Australian National University

FloRence Nightingale

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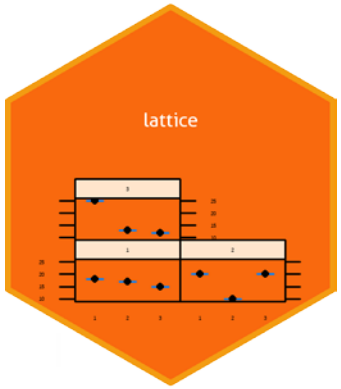
A little bit about me ...

- Splus user since 1990

- R user since ~ 2001

- Favourite R package



- Favourite member of the nightshade family

- 20th anniversary of R1.0.0

- 200th anniversary of Florence Nightingale

TABLE SHOWING the ESTIMATED AVERAGE MONTHLY STRENGTH of the ARMY; and the Deaths and Annual Rate of Mortality per 1,000, in each Month, from April, 1854, to March, 1856, (inclusive), in the Hospitals of the Army in the East.

Months	Estimated Average Monthly Strength of the Army.	Deaths.			Annual Rate of Mortality per 1,000.		
		Zymotic Diseases.	Wounds and Injuries.	All other Causes.	Zymotic Diseases.	Wounds and Injuries.	All other Causes.
1854 April	8,571	1	..	5	1·4	..	7·0
May	23,333	12	..	9	6·2	..	4·6
June..	28,333	11	..	6	4·7	..	2·5
July..	28,722	359	..	23	150·0	..	9·6
August	30,246	828	1	30	328·5	·4	11·9
September ..	30,290	788	81	70	312·2	32·1	27·7
October	30,643	503	132	128	197·0	51·7	50·1
November ..	29,736	844	287	106	340·6	115·8	42·8
December ..	32,779	1,725	114	131	631·5	41·7	48·0
1855 January	32,393	2,761	83	324	1022·8	30·7	120·0
February.. ..	30,919	2,120	42	361	822·8	16·3	140·1
March	30,107	1,205	32	172	480·3	12·8	68·6
April	32,252	477	48	57	177·5	17·9	21·2
May	35,473	508	49	37	171·8	16.6	12·5
June..	38,863	802	209	31	247·6	64·5	9·6
July..	42,647	382	134	33	107·5	37·7	9·3
August	44,614	483	164	25	129·9	44·1	6·7
September ..	47,751	189	276	20	47·5	69·4	5 0
October	46,852	128	53	18	32·8	13·6	4·6
November ..	37,853	178	33	32	56·4	10·5	10·1
December ..	43,217	91	18	28	25·3	5·0	7·8
1856 January	44,212	42	2	48	11·4	·5	13·0
February.. ..	43,485	24	..	19	6·6	..	5·2
March	46,140	15	..	35	3·9	..	9·1

The Deaths under the head of "Wounds and Injuries," comprise the following causes:—Luxatio, Sub-Luxatio, Vulnus Sclopitorum, Vulnus Incisum, Contusio, Fractura, Ambustio, and Concussio Cerebri.

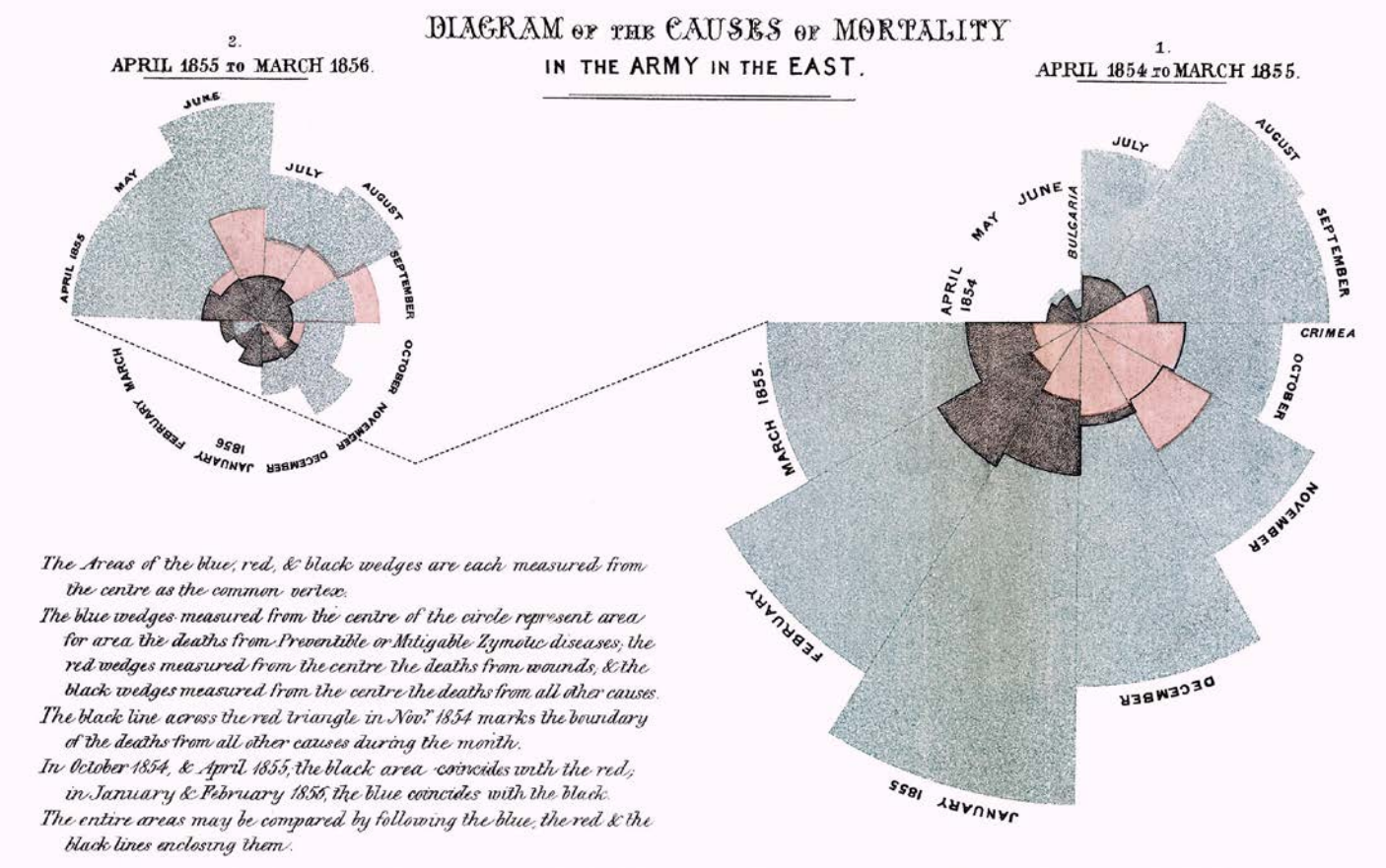
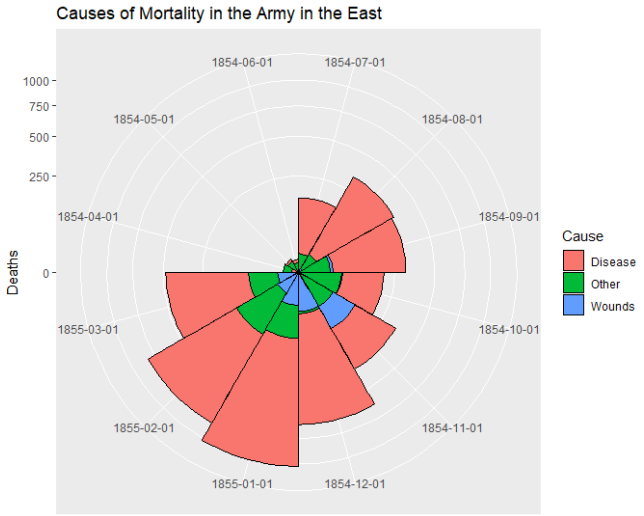
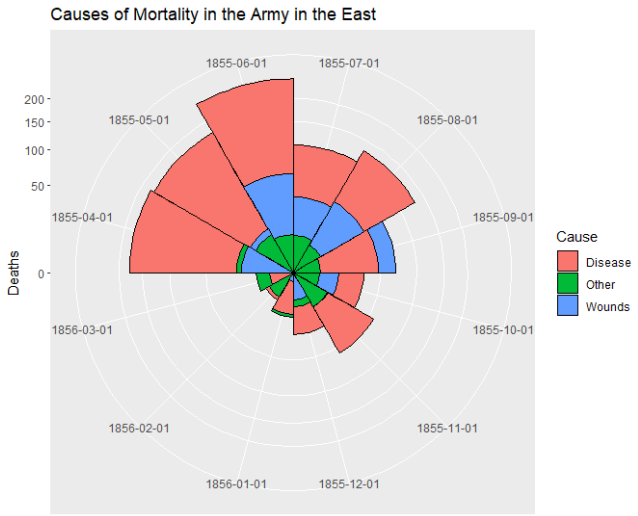


DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.
2.
APRIL 1855 TO MARCH 1856.
1.
APRIL 1854 TO MARCH 1855.
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
1856
FEBRUARY
MARCH
APRIL 1855
MAY
APRIL 1854
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY 1855
FEBRUARY
MARCH 1855.
BULGARIA
CRIMEA
The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.
The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic diseases; the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.
The black line across the red triangle in Nov.r 1854 marks the boundary of the deaths from all other causes during the month.
In October 1854, & April 1855, the black area coincides with the red; in January & February 1856, the blue coincides with the black.
The entire areas may be compared by following the blue, the red & the black lines enclosing them.

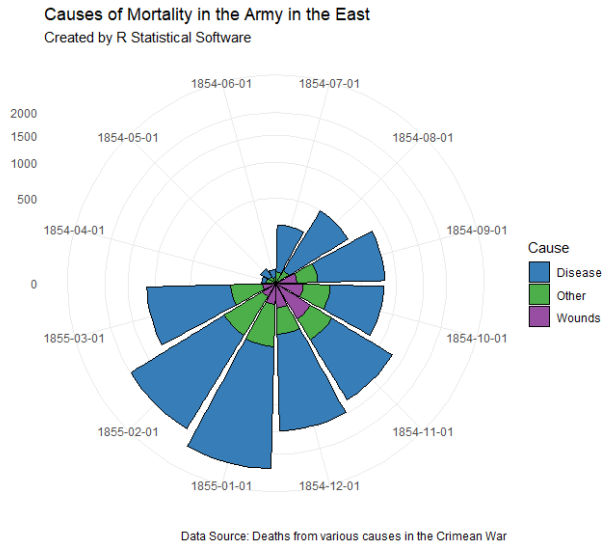
```
cxc1 <- ggplot(Night1, aes(x =
factor(Date), y=Deaths, fill =
Cause)) +
# do it as a stacked bar chart
first
   geom_bar(width = 1,
position="identity",
stat="identity", color="black") +
# set scale so area ~ Deaths
   scale_y_sqrt()
# A coxcomb plot = bar chart +
polar coordinates
cxc1 + coord_polar(start=3*pi/2) +
       ggtitle("Causes of
Mortality in the Army in the
East") +
       xlab("")
```



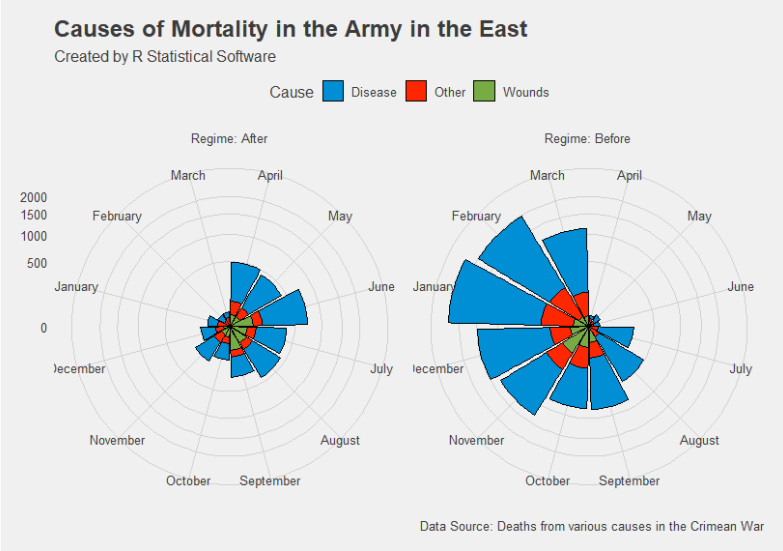
```
cxc2 <- ggplot(Night2, aes(x =
factor(Date), y=Deaths, fill =
Cause)) +
   geom_bar(width = 1,
position="identity",
stat="identity", color="black")
+
   scale_y_sqrt()
cxc2 +
coord_polar(start=3*pi/2) +
       ggtitle("Causes of
Mortality in the Army in the
East") +
       xlab("")
```



```
Night %>%
  filter(Date < ymd("1855_04_01")) %>%
  ggplot(aes(x = factor(Date), y = Deaths, fill = Cause)) +
  geom_col(color = "black") +
  scale_y_sqrt() +
  coord_polar(start = 3*pi/2) +
  labs(x = NULL, y = NULL,
       title = "Causes of Mortality in the Army in the East",
       subtitle = "Created by R Statistical Software",
       caption = "Data Source: Deaths from various causes in the Crimean War") +
  scale_fill_manual(values = c('#377eb8','#4daf4a','#984ea3')) -> p2
p2
```

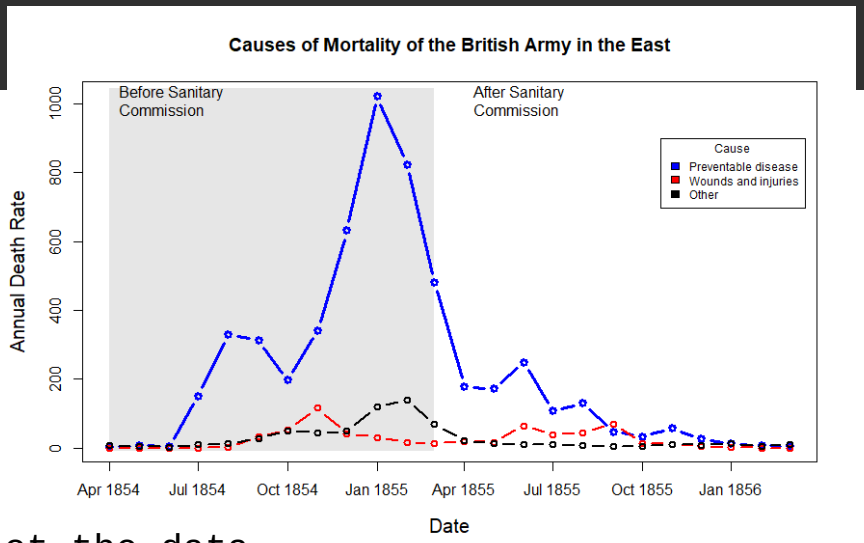


```
ggplot(aes(x = factor(mo), y =
Deaths, fill = Cause)) +
  geom_col(color = "black") +
  scale_y_sqrt() +
  facet_grid(. ~ Regime, scales =
"free", labeller = label_both) +
  coord_polar(start = 3*pi/2) +
  labs(x = NULL, y = NULL,
       title = "Causes of
Mortality in the Army in the
East",
       subtitle = "Created by R
Statistical Software",
       caption = "Data Source:
Deaths from various causes in the
Crimean War") +
  theme_fivethirtyeight() +
  scale_fill_fivethirtyeight() +
  theme(legend.position = "top")
```

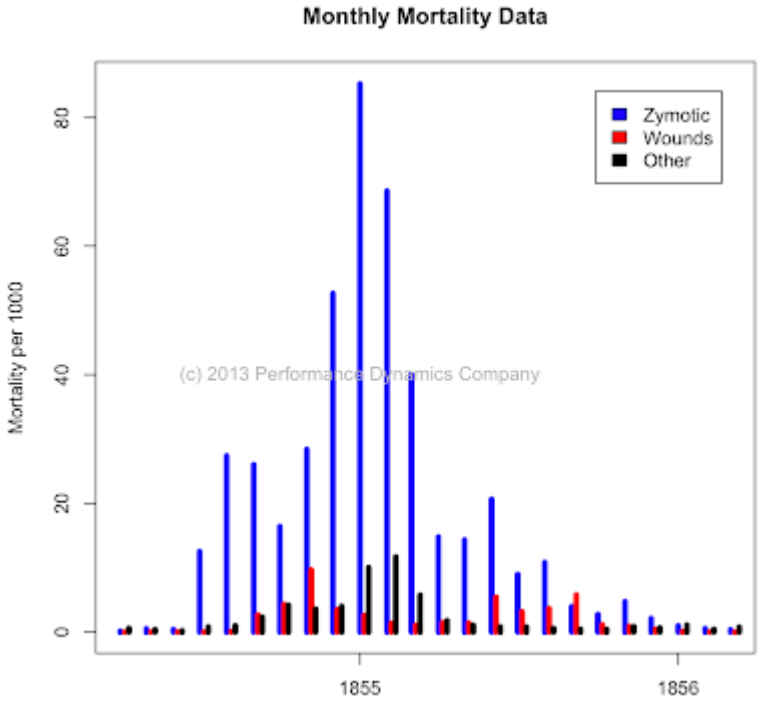


- Flo applied sectoral areas, instead of classic pie chart wedges (pie charts indeed did exist in her day) or histogram columns, so as to reduce the visual impact of high variance in her data.
- In particular, she wanted to counter any criticism that diminishing zymotic disease was due things like seasonal effects (e.g., the onset of spring weather) and not her sanitation methodologies.

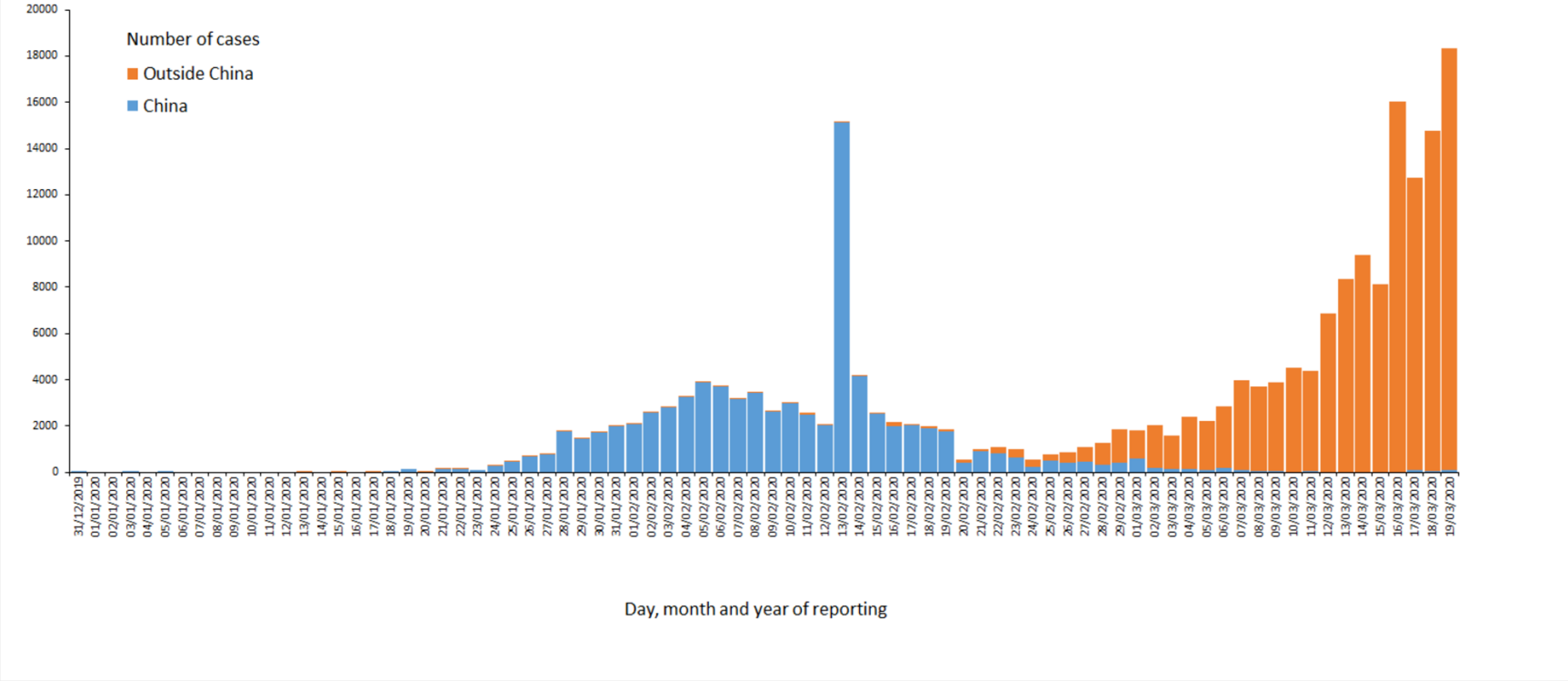
```
colors <- c("blue", "red", "black")
with(Nightingale, {
        plot(Date, Disease.rate,
type="n", cex.lab=1.25,
ylab="Annual Death Rate", xlab="Date",
xaxt="n", main="xxx");
# background, to separate before, after
rect(as.Date("1854/4/1"), -10,
as.Date("1855/3/1"),
1.02*max(Disease.rate), col=gray(.90),
border="transparent");
text( as.Date("1854/4/1"),
.98*max(Disease.rate), "xxx", pos=4);
text( as.Date("1855/4/1"),
.98*max(Disease.rate), "xxx", pos=4);
```




```
# plot the data
points(Date, Disease.rate, type="b",
col=colors[1], lwd=3);
points(Date, Wounds.rate, type="b",
col=colors[2], lwd=2);
points(Date, Other.rate, type="b",
col=colors[3], lwd=2)})
# add custom Date axis and legend
axis.Date(1, at=seq(as.Date("1854/4/1"),
as.Date("1856/3/1"), "3 months"),
format="%b %Y")
legend(as.Date("1855/10/20"), 700,
c("Preventable disease", "Wounds and
injuries", "Other"),
        col=colors, fill=colors,
title="Cause", cex=1.25)
```


Monthly Mortality Data
Zymotic
Wounds
Other
Mortality per 1000
0
20
40
60
80
1855
1856
(c) 2013 Performance Dynamics Company

Distribution of COVID-19 cases worldwide, as of 19 March 2020

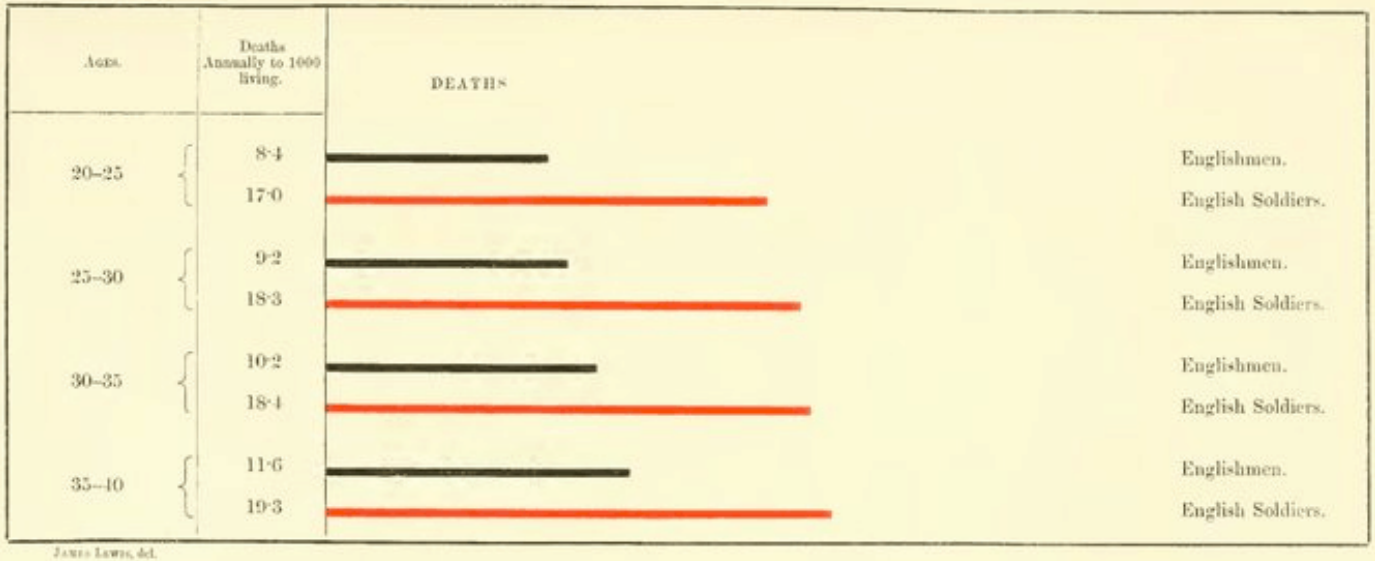


https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases

(B.)

Lines

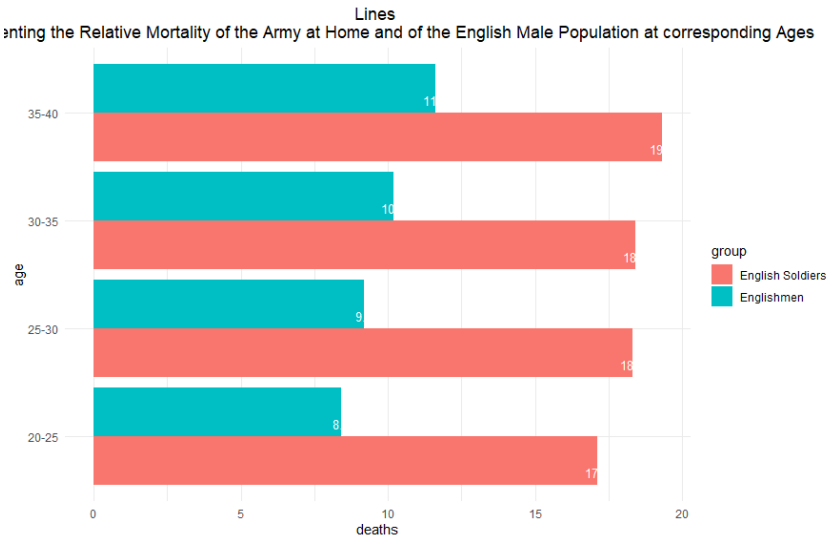
Representing the Relative Mortality of the **Army at Home** *and of the* **English Male Population** *at corresponding Ages.*



James Lewis, del.

Note.—The Mortality of the English Male Population, at the above ages, is taken from English Life Table (1849–53).

```
ggplot(aes(x = age, y = deaths,
fill=group), data =
RLadies_FloN_lines_data) +
  geom_bar(stat="identity",
position=position_dodge()) +
  coord_flip() +
  geom_text(aes(label=deaths),
vjust= 1.6, color="white",
position = position_dodge(0.9),
size=3.5) +
  labs(title = "Lines \n
Representing the Relative
Mortality of the Army at Home and
of the English Male Population at
corresponding Ages") +
 theme(plot.title =
element_text(hjust = 0.5))
```



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