Add an exponential fit to a plot

Murpholinox Peligro

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Setup

```
library(tidyverse)
library(latex2exp)
```

Data

Get `pressure` data into a tibble.

```
x<-pressure$temperature
y<-pressure$pressure
tib<-tibble(x,y)
```

Base plot

Make a base plot.

```
p<-ggplot(data=tib, aes(x=x, y=y)) + geom_point()
```

Model

Make a linear model to get the coefficients to generate the exponential model.

```
linm <- lm(log(y)~x, data = tib)
a <- exp(coef(linm)[1])
b <- coef(linm)[2]
expm <-nls(y ~ a * exp(b * x), start = list(a=a, b=b), data = tib)
# If your data has zero values in y you will get an error.
# To prevent this, add a constant to y.
summary(expm)
```

```
##
## Formula: y ~ a * exp(b * x)
##
## Parameters:
##   Estimate Std. Error t value Pr(>|t|)
## a 0.507555   0.066385   7.646 6.73e-07 ***
## b 0.020520   0.000379  54.142  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Residual standard error: 9.839 on 17 degrees of freedom
##
## Number of iterations to convergence: 30
## Achieved convergence tolerance: 6.024e-06
```

```
a2 <- coef(expm)[1]
b2 <- coef(expm)[2]
```

Plot plus fit plus equation label.

```
p2 <- p +
  stat_smooth(method = 'nls', formula = y ~ a * exp(b * x), se=FALSE,
              method.args = list(start = list(a = a2, b =  b2))) +
  annotate("label", x = 100, y = 600,
           label = TeX(sprintf("$y = %.2f e ^{%.2fx}$", a2, b2)))
p2
```