

Networks of Ingredients in Apicius Recipes

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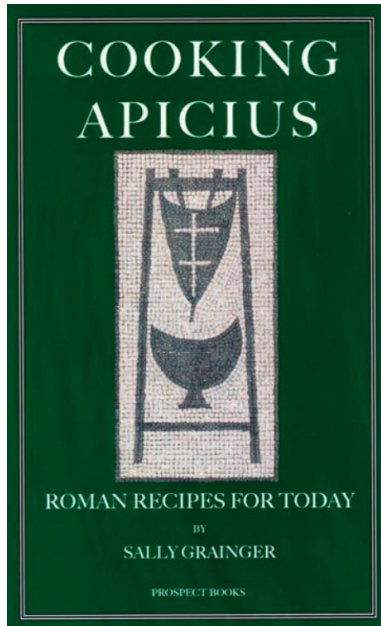
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Apicius

- ▶ **Apicius**, also known as **De re culinaria** or **De re coquinaria** (*On the Subject of Cooking*) is a collection of Roman cookery recipes.
- ▶ It is thought to have been compiled in the fifth century AD (B. Laurioux, 1994).
- ▶ Among a number of different Roman cooks from the first century AD, the book has been attributed to an otherwise unknown **Caelius Apicius**, an invention based on the fact that one of the two manuscripts are headed with the words "**API CAE**" or rather because a few recipes are attributed to Apicius in the text.
- ▶ The Latin text is organized in the following ten books with Greek titles:

- Book 1 *Epimeles* (Prudent)
- Book 2 *Sarcoptes* (Ground-beef)
- Book 3 *Cepuros* (Vegetables)
- Book 4 *Pandecter* (Many ingredients)
- Book 5 *Ospreon* (Legumes)
- Book 6 *Aeropetes* (Poultry)
- Book 7 *Polyteles* (Gourmet)
- Book 8 *Tetrapus* (Four-legged animals)
- Book 9 *Thalassa* (Sea-food)
- Book 10 *Halieus* (Fisherman)

The Source Book



An Example of an Entry

Soft eggs in pine kernel sauce, *Apicius* 7.13.3

This is a easy standby recipe that is similar to egg mayonnaise but with an extra kick from the lovage. The pine kernels are soaked in water or wine to soften them so that they make a soft creamy sauce.

100 g pine kernels

50 ml wine

1 dessert spoon honey

1 tbsp white wine vinegar

1 tbsp fish sauce

½ tsp lovage seed

generous freshly ground black pepper

4 soft-boiled eggs, cooled and shelled

Soak the pine kernels in the wine overnight. Put them in a food processor with the honey, vinegar, and fish sauce, and process until smooth. Roast and grind the lovage seeds, mix with black pepper, add to the sauce and taste. Adjust the texture with the wine used to soak the pine kernels. Shell the eggs carefully and cut them in half, spooning a little sauce on each half. Serve with a green salad dressed with an *oenogarum* as above.

The Relational Structure of Lexicons

- ▶ A lexicon is composed of **entries** (or **articles**, **items**).
- ▶ Any entry has:
 - ▶ a **title** and
 - ▶ the **contents** (or the **description**) of the entry.
- ▶ Thus, using standard NLP techniques of **extraction** of words, an entry of the Apicius **Recipes** may generate two types of **ingredients**
 - ▶ **title ingredients** and
 - ▶ **contents ingredients**

The Dataset

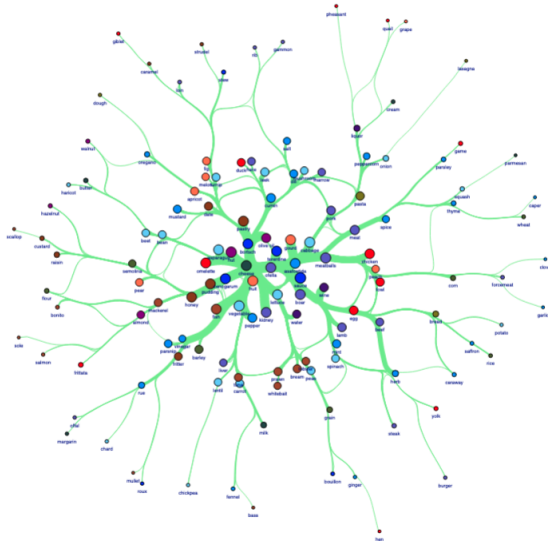
- ▶ 60 recipes
- ▶ 10 books
- ▶ 64 title ingredients
- ▶ 134 contents ingredients

Recipe	Book	Title Ingredients	Contents Ingredients	No. of All Ingredients
Roman bortsch	Book 3. Cepuros (Vegetables)	bortsch	asafoetida, asparagus, beet, boar, bortsch, cabbage, cheese, chicken, fish, fruit, gourd, honey, kidney, lettuce, meat, meatballs, nut, oenogarum, ofella, olive oil, omelette, pastry, pepper, pudding, salt, sauce, terentine, vegetable, water, wine	30
Barley and vegetable soup	Book 4. Pandecter (Many ingredients)	barley, vegetable	asafoetida, asparagus, barley, beet, boar, bortsch, cabbage, chard, cheese, chickpea, dill, fennel, fish, flour, fruit, gourd, grain, herb, kidney, leek, lentil, lettuce, meatballs, nut, oenogarum, ofella, olive oil, omelette, oregano, pastry, peas, pepper, pudding, salt, sauce, spice, spinach, terentine, vegetable, water	40
Beef or lamb faggots	Book 2. Sarcoptes (Ground-beef)	beef, lamb	asafoetida, asparagus, beef, boar, bortsch, bread, burger, cabbage, cheese, egg, fish, fruit, gourd, kidney, lamb, lettuce, meat, meatballs, nut, oenogarum, ofella, olive oil, omelette, pastry, peppercorn, pudding, sauce, terentine, vegetable, wine	30
Chicken pottage to serve with meatballs	Book 2. Sarcoptes (Ground-beef)	chicken, meatballs	asafoetida, asparagus, boar, bortsch, cabbage, cheese, chicken, dill, fish, fruit, gourd, kidney, leek, lettuce, meatballs, nut, oenogarum, ofella, olive oil, omelette, pastry, peas, pepper, potato, pudding, rice, salt, sauce, terentine, vegetable, water	31
Chicken meatballs in hydrogarum	Book 2. Sarcoptes (Ground-beef)	chicken, meat, meatballs	asafoetida, asparagus, beef, boar, bortsch, bread, cabbage, cheese, chicken, corn, cumin, egg, fish, forcemeat, fowl, fruit, game, gourd, kidney, lamb, lettuce, liquor, meat, meatballs, nut, oenogarum, ofella, olive oil, omelette, parsley, pastry, pepper, peppercorn, pudding, sauce, terentine, vegetable, water, wine	39

The Directed Graph among Ingredients

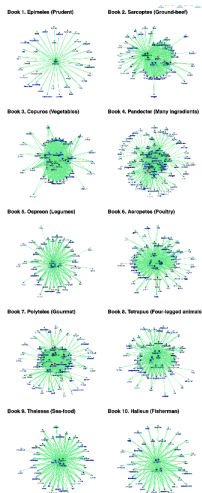
- ▶ 134 nodes and 2192 edges
- ▶ weighted graph
- ▶ not strongly connected and it has 72 strongly connected components with the largest strongly connected component composed of 63 nodes and 1599 edges
- ▶ weakly connected graph
- ▶ density = 0.1230
- ▶ transitivity = 0.5288
- ▶ reciprocity = 0.3367

A Visualization of the Directed Graph among Ingredients with Bundled Edges



Link

A Visualization of the Directed Graphs among Ingredients in Books



[Link](#)