The following data is from "Note on the spectral lines of hydrogen" by J. J. Balmer dated 1885. The numerical values are wavelengths in units of 10^{-10} meter.

	H_α	H_β	H_γ	H_δ	H_ϵ	H_ζ	H_η	H_ϑ	H_ι
Van der Willigen	6565.6	4863.94	4342.80	4103.8	–	–	–	–	–
Angstrom	6562.10	4860.74	4340.10	4101.2	–	–	–	–	–
Mendenhall	6561.2	4860.16	–	–	–	–	–	–	–
Mascart	6560.7	4859.8	–	–	–	–	–	–	–
Ditscheiner	6559.5	4859.74	4338.60	4100.0	–	–	–	–	–
Huggins	–	–	–	–	–	3887.5	3834	3795	3767.5
Vogel	–	–	–	–	3969	3887	3834	3795	3769†

(†The value given in the paper is 6769 which is an obvious typo.)

From this data, Balmer determined that

$$\hat{y} = \frac{m^2}{m^2 - 2^2} \times 3645.6 \times 10^{-10}\,\text{meter}$$

where $\hat{y}$ is the predicted wavelength and m is determined by the hydrogen line according to the following table.

$$m = \begin{array}{ccccccccc} H_\alpha & H_\beta & H_\gamma & H_\delta & H_\epsilon & H_\zeta & H_\eta & H_\vartheta & H_\iota \\ 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \end{array}$$

Just for the fun of it, use linear modeling in R to verify the model coefficient.

```
m = c(3,3,3,3,3,4,4,4,4,4,5,5,5,6,6,6,7,8,8,9,9,10,10,11,11)

x = m^2 / (m^2 - 4)

y = c(6565.6,6562.1,6561.62,6560.7,6559.5,
4863.94,4860.74,4860.16,4859.8,4859.74,
4342.8,4340.1,4338.6,
4103.8,4101.2,4100,
3969,
3887.5,3887,
3834,3834,
3795,3795,
3767.5,3769)

lm(y ~ 0 + x)
```

The result is

```
Call:
lm(formula = y ~ 0 + x)

Coefficients:
   x
3645
```

The actual value is now known from theory to be

$$3645.07 \times 10^{-10}\,\text{meter}$$