

Tenary Plot

Mirco Brunner

Introduction

All data and some Text are from (Baxter and Cool 2016) <http://www.barbicanra.co.uk/simple-r.html>.

Histograms are one of the most familiar methods for presenting continuous data. For illustration unpublished data from Cool (1983) will be used. They are the lengths (mm) of 90 copper alloy hairpins from southern Britain, 55 classified as early and 35 as late on archaeological grounds (see Cool, 1990, for a review of the use of such hairpins). The data are given in Table 4.1.

```
#load libraries
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.5.2
```

show data table 1

```
#show data
pins <- read.csv("data_pins/pins.csv")
print(pins)
```

##	Length	Date
## 1	51	Late
## 2	52	Late
## 3	54	Late
## 4	56	Late
## 5	57	Late
## 6	58	Late
## 7	60	Late
## 8	60	Late
## 9	61	Late
## 10	62	Late
## 11	62	Late
## 12	63	Late
## 13	63	Late
## 14	63	Late
## 15	65	Late
## 16	65	Late
## 17	66	Late
## 18	67	Late
## 19	68	Late
## 20	68	Late
## 21	70	Late
## 22	70	Late
## 23	70	Late
## 24	70	Late
## 25	71	Late
## 26	74	Late
## 27	75	Late
## 28	77	Late

## 29	78	Late
## 30	78	Late
## 31	80	Late
## 32	80	Late
## 33	82	Late
## 34	82	Late
## 35	87	Late
## 36	54	Early
## 37	56	Early
## 38	74	Early
## 39	84	Early
## 40	85	Early
## 41	85	Early
## 42	87	Early
## 43	88	Early
## 44	89	Early
## 45	90	Early
## 46	90	Early
## 47	92	Early
## 48	92	Early
## 49	92	Early
## 50	92	Early
## 51	93	Early
## 52	93	Early
## 53	93	Early
## 54	93	Early
## 55	93	Early
## 56	94	Early
## 57	94	Early
## 58	94	Early
## 59	95	Early
## 60	95	Early
## 61	95	Early
## 62	96	Early
## 63	96	Early
## 64	97	Early
## 65	97	Early
## 66	97	Early
## 67	98	Early
## 68	98	Early
## 69	100	Early
## 70	100	Early
## 71	100	Early
## 72	100	Early
## 73	101	Early
## 74	102	Early
## 75	103	Early
## 76	104	Early
## 77	104	Early
## 78	104	Early
## 79	104	Early
## 80	105	Early
## 81	107	Early
## 82	108	Early

```
## 83    108 Early
## 84    111 Early
## 85    115 Early
## 86    115 Early
## 87    116 Early
## 88    123 Early
## 89    128 Early
```

Tab. 1: Pins

Figure 1a – Based on Table 1 (pins)

```
Length <- pins$Length
hist(Length)
```

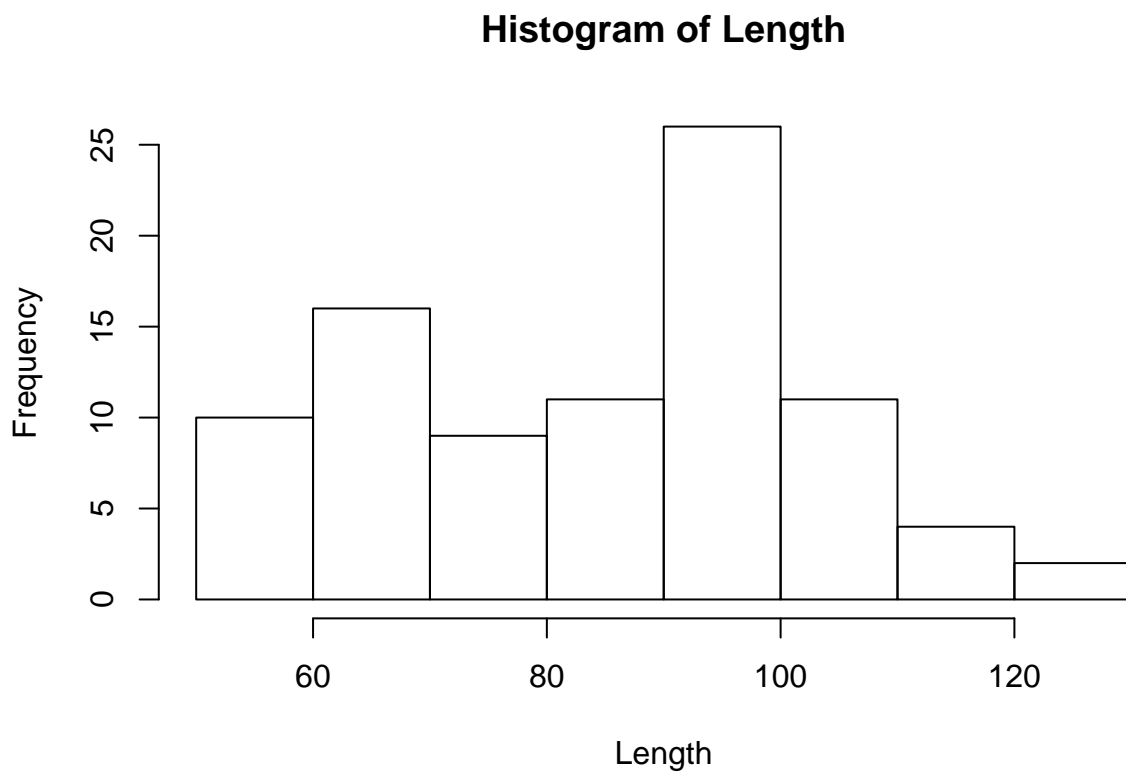


Fig. 1a:

Figure 1b – Based on Table 1 (pins)

```
Length <- pins$Length
hist(Length, breaks = 20, main = " ", col = "skyblue",
xlab = "Romano-British hairpin lengths (mm)",
cex.main = 1.4, cex.lab = 1.3, cex.axis = 1.2)
```

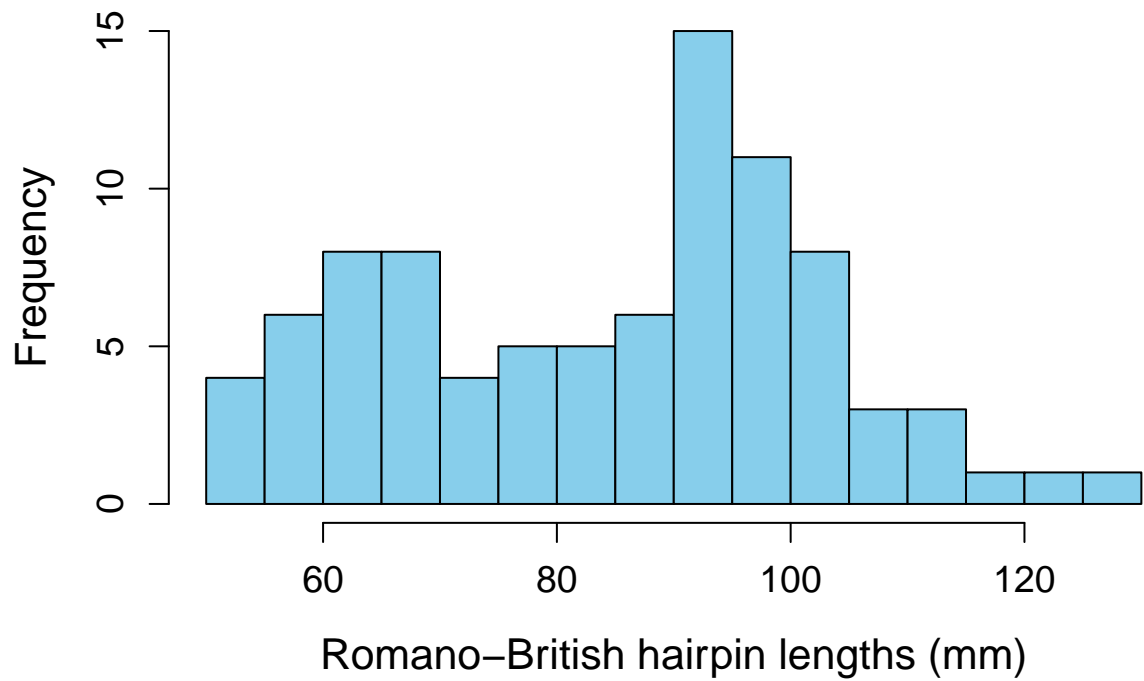


Fig. 1b:

Figure 2a – Based on Table 1 (pins)

```
Length <- pins$Length
hist(Length, breaks = 30, main = " ", col = "grey80",
xlab = "Romano-British hairpin lengths (mm)",
cex.main = 1.4, cex.lab = 1.3, cex.axis = 1.2)
```

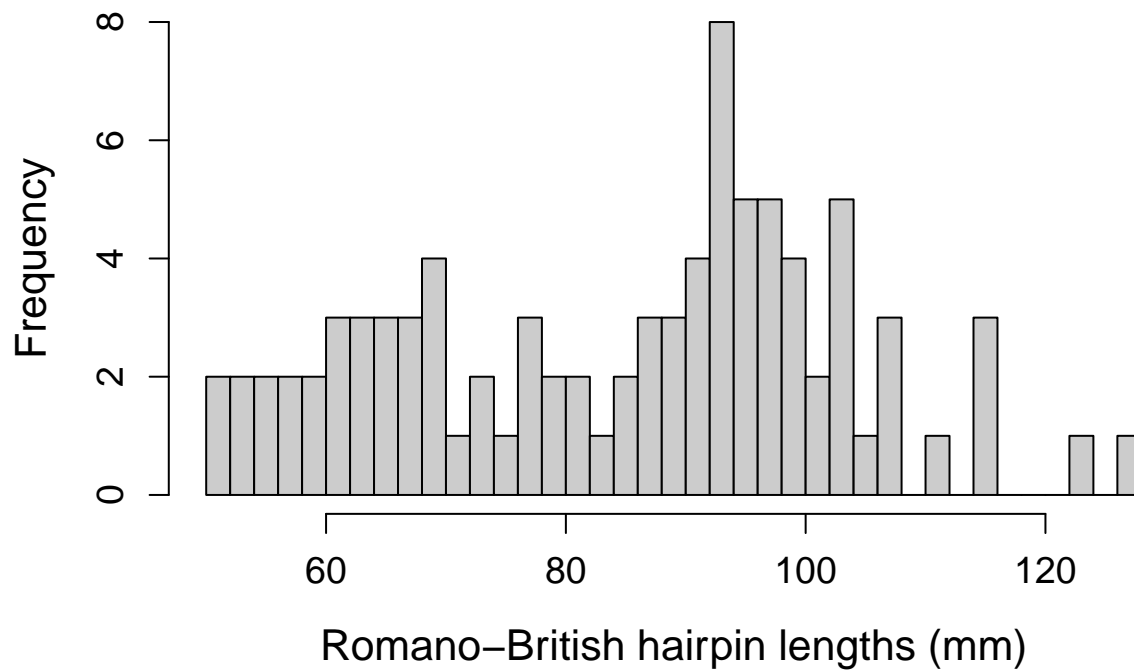


Figure 2b – Based on Table 1 (pins)

```
Length <- pins$Length
hist(Length, breaks = 20, freq = FALSE, main = " ",
border = "skyblue", col = "skyblue",
xlab = "Romano-British hairpin lengths (mm)",
cex.main = 1.4, cex.lab = 1.3, cex.axis = 1.2)
lines(density(Length, bw = 4), lwd = 2, col = "red")
```

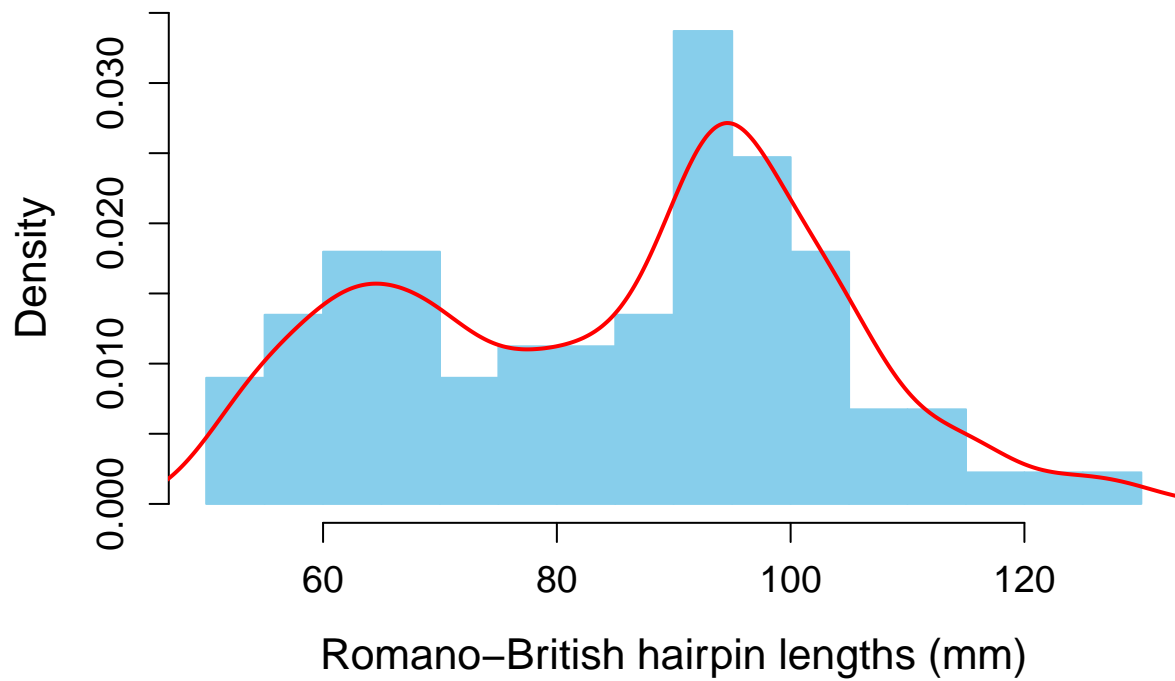
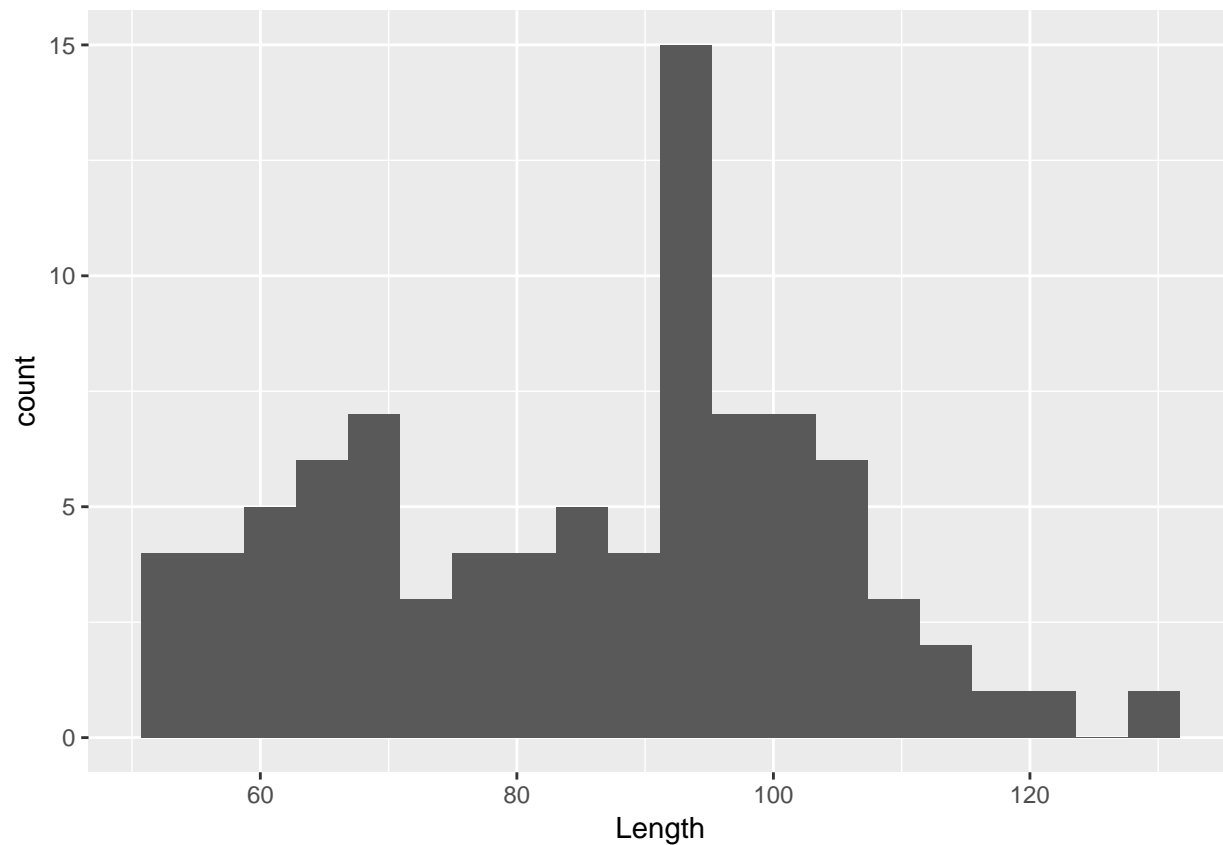


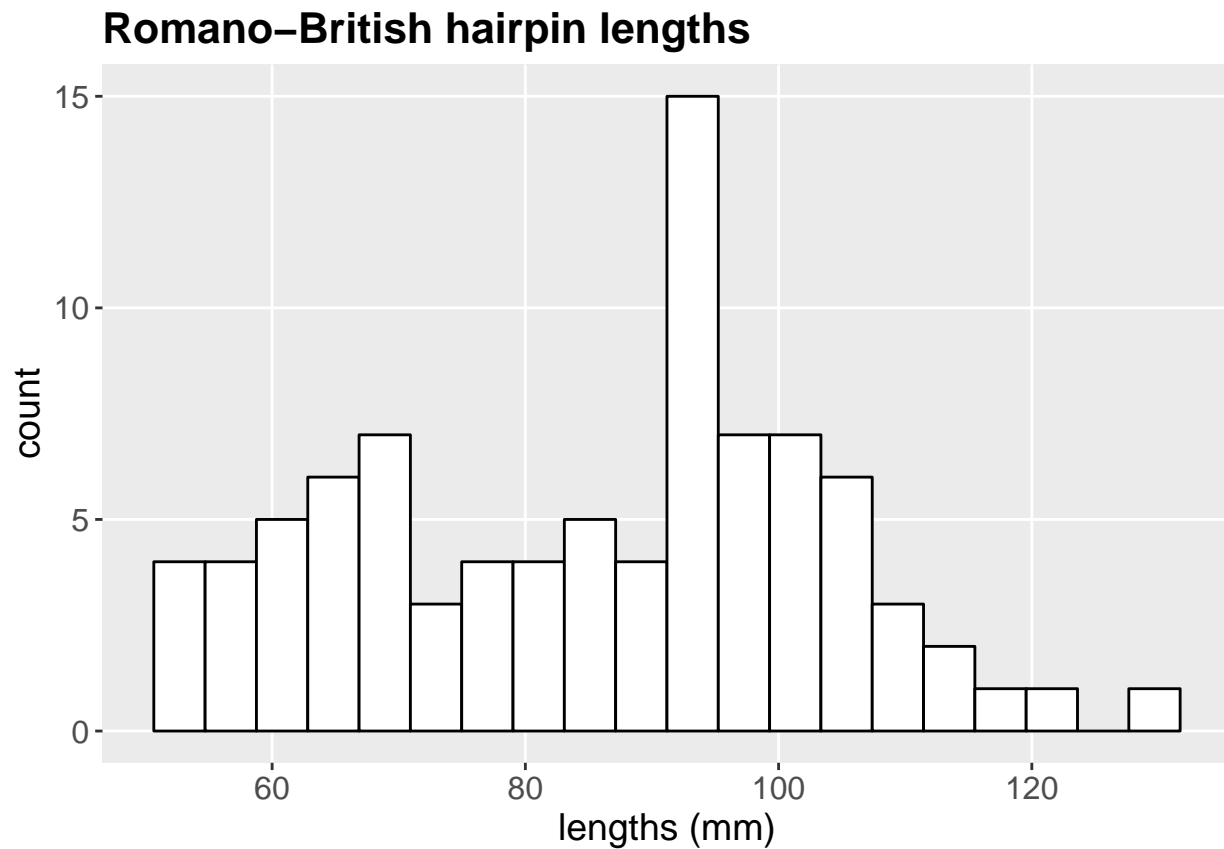
Figure 3a – Based on Table 1 (pins)

```
library(ggplot2); library(grid)
ggplot(data = pins, aes(x = Length)) + geom_histogram(bins = 20)
```



```
fig3b <- function() {
  library(ggplot2); library(grid)
  ggplot(data = pins, aes(x = Length)) +
  geom_histogram(bins = 20, fill = "white", colour = "black") +
  # remove minor grid lines
  # The # symbol comments out what follow it
  theme(panel.grid.minor = element_blank()) +
  # add labels, title etc. and control their appearance
  xlab("lengths (mm)") + ggtitle("Romano-British hairpin lengths") +
  theme(axis.text=element_text(size=12),
  axis.title=element_text(size=14)) +
  theme(plot.title = element_text(size = 16, face="bold"))
}

fig3b()
```

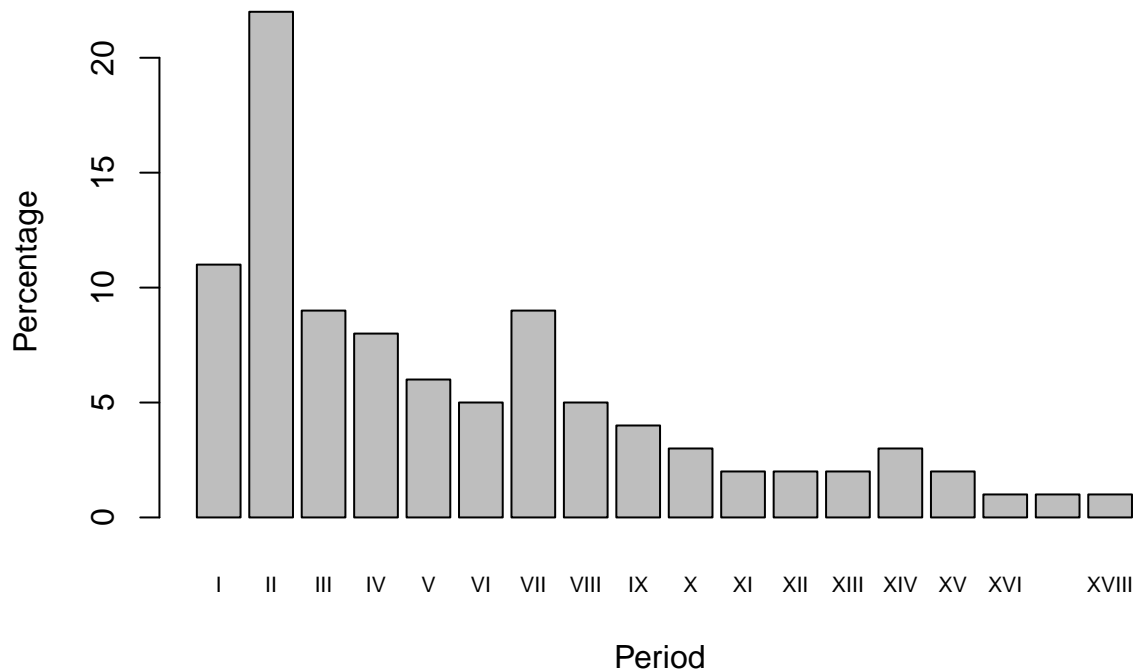


show data table 2

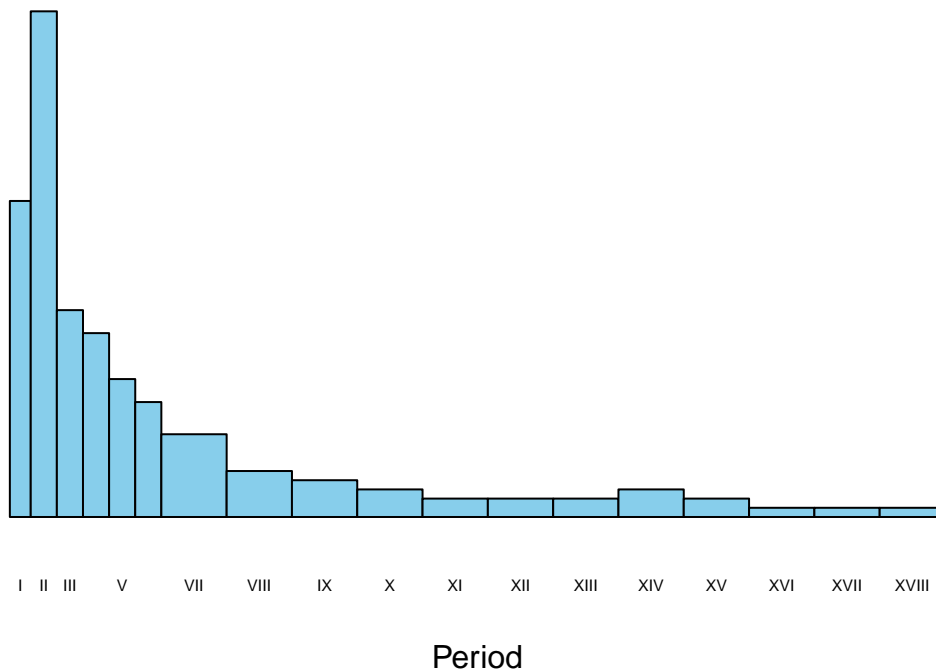
```
#show data
pillar <- read.csv("data_pillar/pillar.csv")
print(pillar)
```

##	Period	Date	Width	Midpoint	Percentage
## 1	I	45-50	8	46	11
## 2	II	51-60	10	55	22
## 3	III	61-70	10	65	9
## 4	IV	71-80	10	75	8
## 5	V	81-90	10	85	6
## 6	VI	91-100	10	95	5
## 7	VII	101-125	25	112	9
## 8	VIII	126-150	25	137	5
## 9	IX	151-175	25	162	4
## 10	X	176-200	25	187	3
## 11	XI	201-225	25	212	2
## 12	XII	226-250	25	237	2
## 13	XIII	251-275	25	262	2
## 14	XIV	276-300	25	287	3
## 15	XV	301-325	25	312	2
## 16	XVI	326-350	25	337	1
## 17	XVII	351-375	25	362	1
## 18	XVIII	376-400	25	387	1


```
Percentage <- pillar$Percentage; Period <- pillar$Period
barplot(Percentage, names.arg = Period, xlab = "Period ",
        ylab = "Percentage ", cex.names = 0.7)
```



```
percentage <- pillar$Percentage; Period <- pillar$Period
Width <- pillar$Width
barplot(Percentage/Width, space = 0, width = Width, col = "skyblue",
        names.arg = Period, xlab = "Period", axes = F, cex.names = 0.5)
```

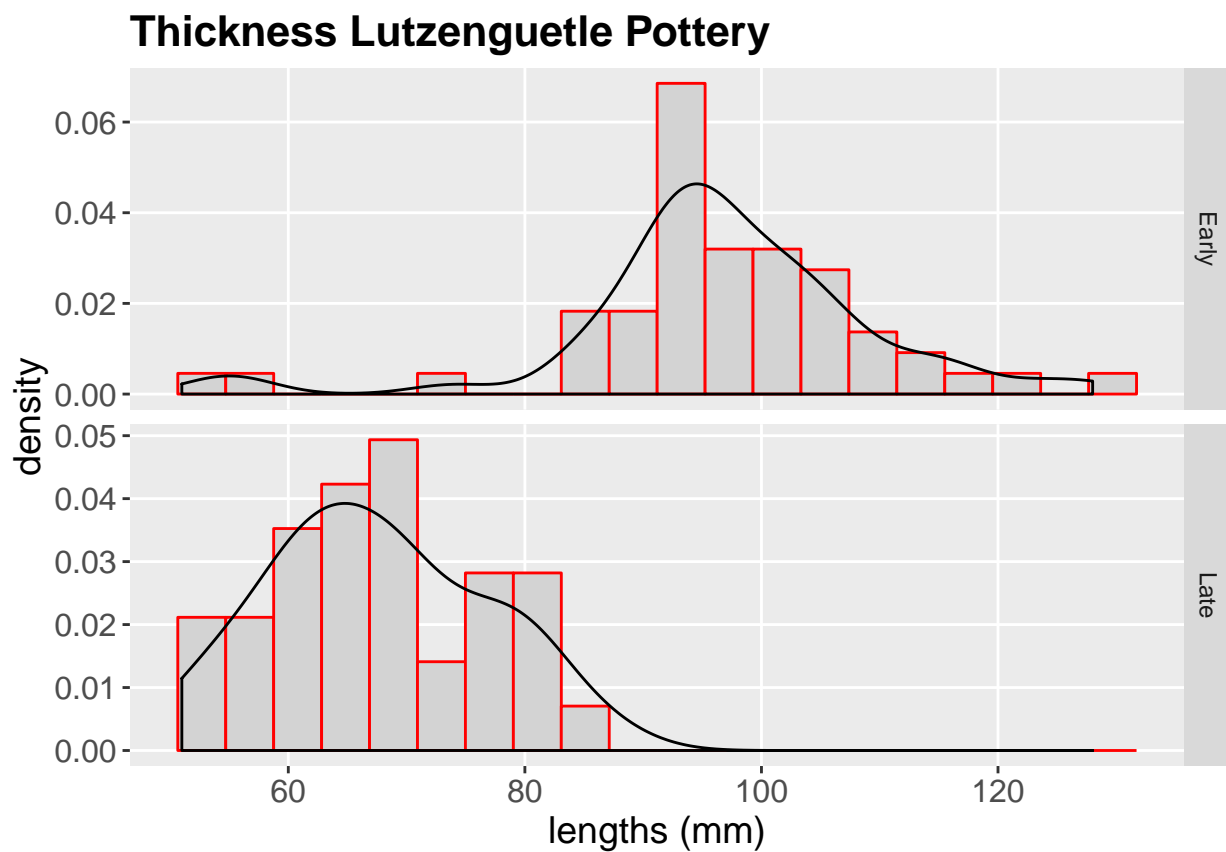


```
fig4.7 <- function() {
  library(ggplot2); library(grid)
```

```
p <- ggplot(data = pins, aes(x = Length)) +
  geom_histogram(aes(y=..density..), bins = 20, fill = "light gray", colour = "red") +
  geom_density() +
  facet_grid(Date ~ ., scales = "free_y") + # make y axes independent for all grid elements
  theme(panel.grid.minor = element_blank()) +
  xlab("lengths (mm)") + ggtitle("Thickness Lutzenguetle Pottery") +
  theme(axis.text=element_text(size=12),
        axis.title=element_text(size=14)) +
  theme(plot.title = element_text(size = 16, face="bold"))

p
}

fig4.7()
```



References

Baxter, Mike, and Hilary Cool. 2016. *Basic Statistical Graphics for Archaeology with R: Life Beyond Excel*. Nottingham: Barbican Research Associates Nottingham.