

THE GENUS LACTARIUS IN AUSTRALIA



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Two parts to the story

- What is a Lactarius
 - Morphological species
 - How our ideas have changed over 250 years
 - The influence of molecular biology
- What Lactarius species are in Australia
 - Introduced species
 - Published species
 - Unpublished species

Morphological species

- White to cream coloured spores
- Agaricoid: cap, stipe central, small to medium.
- Mycorrhizal: growing in soil under trees
- Flesh yields latex when cut
- Spores with amyloid ornamentation
- Tissues with sphaerocysts
- Lamellar edge with pseudocystidia

White to cream spores



Agaricoid



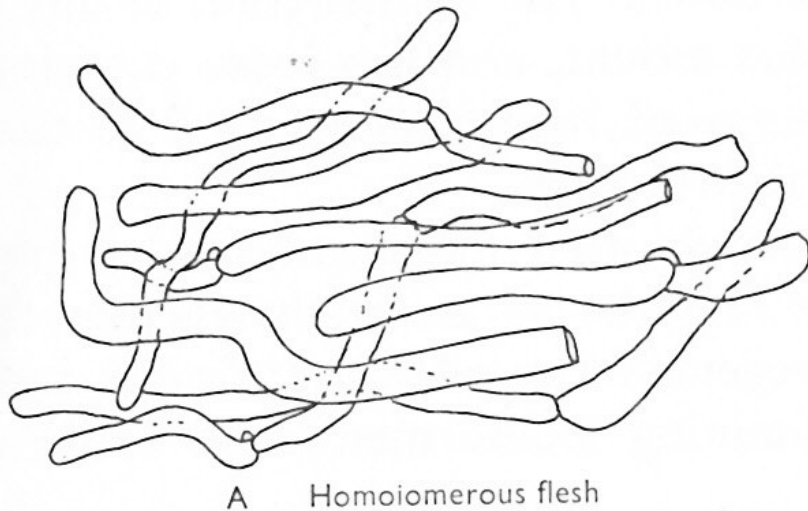
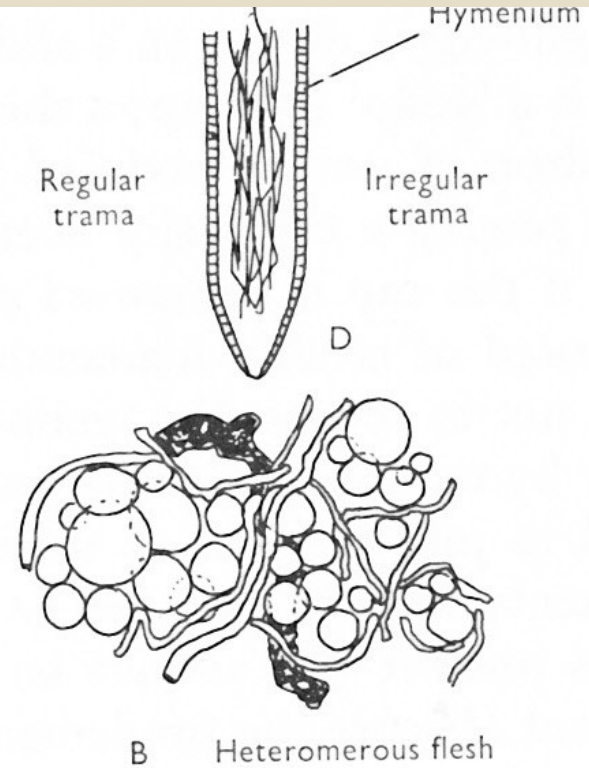
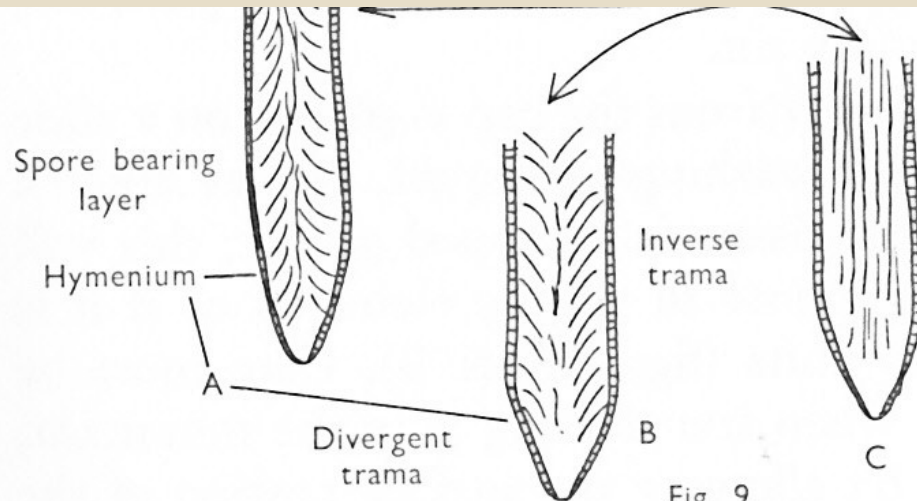
Mycorrhizal



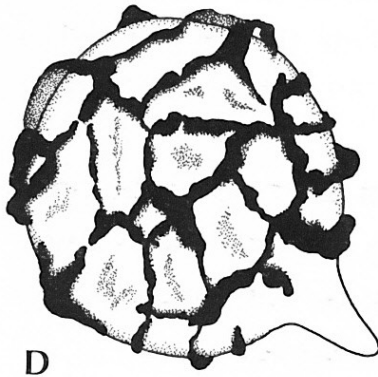
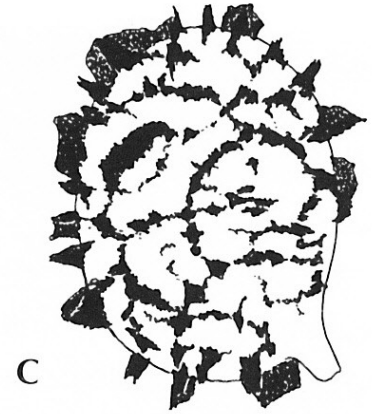
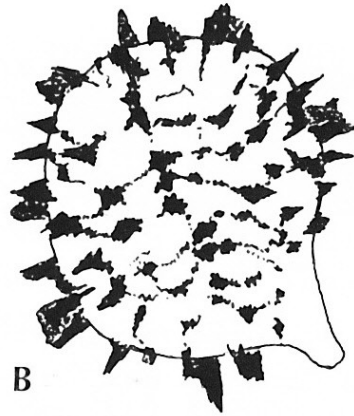
Flesh yields latex when cut



Tissues with sphaerocysts

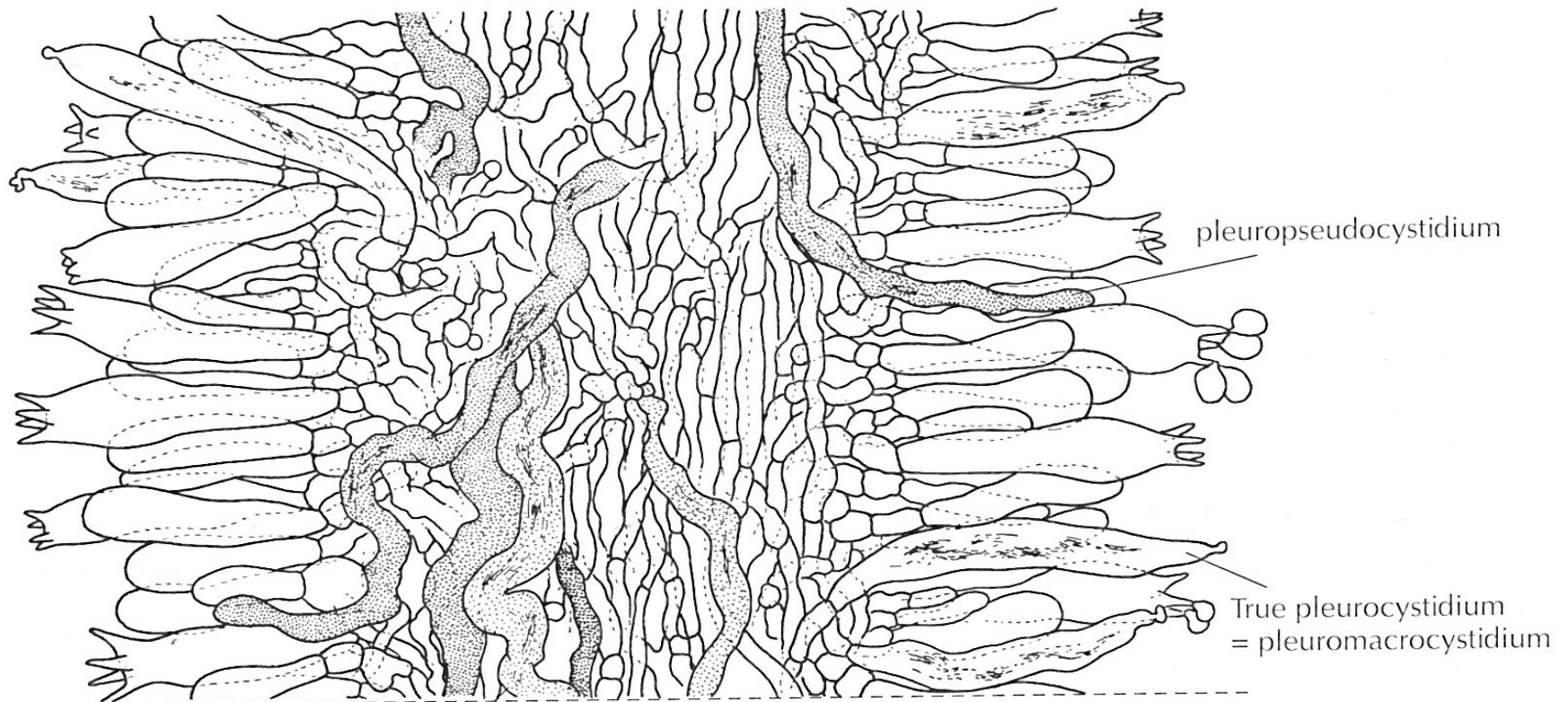


Spores with amyloid ornamentation



Lamellae with pseudopleurocystidia

THE GENUS LACTARIUS



lactiferous hypha

pleuropseudocystidium

True pleurocystidium
= pleuromacrocystidium

A bit of history

- How did we get to this view of Lactarius

Linnaeus



1707 - 1778

- Introduced binomial naming
- Each name has two parts:
e.g. *Homo sapiens*
- The first part is known as the Genus: e.g. *Lactarius*
- The second part is known as the species: e.g. *piperatus*
- For every genus and every species there is a 'type specimen' that is a collection that was used to generate a description.

Linnaeus



1707 - 1778

- For *Homo sapiens* the body of Linnaeus himself is the type specimen.
- For the genus *Lactarius* the type specimen is *Lactarius piperatus*.
- Linnaeus first published his ideas in *Systema Naturae* in 1735.

Persoon

- 1761 – 1836
- 1801 - Published *Synopsis methodica fungorum*
- Included *Lactarius*
- Characters:
 - Agaricoid: cap, stipe central, small to medium.
 - Flesh yields latex when cut.

Elias Fries



1794 - 1878

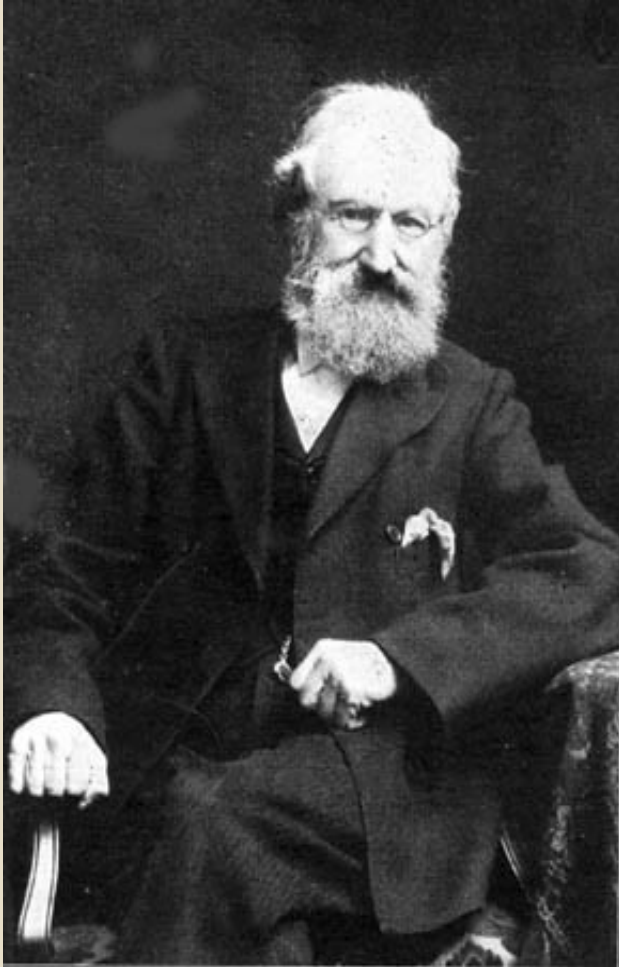
- Another Swede from Femsjo in Smaland
- Workroom now a museum
- Described 13 species of *Lactarius*
- *Lactarius blennius* still grows under the Beech tree on the lawn by his workroom

Fries concept of Lactarius



- A mushroom with a cap and stipe and gills
- Spores white to creamy yellow
- Growing in the ground under trees
- Gills exuding milk when cut

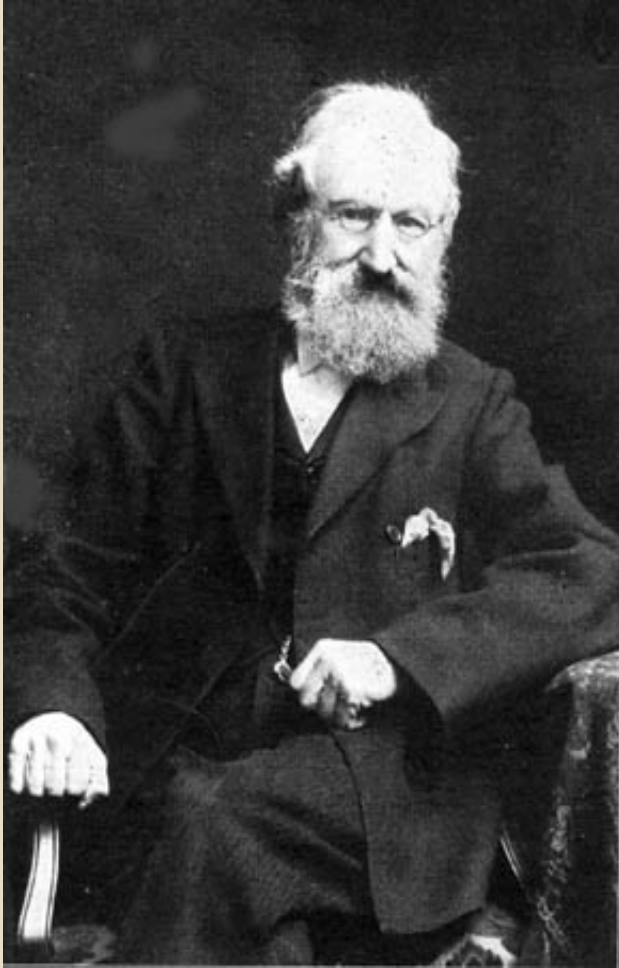
Mordecai Cooke



1825 - 1914

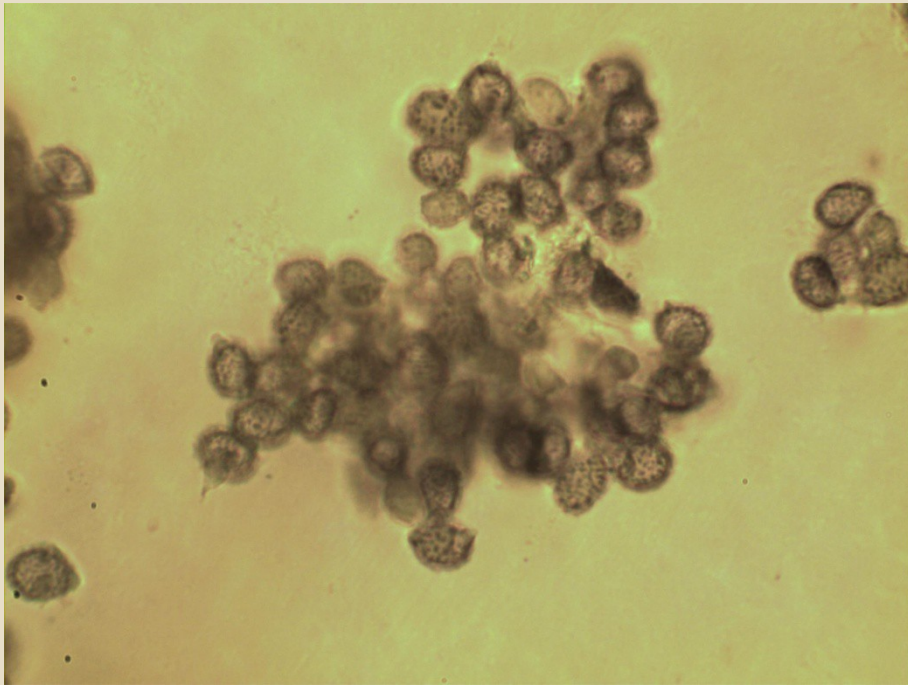
- 1892 – Published Handbook of Australian fungi
- Bit of an eccentric
- American mycologist Lloyd said:
- ‘If there is any other subject on earth that had as little truth, or is as inaccurate as Cooke’s work on Polypores, I do not know what it is, unless it is Leville’s or Kalchenbrenner’s. And, Cooke is the author of the only textbook published on Australian fungi, a book that has about as much truth in it as is in Gulliver’s Travels.’

Cooke's concept of Lactarius



- Hymenophore continuous with the stem. (I think he means subdecurrent gills)
- Gills unequal. (I think he means it has lamellulae that don't reach the stem)
- Gills between membranaceous and waxy, rigid, containing a milky fluid, edge acute.
- Spores globose, white, rarely becoming yellowish.

Vaclav Melzer



- Czech mycologist 1878 – 1968.
- Ran out of KOH in 1924
- Used Iodine and Chloral hydrate solution.
- Starch on surface of spores turned black.
- Lactarius had ridges!
- Melzer's solution

John Cleland 1878 -1971



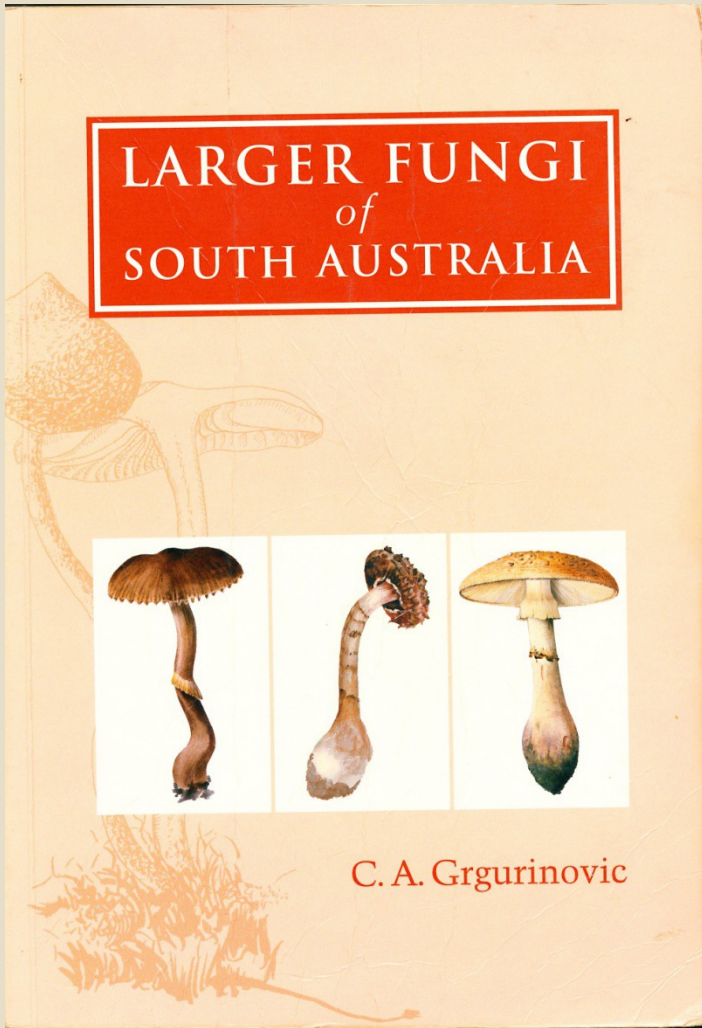
[Watercolours by Miss P. Clarke.]

PLATE VI.

Lactarius Clarkei Clel. (No. 238). Bradley's Head, Sydney.

- First Australian to publish a native *Lactarius*
- Used Melzer's solution
- Described ornamented spores
- Published *Lactarius clarkeae*

Cheryl Grgurinovic



- Full modern description
- Listed six species:
- *L. necator*
- *L. clelandii*
- *L. mea*
- *L. wirrabara*
- *L. clarkeae*
- *L. subclarkeae*

Buyck & Verbeken



Bart Buyck

- Studied Russulas in Africa
- Brown spored Russulas
- Russulas with milk
- Russulas on trees



Annemieke Verbeken

- Studied Lactarius in Africa
- Brown spored Lactarius
- Lactarius without milk
- Lactarius on trees

The Genus Lactarius

- 1998 – Verbeken and two colleagues from Denmark publish monograph on European species.
- The presence of ‘pseudopleurocystidia’ is the most important taxonomic character separating *Russula* from *Lactarius*.
- Other characters retained but apply to *Russula* as well as *Lactarius*.

Molecular Biology

- The Geneticists leap on the stage 2005
- Confirm Buyck and Verbeken's work
- Divide Lactarius in to three:
 - 1.Lactarius
 - 2.Lactifluus
 - 3.Multifurca
- .All three genera occur in Australia

What Lactarius species are in Australia

1. Introduced species

- Two confirmed:
 - *L. turpis*
 - *L. deliciosus*
- Two uncertain:
 - *L. aff piperatus*
 - *L. aff glaucescens*

Lactarius turpis



Lactarius deliciosus



Lactarius aff piperatus



Lactarius aff glaucescens



2. Published Australian species

- *Lactarius eucalypti* /*L. clelandii*
- *Lactifluus clarkeae*
- *Lactifluus subclarkeae*
- *Lactifluus mea*

Published Australian species

- *Lactifluus genevievae*
- *Lactifluus leonardii*
- *Lactifluus sepiaceus*
- *Lactifluus wirrabara*
- *Multifurca stenophylla*

Lactarius eucalypti



Lactifluus clarkeae



Lactifluus subclarkeae



Lactifluus mea



Lactifluus genevievae



Lactifluus leonardi



Lactarius sepiaceus



Lactifluus wirrabara



Multifurca stenophylla



3. Unpublished Australian species

- *Lactifluus aurantiorubra*
- *Lactifluus* 'bald rock'
- *Lactifluus lactifuscus*
- *Lactarius luteocremeus*
- *Lactifluus* aff *lignyotus*

3. Unpublished Australian species

- *Lactarius pallidoaurantiarcus*
- *Lactifluus queenslandicus*
- *Lactarius tasmanicus*
- *Lactifluus* 'Crow's Nest'

Lactifluus aurantiorubra



Lactifluus 'Bald Rock'



Lactifluus lactifuscus



L. lactifuscus latex



Lactarius luteocremeus



Lactifluus aff lignyotus



Lactarius pallidoaurantiarcus



Lactifluus queenslandicus



Lactarius tasmanicus



Lactifluus 'Crow's Nest'



Conclusions

In Australia we appear to have:

- Two introduced *Lactarius* species
- Nine properly named species
- Three or four species that need re-naming
- Eight or nine species that need to be published.

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