

Learning and using the tidyverse for historical research

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Lans deo 1586 adi 17 decembrio anno vero L hundre

Muyxere Ende grotter w^e gebrude my hertelycken In v. L. goede
tare dese overleden daghien / over hollant hebbe ich v. L. mynen lezen
geezenuen / ende hebbende d. sondicheyt van Een Toechman / huys by
Soont die op enghden waer / hebbe niet come / laeten / & te aduertere
dat ich op gheistere / alsoo coteelo / op de postme was / zyne walle weggen /
ben ich in huys gemalet / En hebbe de kroet met L 2134 / 11 de wech
ghenoert / En zo mede de boeken vanden sterfgyse / En zoock de
boeken van martens Eighen necchie / Ende hebbe de zelue al wein
ich meynden noch meer mede ghezon / te hebbe / dan my gebrue i.
halpe Ende hyt / hebbe niet bouen / & vro / hyt gesadt want hy tunc / jaclot
Ende quamp / En onerbiel my zooc / datty my zonde doekteken zullen /
hadde ich niet geafstortet geworden / want ik en hadde spelle scarp /
En heeft wel 20 maal gestoren dat ik van ghene andere Sante derw
zael als vande zyne / maar zelue is hem verleert / En mullord mayer
geesten doen liessen / En daedoren borghe doen vellen datty my niet
sae misdoen / En meynden my oock niet vageten te slaen / maar hy
moeten / En werdt degelycken ontfauebaer / mi de zaeken zyn wel



Power of coding



Just pick a project

How to draw an owl

1.



2.



1. Draw some circles

2. Draw the rest of the fucking owl



6,000 letters sent to
Daniel van der Meulen
between 1578 and 1600

O'REILLY®

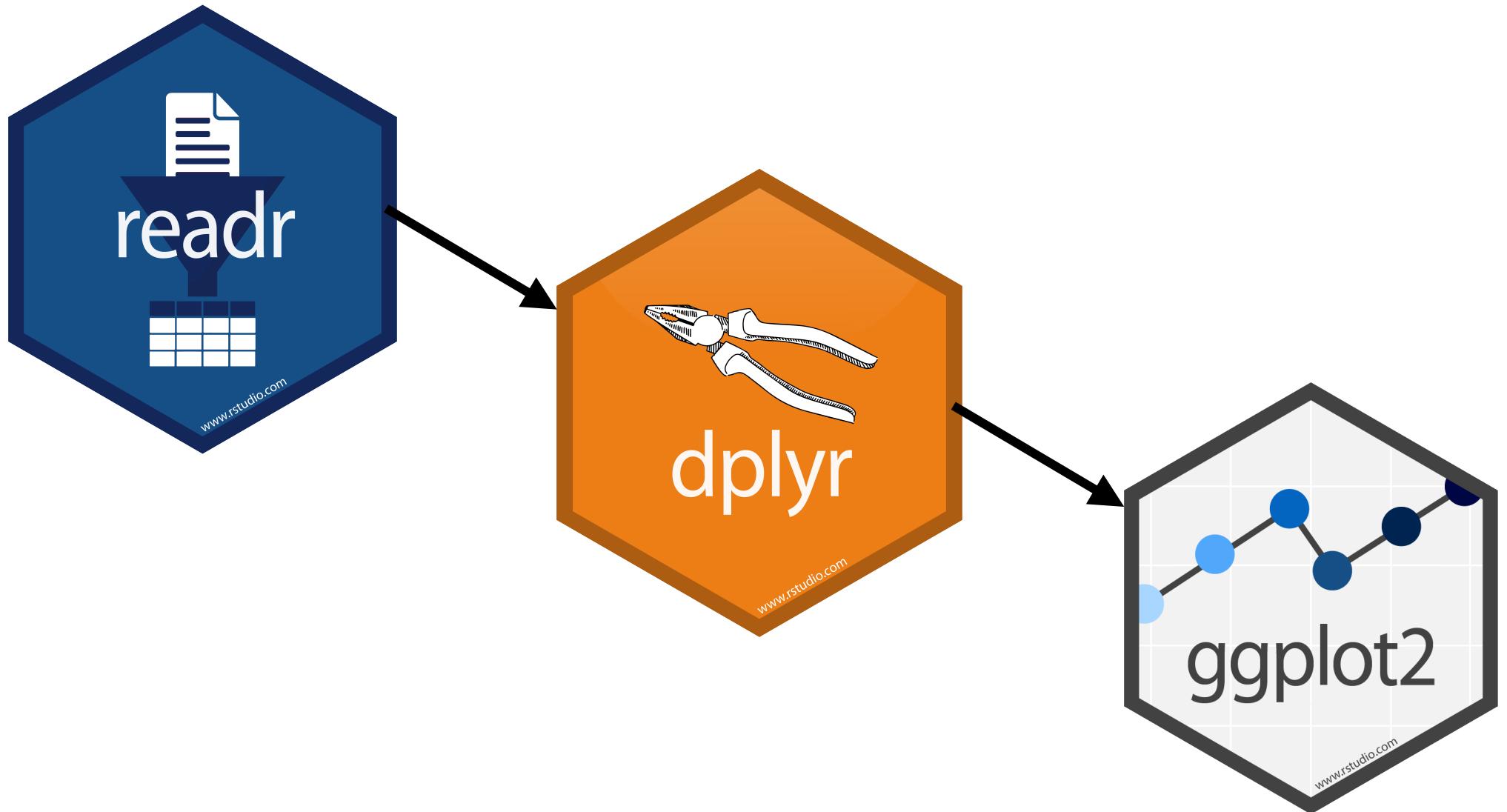


R for Data Science

IMPORT, TIDY, TRANSFORM, VISUALIZE, AND MODEL DATA

Garrett Grolemund
and
Hadley Wickham's
R for Data Science

Hadley Wickham &
Garrett Grolemund





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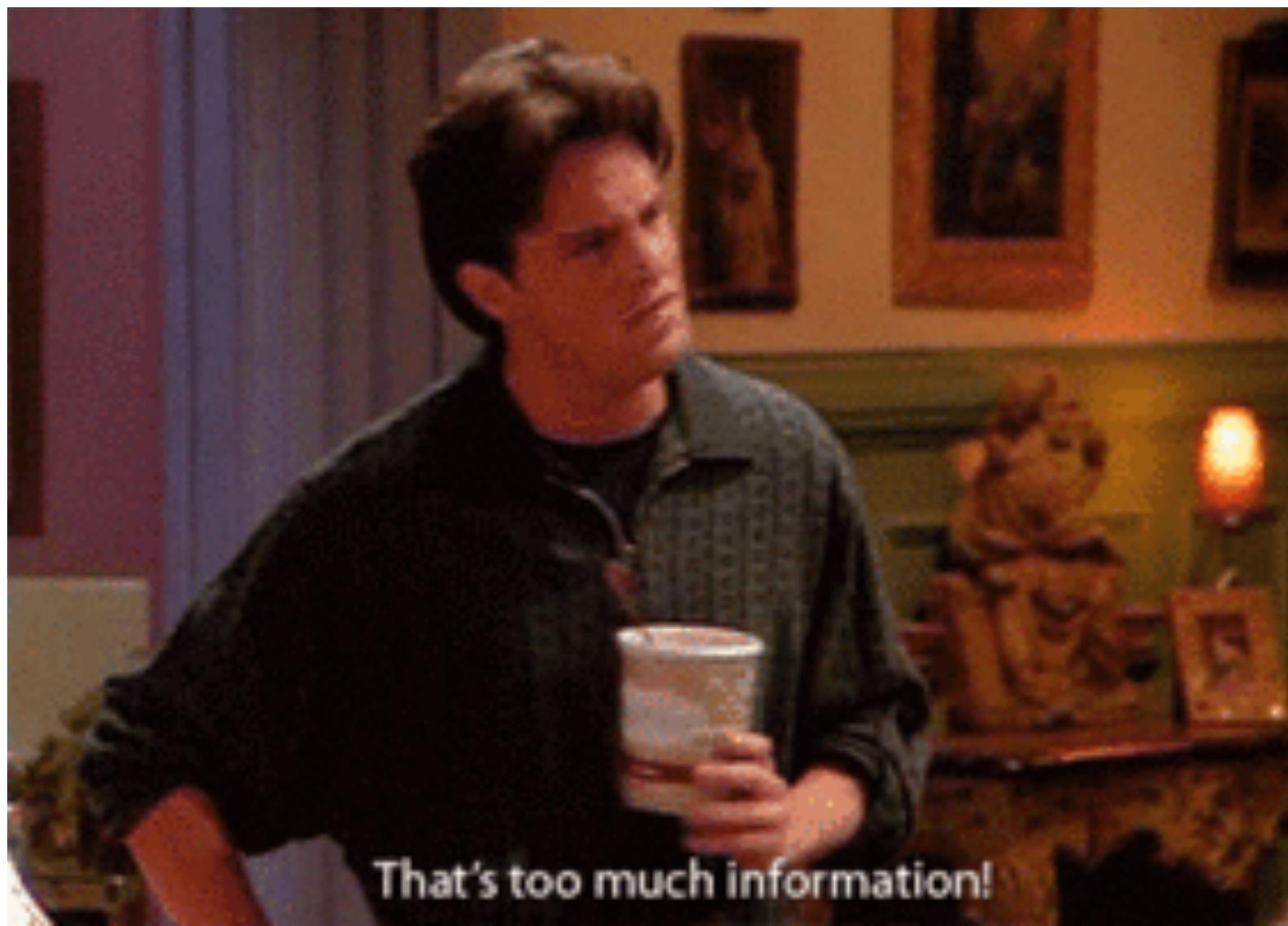
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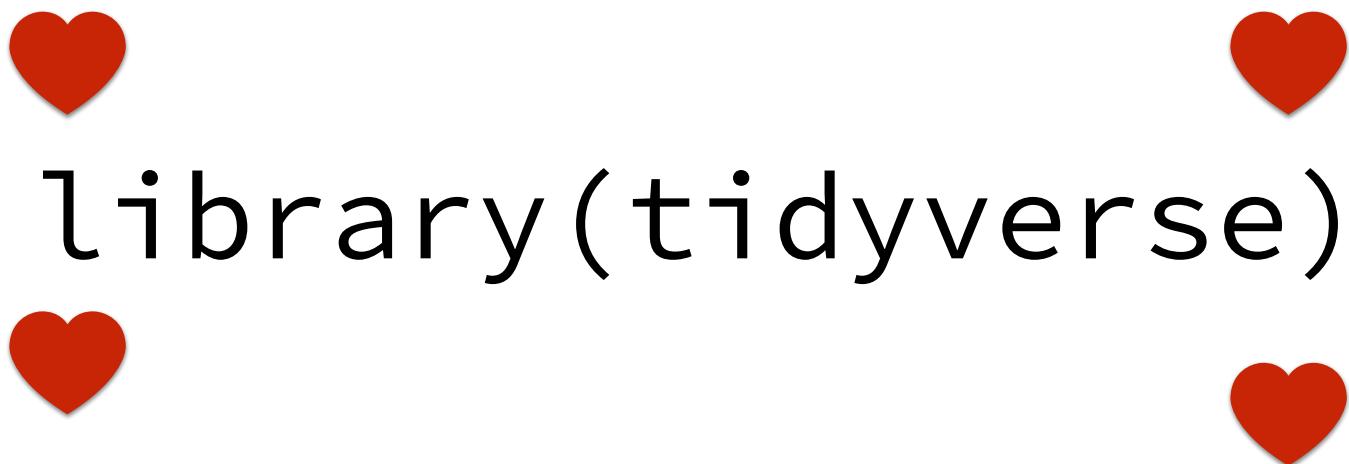
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Available CRAN Packages By Date of Publication

| Date | Package | Title |
|------------|------------------------------|-------------------------------------------------------------------------------|
| 2019-01-18 | cumSeg | Change Point Detection in Genomic Sequences |
| 2019-01-18 | demography | Forecasting Mortality, Fertility, Migration and Population Data |
| 2019-01-18 | diffobj | Diffs for R Objects |
| 2019-01-18 | forecast | Forecasting Functions for Time Series and Linear Models |
| 2019-01-18 | haploR | Query 'HaploReg', 'RegulomeDB', 'LDlink' |
| 2019-01-18 | iotables | Importing and Manipulating Symmetric Input-Output Tables |
| 2019-01-18 | labelled | Manipulating Labelled Data |
| 2019-01-18 | NlcOptim | Solve Nonlinear Optimization with Nonlinear Constraints |
| 2019-01-18 | OpenMx | Extended Structural Equation Modelling |
| 2019-01-18 | palettesForR | GPL Palettes Copied from 'Gimp' and 'Inkscape' |
| 2019-01-18 | ParamHelpers | Helpers for Parameters in Black-Box Optimization, Tuning and Machine Learning |
| 2019-01-18 | QCA | Qualitative Comparative Analysis |
| 2019-01-18 | RKEEL | Using KEEL in R Code |
| 2019-01-18 | Rmosek | The R to MOSEK Optimization Interface |



That's too much information!



library(tidyverse)

Jesse Sadler

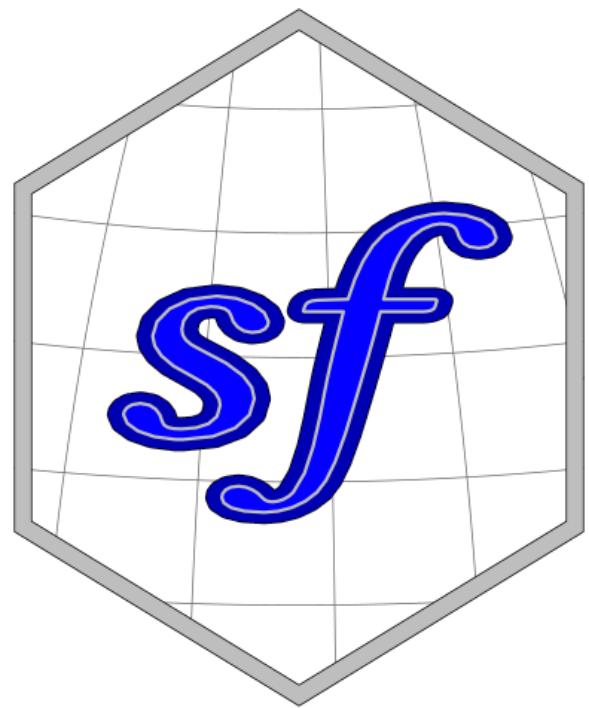
A blog about early modern history and digital humanities

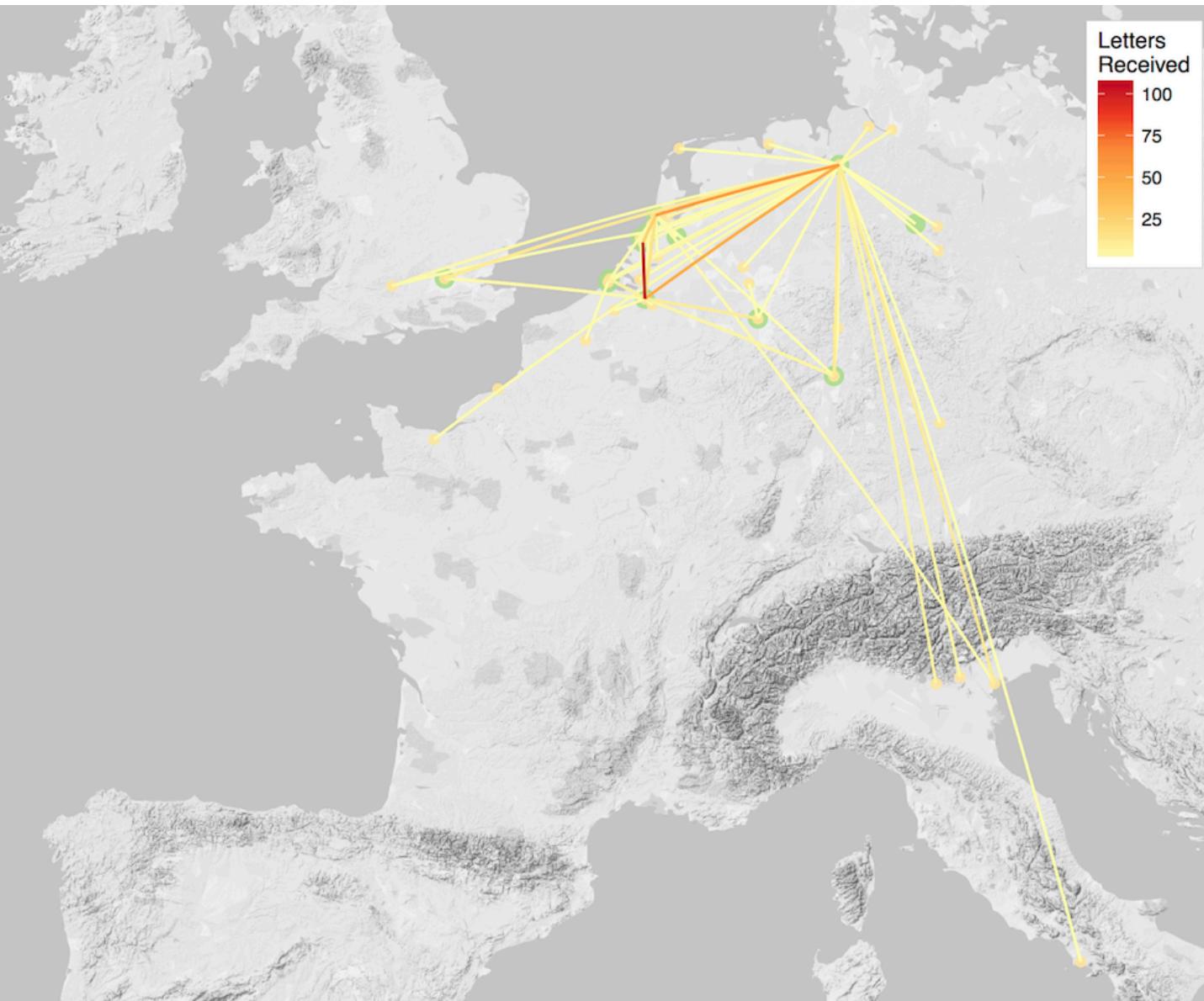
Introducing `debkeepr`

An R package for the analysis of non-decimal currencies

Posted on September 18, 2018

After an extensive period of iteration and a long but rewarding process of learning about package development, I am pleased to announce the release of my first R package. The package is called `debkeepr`, and it derives directly from my historical [research on early modern merchants](#). `debkeepr` provides an interface for working with non-decimal currencies that use the tripartite system of pounds, shillings, and pence that was used throughout Europe in the medieval and early modern periods. The package includes functions to apply arithmetic and financial operations to single or multiple values and to analyze account books that use [double-entry bookkeeping](#) with the latter providing the basis for the name of `debkeepr`. In a later post I plan to write about the package development process, but here I want to discuss the motivation behind the creation of the package and provide some





Letters received by
Daniel van der
Meulen,
1578–1591

[jessesadler.com/project/
dvdm-correspondence/](http://jessesadler.com/project/dvdm-correspondence/)

debkeepr: Analysis of non-decimal currencies

The screenshot shows the top navigation bar of the debkeepr website. It includes a logo, a version badge for '0.0.3.9000', and links for 'Reference', 'Get started', 'Articles ▾', and 'News'. There is also a search icon.

debkeepr: Analysis of Non-Decimal Currencies

`debkeepr` provides an interface for working with non-decimal currencies that use the tripartite system of pounds, shillings, and pence. The package includes functions to apply arithmetic and financial operations to single or multiple values and to analyze account books that use either [single-entry bookkeeping](#) or [double-entry bookkeeping](#) with the latter providing the name for `debkeepr`.

Installation

You can install `debkeepr` from GitHub with `devtools`:

```
# install.packages("devtools")
devtools::install_github("jessesadler/debkeepr")
```

lsd Class

The pounds, shillings, and pence monetary system complicates even relatively simple arithmetic manipulations, as each unit has to be [normalized](#) or converted to the correct base. To unite pounds, shillings, and pence units into a single value and associate the shillings and pence units with non-decimal bases `debkeepr` implements a special class of R object. The `lsd` class consists of a list of one or more numeric vectors of length 3 and a `bases` attribute attached to the list. `debkeepr` provides functions to manipulate objects that can be coerced to class `lsd`, `lsd` objects on their own, or `lsd` list columns in a data frame.

Historical Background

Links

Browse source code at
<https://github.com/jessesadler/debkeepr>

Report a bug at
<https://github.com/jessesadler/debkeepr/issues>

License

[Full license](#)

[MIT + file LICENSE](#)

Developers

Jesse Sadler
Author, maintainer

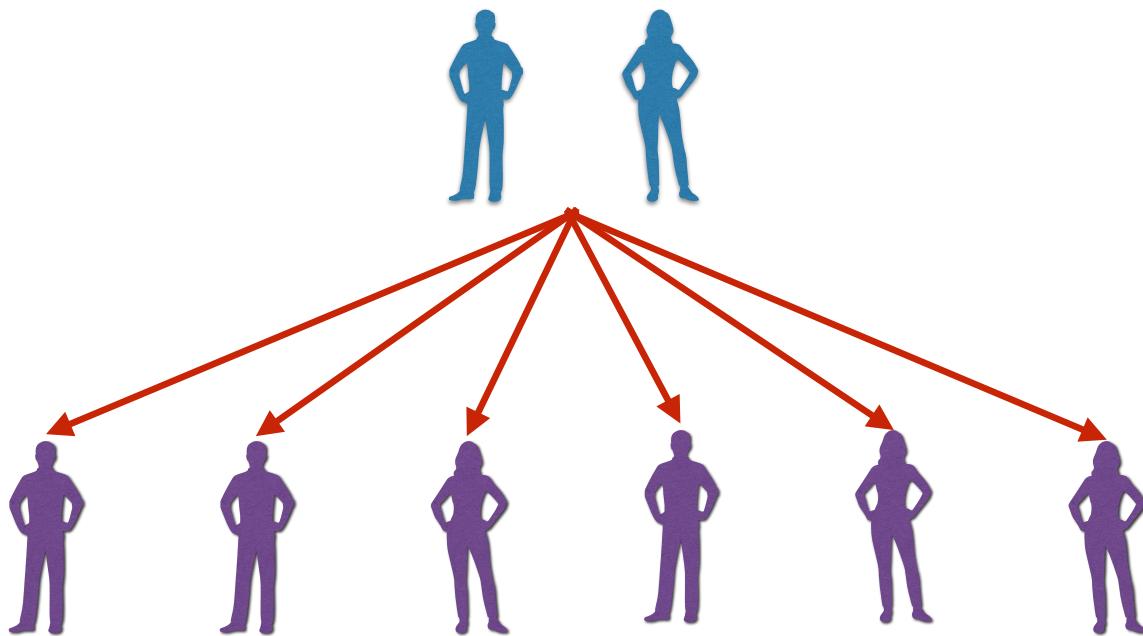
Dev status

build passing
 codecov 100%

jessesadler.github.io/debkeepr



Partible Inheritance



~~+ anno 1585.~~

+ Anno 1585.

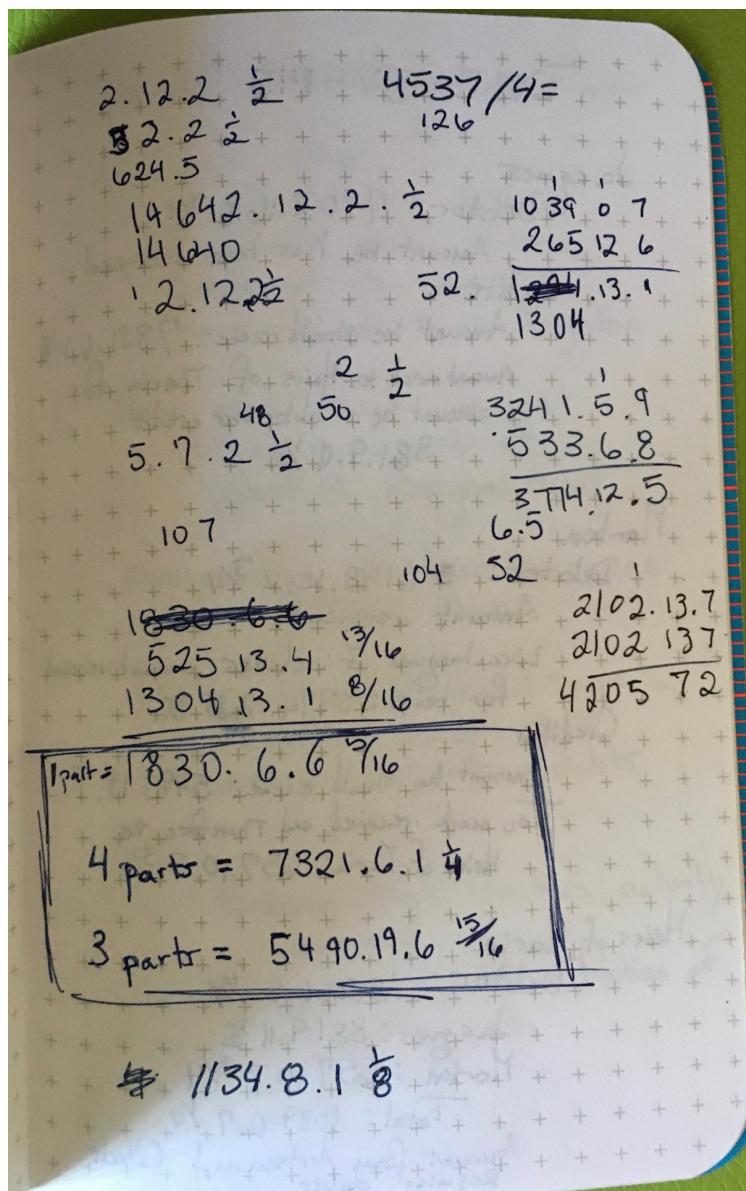
| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|----|
| Jacques de la faille de jonghe. is — rediteur A.D. 15 februarij a. 1585. | 26 | 4 | - |
| C 26. 4. 0. voor oncoste van onse Brugloft voor soet ceestlynaot a 103 daed achterelam monninx. betacet ende 19 p. voor vract van den Coffder met 7. part Rant tonijst hanney. - - - - - | 0 | - | - |
| Ditto 2 6. 0. 0. voor de voors. voor sesijnen acht vijf. Sestier della faille met diuisesse partchardt het vertuut van d'urwach. - - - - - | 0 | - | - |
| Ditto 2 5. 1. 10. voor de voors. voor een siluer scale myndre 11. C. 15. p. adv. toe. 8 offert della faille in october ouer gelaeten. - - - - - | 5 | 1 | 10 |
| Ditto 2 8. 10. 0. voor de voors. voor 4. men wisschen myn voor de bruyer tot d'ort ydlop tonijst met de daten. - - - - - | 20 | 10 | - |
| Ditto 2 4. 7. 0. voor de voors. voor diuers lachten en ransij acht 30. Sestier della faille oock lange ouer gelaeten. - - - - - | 7 | 7 | 0 |
| Ditto 2 3. 5. 4. 7. voor de voors. voor den Rekeninge van oncoste op Brugloft gedaen als breder bydescriu' Kataloou' is behuyden. - - - - - | 369 | 4 | 4 |
| 10 Ditto 2 8. 9. 11. voor de voors. voor den Rekeninge van oncoste tot gesoude van de Brugloft by Jacques hoornet in d'urwach betacet. - - - - - | 05 | 7 | 11 |
| Ditto 2 15. 10. 10. voor de voors. voor soe vele myn della faille voor de rendytuit vant Brugloft welch. int gach ende. Tonijst betacet. - - - - - | 15 | 18 | 10 |
| Ditto 2 2. 18. 6. voor de voors. voor soe vele myn tinnemana voor de bedien deseys ende arbeit betacet. - - - - - | 2 | 18 | 6 |
| Ditto 2 0. 3. 4. voor de voors. voor vract ende licencie van d'urwach annu' alijm toende van sonden. - - - - - | — | 3 | 4 |
| 10 Marti. 2 155. 1. 4. voor tarewe in gouds van Robert hoornet in Sintniclaes voordat ich thoe 235. quartier tarewe gedaen sunt sesij de voors de reyce y daenynet sed des pellux. 2 98. 9. 1. - - - - - | 155 | 1 | 4 |
| Ditto 2 50. 0. 0. voor gesyp in sanden van Jaros. E. sott voordat ich thoe 180. quartier gesyp thoe manjaide van Jamyns gedaen gendaer pellux. - - - - - | 32 | 0 | - |
| Ditto 2 120. 11. 0. voor tarewe in sanden van Jaros voordat ich thoe 160. quartier tarewe gedaen thoe manjaide van Jamyns gedaen gendaer pellux. - - - - - | 70 | 10 | 10 |
| 18 April. 2 9. 10. 0. voor oncoste van sunsoudingrs. voordat sy' Keldry geeft voor diuisesse oncoste voor ons valijft tu sebyg. - - - - - | 120 | 11 | - |
| Ditto 2 2. 9. 3. voor de voors. voor packij van 2 roffet met Tandfat Basung ende anderly by sijn velep. - - - - - | 9 | 10 | 0 |
| 3 May. 2 23. 6. 8. voor Ganta. voor 200. zilveren nobels mit pri loodswich mudijs. - - - - - | 2 | 9 | 3 |

Non-decimal currency

1 pound = 20 shillings
1 shilling = 12 pence

Problems

- Arithmetic calculations are cumbersome



Arithmetic by hand

Handwritten accounting entries:

Profits

| | | |
|----------------|----------------------|------|
| 200 | Piorella (94, 74b) | 7168 |
| | Florette (93, 72b) | 4281 |
| | Naples (66, 43a) | 1314 |
| | Five round (40, 20b) | 782 |
| | Ardassa (84, 868) | 34 |
| | Linen | |
| | Ardassa (87, 69a) | 44 |
| | Linen | |
| | Linen | |

Winnings and Losses

| | |
|-------------|------------|
| Debit | 324.2 |
| | 324.16.0 |
| | 100 |
| | 90.10.0 |
| | 10.16.0 |
| | 39.16.33 |
| | 0.3.1½ |
| | 0.4.5 |
| | 464.13.6 |
| | 682.0.1½ |
| Small Debit | 1713.0 |
| | 22880.15.0 |
| | 3584.17.4 |
| | 28178.12.6 |

Same on Both credit and debit

Small Debits + Business expenses = 5297.17.6

Problems

- Arithmetic calculations are cumbersome
- How to deal with tripartite non-decimal values in a data base

Problems in R

- Three separate units make up one value
- The units have non-decimal bases
- The bases may be different when a value is transferred to another currency

lsd

libra

(pound)

solidus

(shilling)

denarius

(penny)

lsd class

- £10 18s. 4d. = c(10, 18, 4)
- bases attribute: c(20, 12)
- lsd objects are stored as lists

lsd class

```
> deb_as_lsd(lsd = c(10, 18, 4),  
              bases = c(20, 12))  
  
##      l  s  d  
## [1] 10 18  4
```

Input as three variables

```
> transactions  
  
# A tibble: 2,155 x 6  
  
   credit debit date      l      s      d  
   <dbl> <dbl> <date>    <dbl> <dbl> <dbl>  
  
 1     1     1 1582-11-08     0     0     1  
 2     1     4 1582-11-08     0     0     1  
 3     1     5 1582-11-08     0     0     1  
 4     1     6 1582-11-08    17    17     6  
 5     1     7 1582-11-08    10     4     0  
 6     1     8 1582-11-08     0    15     2  
 7     1     9 1582-11-08    16     4    10  
 8     1    10 1582-11-08   11     5     0  
 9     1    11 1582-11-08   62     7     9  
10    1    12 1582-11-08   25     0     0  
  
# ... with 2,145 more rows
```

lsd list column

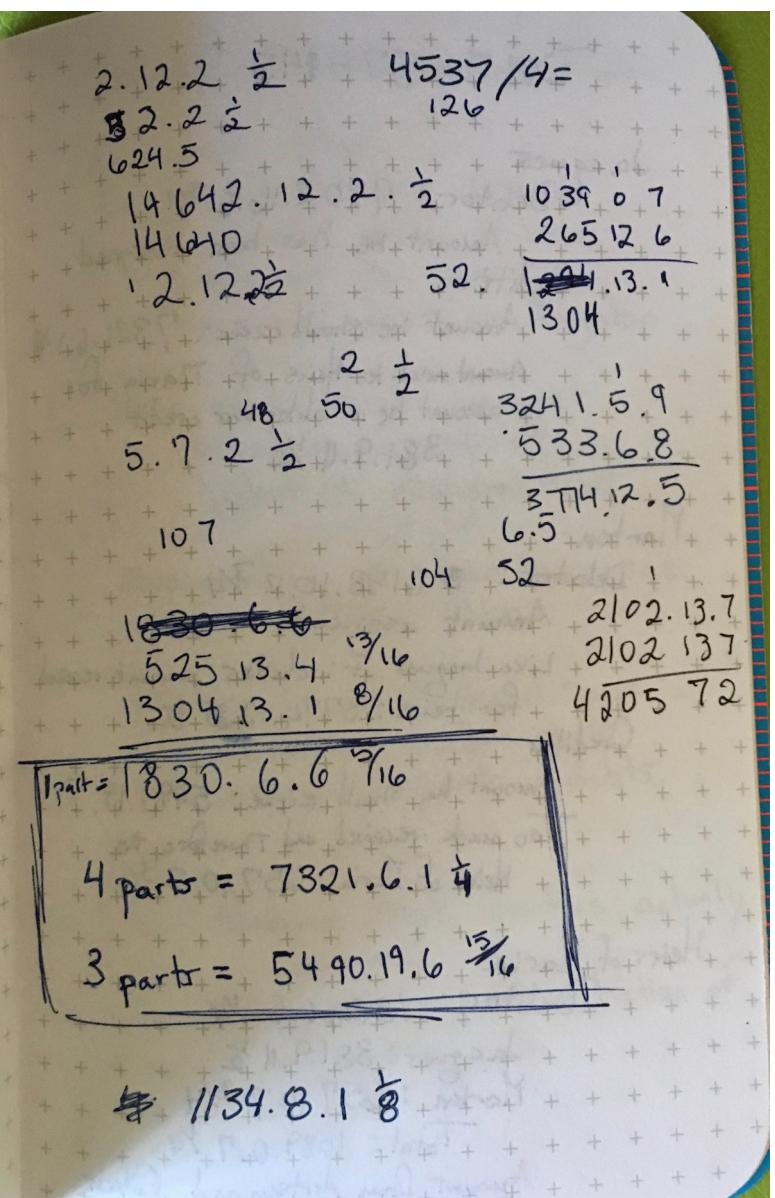
```
> deb_lsd_gather(transactions, replace = TRUE)  
  
# A tibble: 2,155 x 4  
  
   credit debit date      lsd  
   <dbl> <dbl> <date> <s3: lsd>  
  
 1     1     1 1582-11-08 0, 0, 1  
 2     1     4 1582-11-08 0, 0, 1  
 3     1     5 1582-11-08 0, 0, 1  
 4     1     6 1582-11-08 17, 17, 6  
 5     1     7 1582-11-08 10, 4, 0  
 6     1     8 1582-11-08 0, 15, 2  
 7     1     9 1582-11-08 16, 4, 10  
 8     1    10 1582-11-08 11, 5, 0  
 9     1    11 1582-11-08 62, 7, 9  
10    1    12 1582-11-08 25, 0, 0  
  
# ... with 2,145 more rows
```

$2.12.2 \frac{1}{2}$ $4537/4 =$
~~82.2 $\frac{1}{2}$~~
~~624.5~~
 $14642.12.2 \cdot \frac{1}{2}$
 14640
 $12.12 \frac{1}{2}$
 $5.7 \cdot 2 \frac{1}{2}$ $2 \frac{1}{2}$
 107
~~1830.6 $\frac{7}{16}$~~
 $525.13.4 \frac{3}{16}$
 $1304.13.1 \frac{8}{16}$
 $1\text{part} = 1830.6.6 \frac{7}{16}$
 $4\text{ parts} = 7321.6.1 \frac{3}{4}$
 $3\text{ parts} = 5490.19.6 \frac{15}{16}$
~~1134.8.1 $\frac{1}{8}$~~

Normalization

```
> deb_normalize(c(21, 48, 28))
```

```
##      l  s  d
## [1] 23 10  4
```



Addition

```
> deb_sum(c(10, 14, 8),
           c(5, 18, 11),
           c(6, 16, 9))
```

```
##      l  s  d
## [1] 23 10  4
```

Multiplication

RULE II. "If the multiplier be a composite number, whose component parts do not exceed 12, multiply first by one of these parts, then multiply the product by the other. Proceed in the same manner if there be more than two."

Ex. 1st.] L. 15 3 8 by 32 = 8 × 4

$$\frac{8}{\hline}$$

$$\begin{array}{r} \text{L. } 121 \\ \hline 9 & 4 \\ & 4 \end{array} = 8 \text{ times.}$$

$$\begin{array}{r} \text{L. } 485 \\ \hline 17 & 4 \end{array} = 32 \text{ times.}$$

Multiply £15 3s. 8d.
sterling by 32

```
> deb_multiply(c(15, 3, 8),  
               x = 32)
```

```
##           l   s   d
```

```
## [1] 485 17 4
```

RULE I. "When the dividend only consists of different denominations, divide the higher denomination, and reduce the remainder to the next lower, taking in (p. 296. Rule V.) the given number of that denomination, and continue the division."

Examples.

Divide L. 465 : 12 : 8 Divide 345 cwt. 1 q. 8 lb.
by 72. by 22.

$$\begin{array}{r}
 \begin{array}{ll}
 L. & s. d. \\
 72) 465 & 12 \ 8
 \end{array} \quad
 \begin{array}{ll}
 L. & s. d. \\
 22) 345 & 1 \ 8
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{r}
 Cwt. q. lb. \\
 22) 345 & 1 \ 8
 \end{array} \quad
 \begin{array}{r}
 Cwt. q. lb. \\
 15 \ 2 \ 21
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \begin{array}{r}
 432 \\
 \hline
 33 \\
 20 \\
 \hline
 672
 \end{array} \quad
 \begin{array}{r}
 125 \\
 110 \\
 \hline
 15
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \begin{array}{r}
 648 \\
 \hline
 24 \\
 12 \\
 \hline
 296
 \end{array} \quad
 \begin{array}{r}
 4 \\
 22) 61 \\
 44 \\
 \hline
 17
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \begin{array}{r}
 288 \\
 \hline
 8 \text{ Rem.}
 \end{array} \quad
 \begin{array}{r}
 28 \\
 \hline
 144 \\
 34 \\
 \hline
 0
 \end{array}
 \end{array}$$

Or we might divide by 22 the component parts of 72, (as explained under Thirdly, p. 298).

$$\begin{array}{r}
 22) 484 \\
 44 \\
 \hline
 44 \\
 44 \\
 \hline
 0
 \end{array}$$

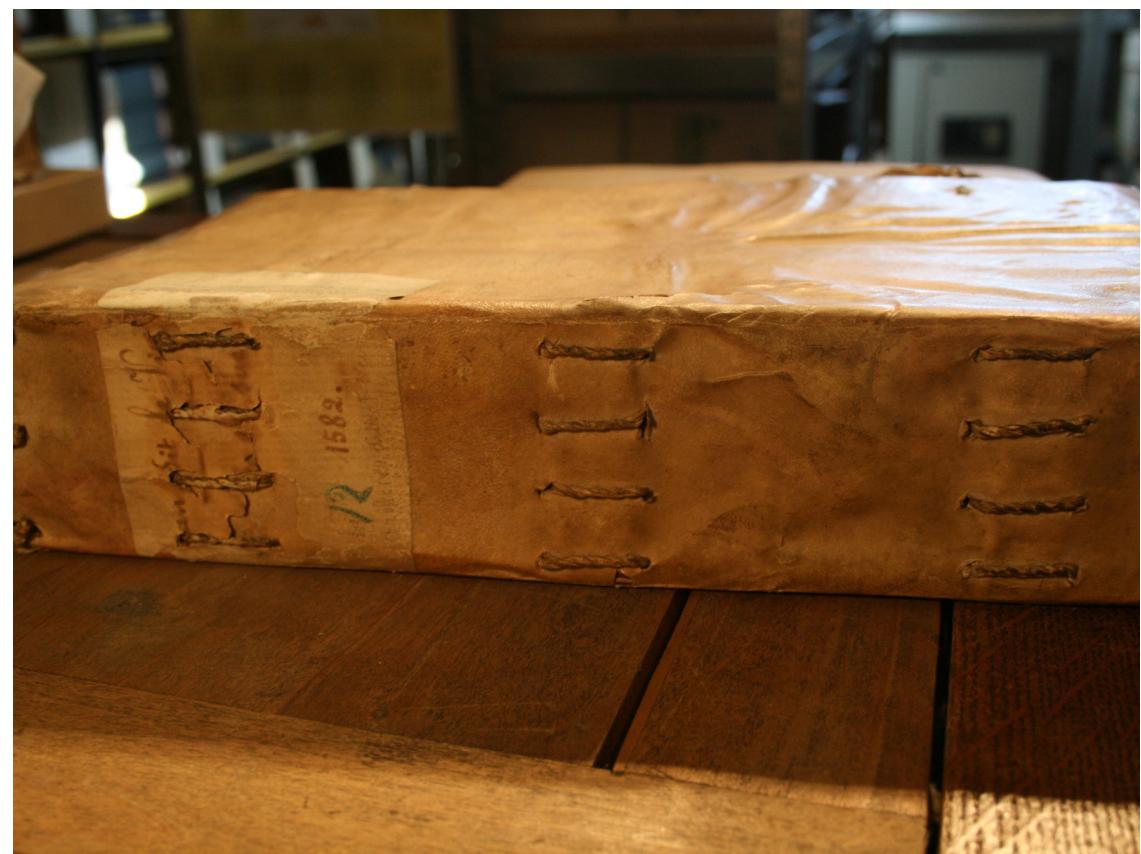
Division

Divide 345cwt. 1q. 8lbs.
by 22

```
> deb_divide(c(345, 1, 8),
  x = 22,
  bases = c(4, 28))
```

```
##      l  s   d
## [1] 15 2 22
```

Jan della Faille de Oude, (c. 1515–1582)



lxxviii vay £ 327: 9: 9: vunt gemaect
 voores pro M. monnaie
 lxixm reene & christalynne spiegelstaer
 fo. voortrediten vay £ 216: 4: 0:
 voores spiegelstaer fo. voores ge
 augmentert wort op 21. october
 1503: ady cassa voores o1 do spiegel
 spiegelstaer voores ge
 vay elchery ende diuersche andere
 cassa gevocht vay Melchior den
 spiegelmaester £ 25: 0: 3:
 doet t'same de soe vay £ 241: 12: 11:
116
 daer tegens de selue spiegel fo.
 wort crediteur staer op 16. novembris
 1503: v. vanagie vay Londen voores
 vercoemge tot Londen vay 44:
 doysind spiegel fo. crediteur hebbet
 £ 33: 7: 10: reclame a 31 decemb'r
voores £ 51: 15: 3:
 Maer gemaect & voore £ 51: 15: 3:

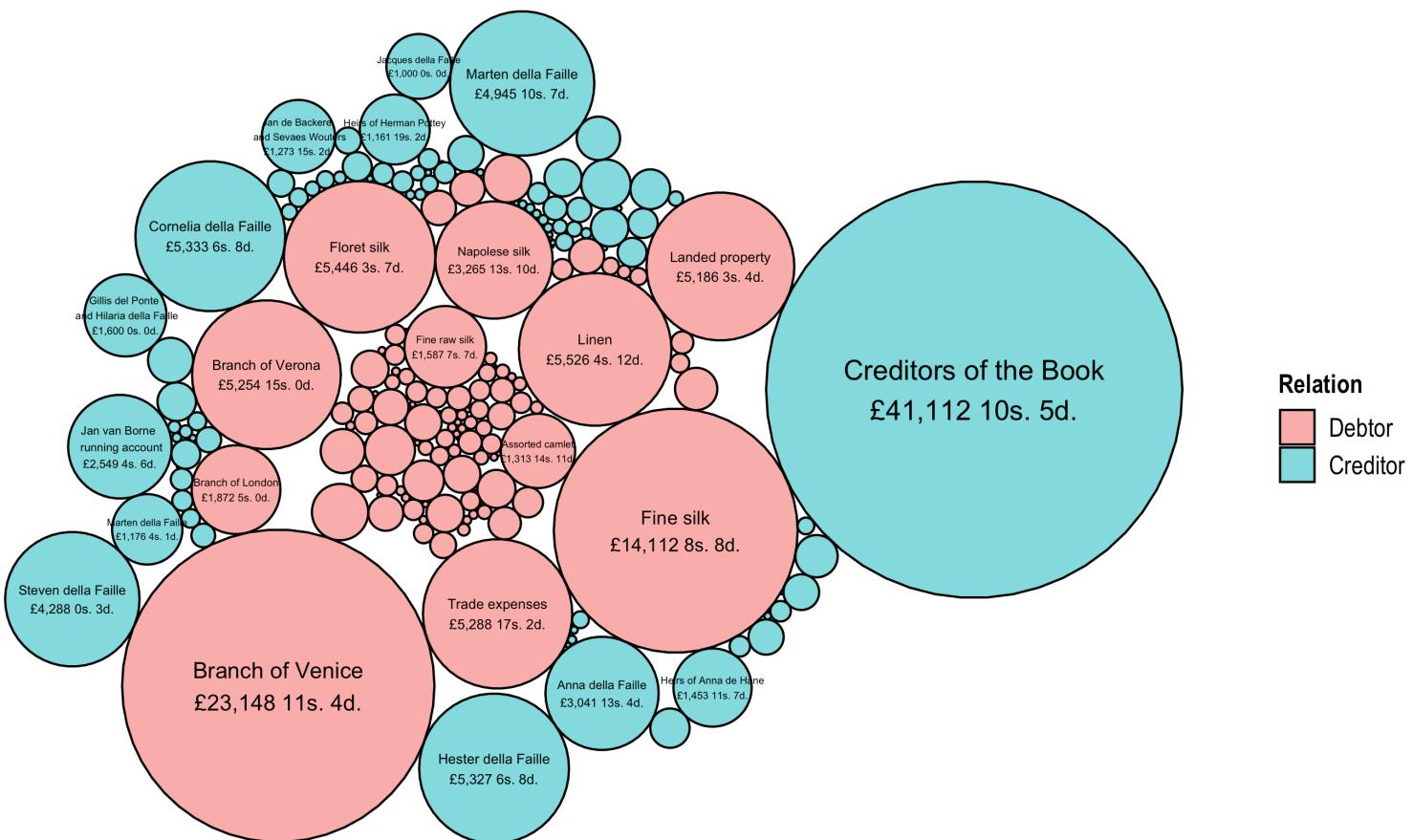
Accounts of the estate of Jan della Faille de Oude

- Date: 8 November 1582 to 31 December 1594

- 2,155 transactions
- 480 accounts

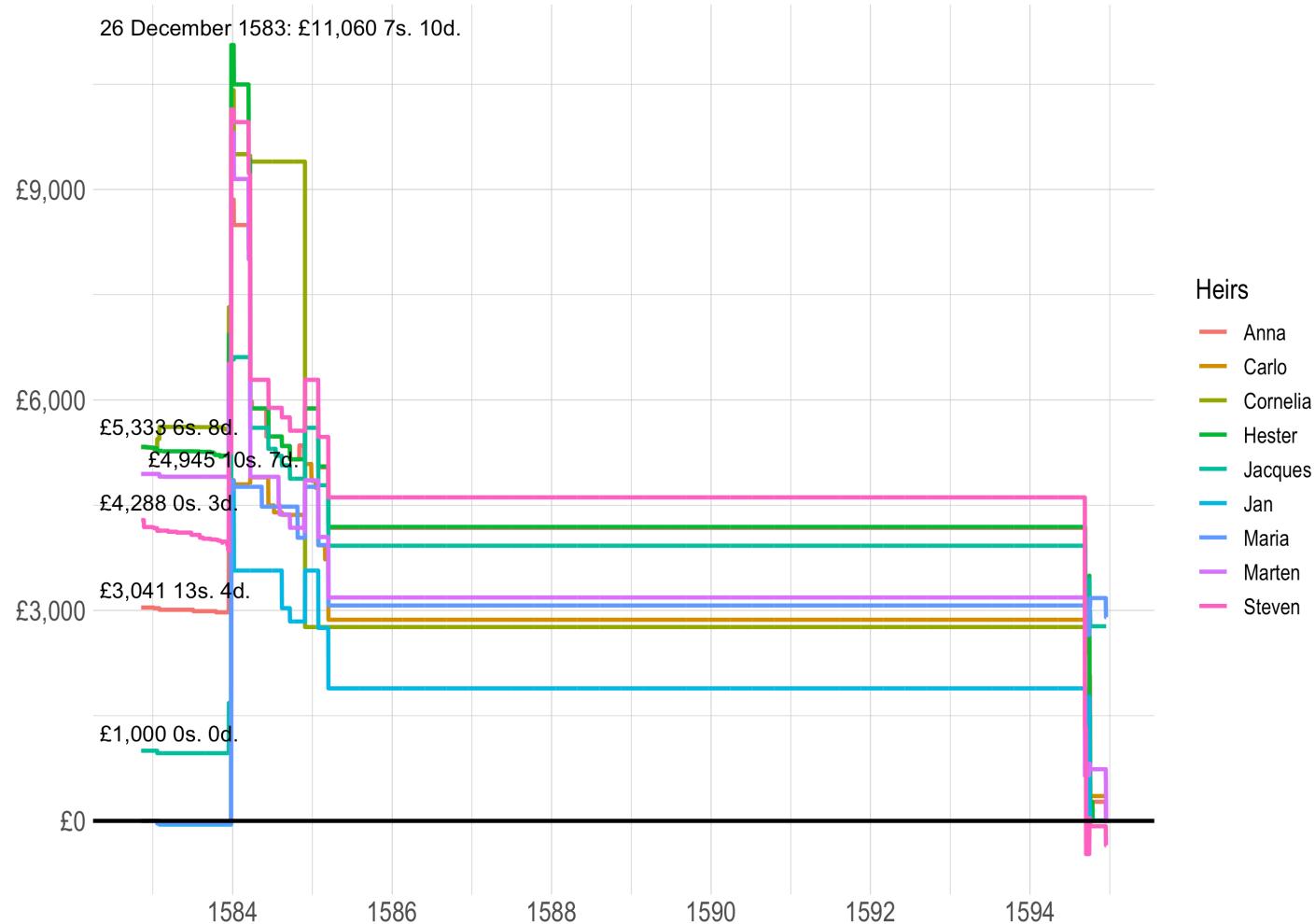
Value of accounts in the estate of Jan della Faille de Oude, 8 December 1582

Opening value of the estate: £82,813 5s. 8d.



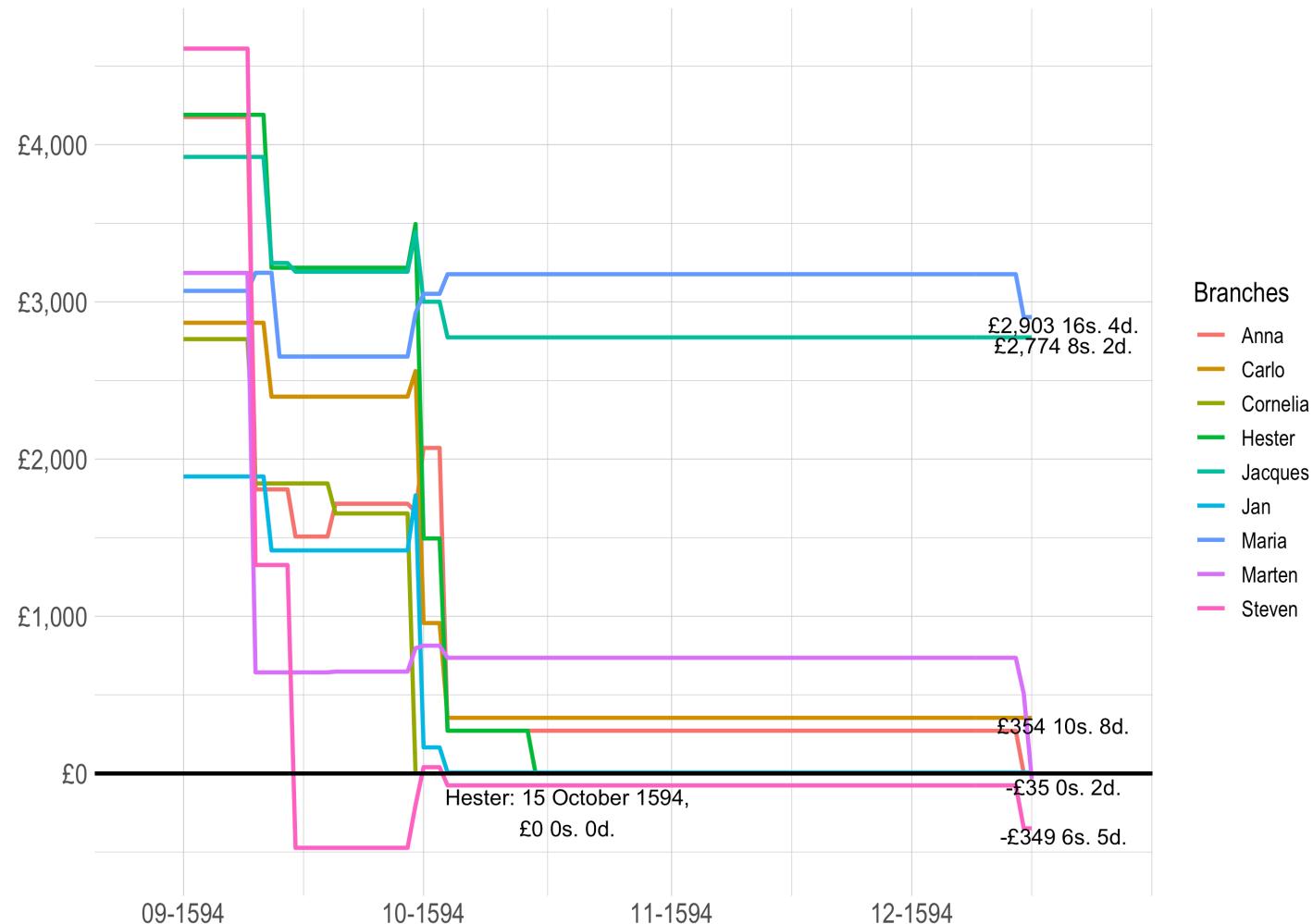
Inheritance due to the heirs of Jan de Oude

Estate of Jan della Faille de Oude, 1582–1594

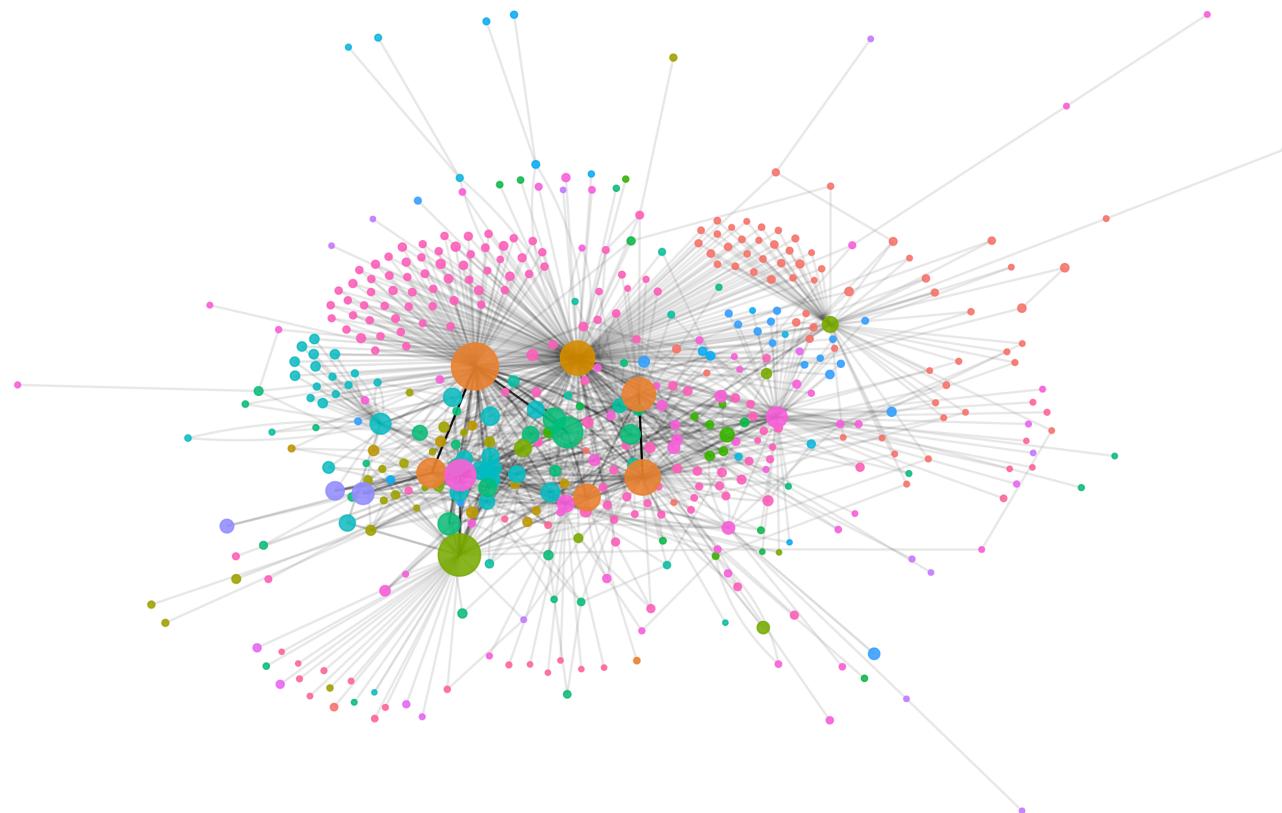


Inheritance due to the heirs of Jan de Oude

September 1594 to 16 December 1594



Estate of Jan della Faille de Oude, 1582–1594

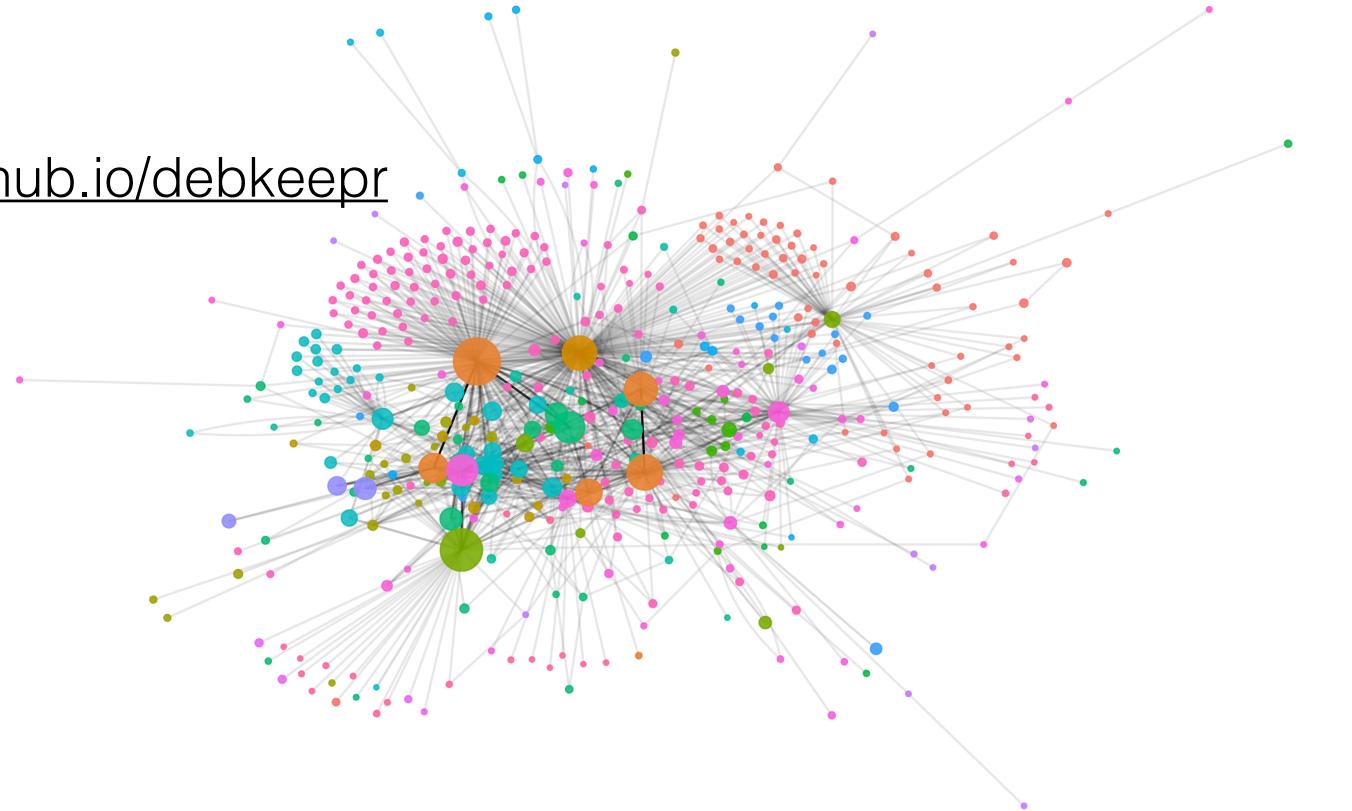


Account types

- | | | | | | | | | | |
|---------------|----------|---------|-----------|----------------------|-----------------|-------------|-----------|----------|---------------|
| ● Bequest | ● Branch | ● Cassa | ● Company | ● Erffgoed | ● Estate | ● Factor | ● Giovane | ● Goods | ● Heir |
| ● Inheritance | ● Kin | ● Law | ● Loan | ● London Inheritance | ● Miscellaneous | ● Political | ● Trade | ● Wissel | ● Written off |

Estate of Jan della Faille de Oude, 1582–1594

debkeepr
jessesadler.github.io/debkeepr

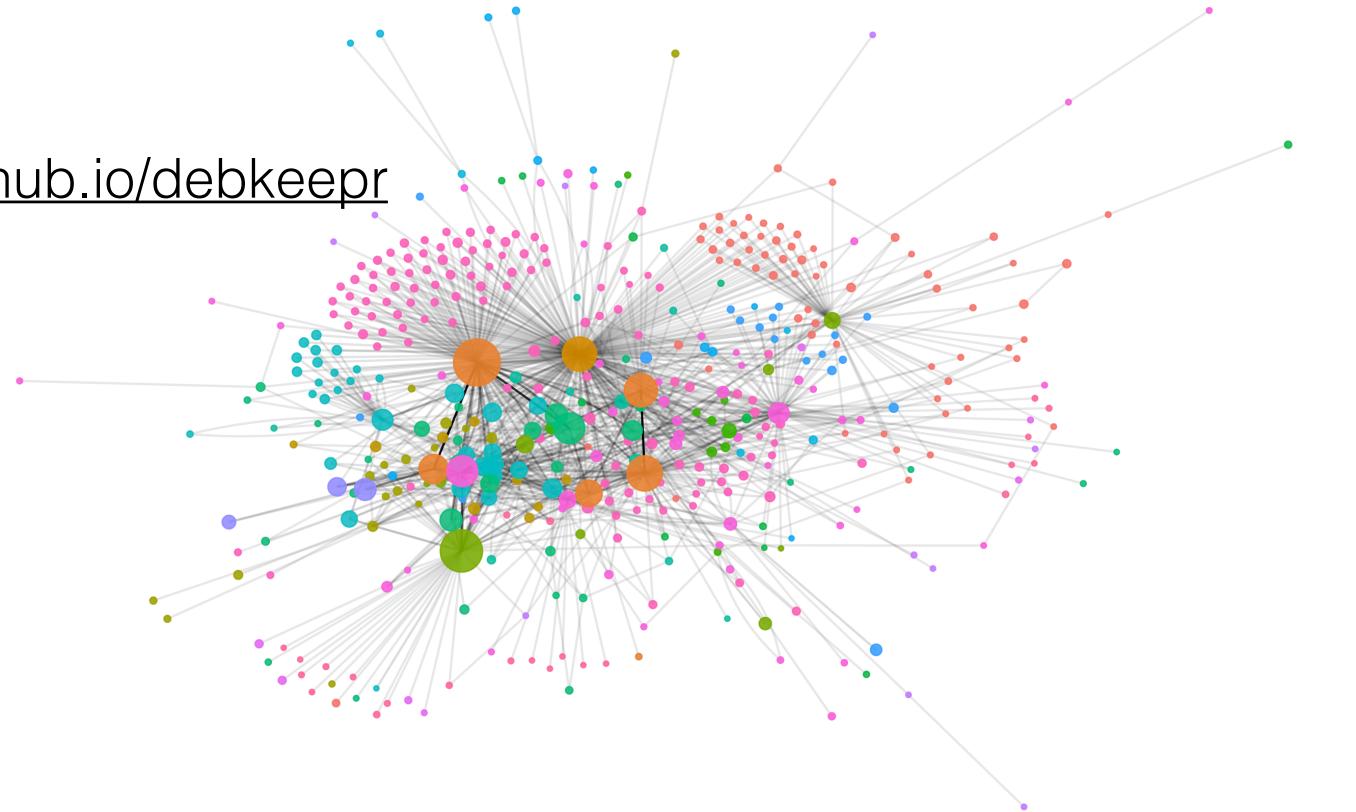


Account types

- Bequest Branch Cassa Company Erffgoed Estate Factor Giovane Goods Heir
Inheritance Kin Law Loan London Inheritance Miscellaneous Political Trade Wissel Written off

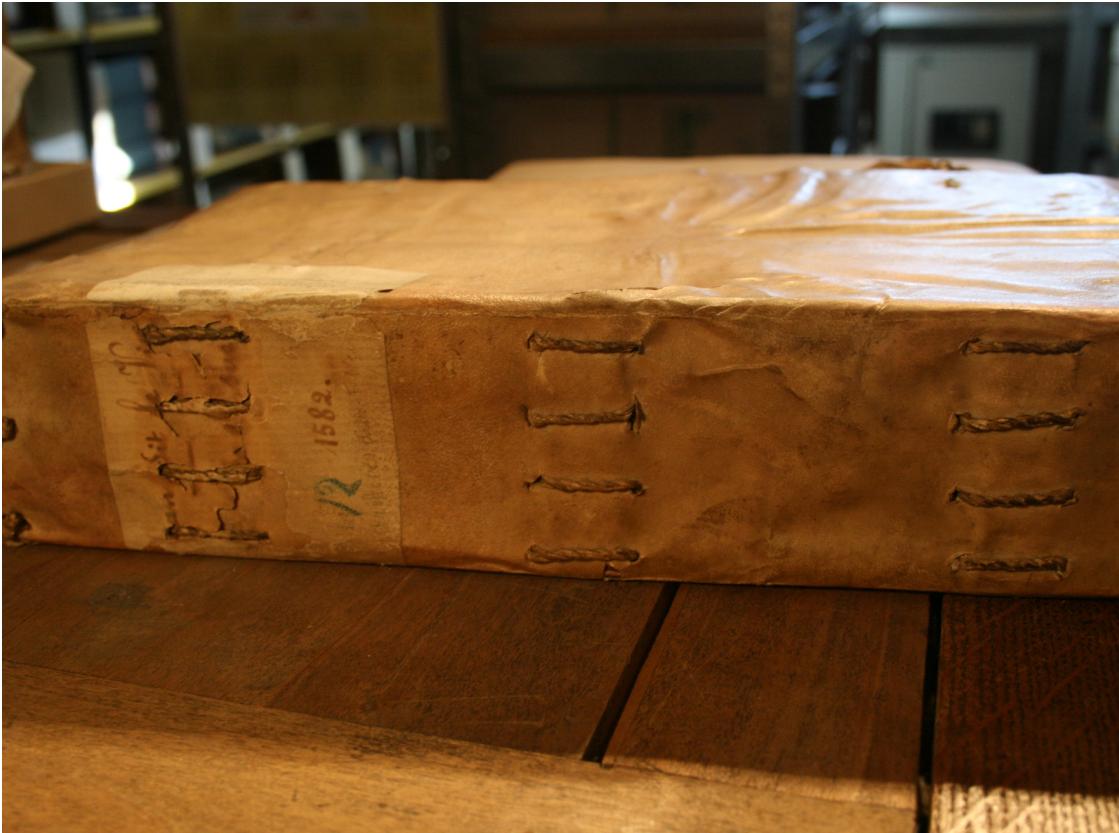
Estate of Jan della Faille de Oude, 1582–1594

debkeepr
jessesadler.github.io/debkeepr



Account types

- Bequest Branch Cassa Company Erffgoed Estate Factor Giovane Goods Heir
Inheritance Kin Law Loan London Inheritance Miscellaneous Political Trade Wissel Written off



Thank you

Jesse Sadler

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jessesadler.com
github.com/jessesadler