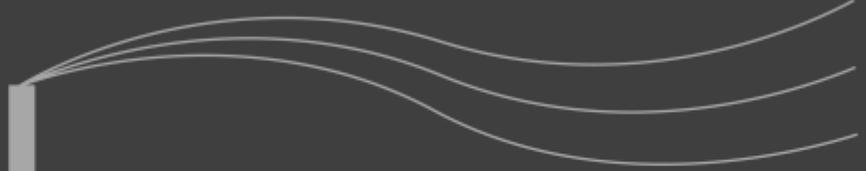
Quo vadis

- Concern about H₂S testing techniques
- Remember:
 - Stickiness
 - Interference
 - Calibration
- Discuss other approaches
- Odour is a problem between neighbours

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The logo graphic consists of three thin, white, wavy lines that start from a single point on the left and curve upwards and then downwards to the right, resembling a stylized horizon or a signal wave.

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