Working with dates using `lubridate`

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Date Formats

Think of how many different formats you know of to format a date:

- 2023 07 06
- Wed, Jun 7, 2023
- 07-06-23
- 06-07-23 14:55 ET
- 06/07/2023 2:55pm

Yikes!

Date, Time, and Datetime

Date/time data are data that conveys information about, you guessed it, date and/or time! There are three relevant data types when we talk about date/time data:

1. Date - only has the date (e.g. 2020-05-15)
2. Time - only has the time (e.g. 20:45:00)
3. Datetime - has both the date and time (e.g. 2020-05-15 20:45:00)

Lubridate

Figure 1: Artwork by @allisonhorst

```
#LOAD PACKAGES
library(tidyverse)
library(lubridate)
```

Standard Date Format

The `ymd()` function transforms data in all kinds of different formats into a standardized date format displaying year, then month, then day.

```
ymd("06 02 04")
```

```
[1] "2006-02-04"
```

```
ymd("06/02/04")
```

```
[1] "2006-02-04"
```

```
ymd("20060204")  # works as well
```

```
[1] "2006-02-04"
```

```
ymd("2006 2 4")
```

```
[1] "2006-02-04"
```

```
ymd(060204)  # works with numbers
```

```
[1] "2006-02-04"
```

`mdy()` (month day year) and `dmy()` (day month year) formats also exist.

```
ymd_hms("2020-04-01 10:30:13")
```

```
[1] "2020-04-01 10:30:13 UTC"
```

```
ymd_hm("2020/04/01 10.30")
```

```
[1] "2020-04-01 10:30:00 UTC"
```

Solar Data

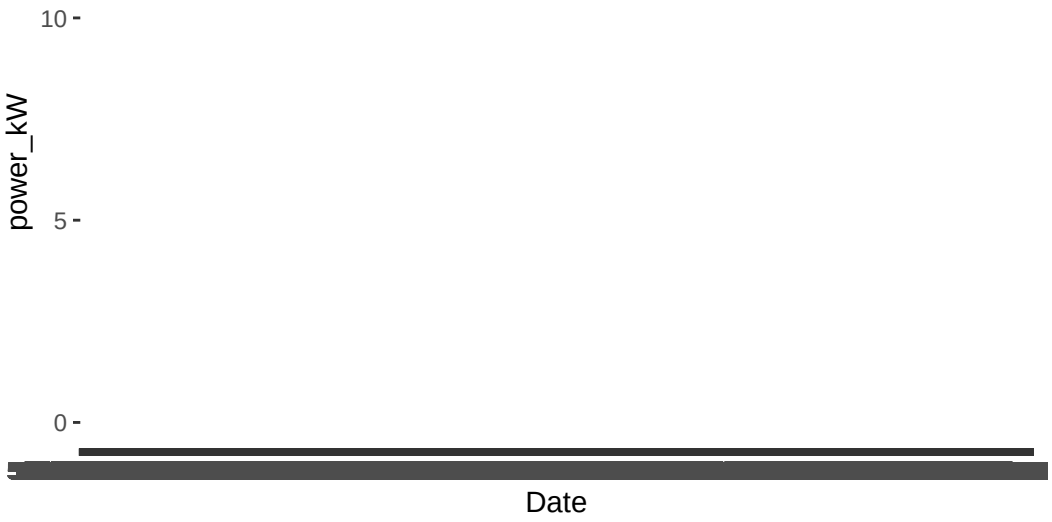
Shoal Marine Lab (SML) is a remote field station located on Appledore Island, Maine jointly operated by Cornell University and the University of New Hampshire. The island is powered primarily by solar power.

```
#read in Data
power <- read.csv("data/power.csv")
```

What format is the date in?

> **Warning**
>
> What happens if we try to make a line plot with the date in this format?

```
power %>%
  ggplot(aes(x=Date, y=power_kW)) +
  geom_line()
```



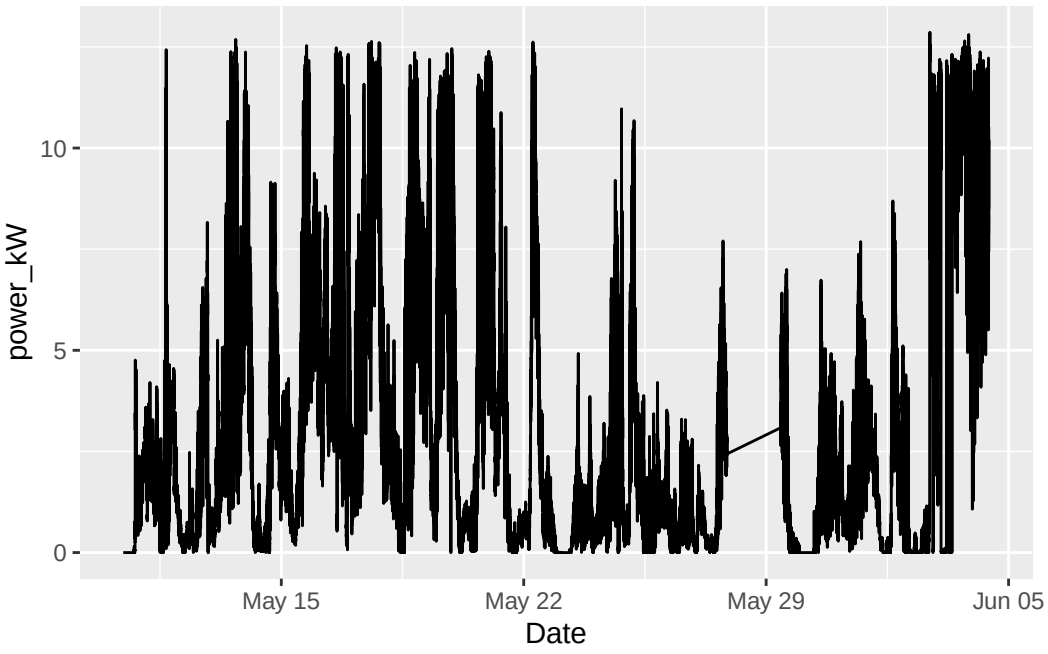
Yikes!

We need to put it in standardized date format first:

```
power <- power %>%
  mutate(Date = mdy_hm(Date))
```

Standardized Format helps us to create time series plots very easily!

```
power %>%
  ggplot(aes(x=Date, y=power_kW)) +
  geom_line()
```



Picking out information

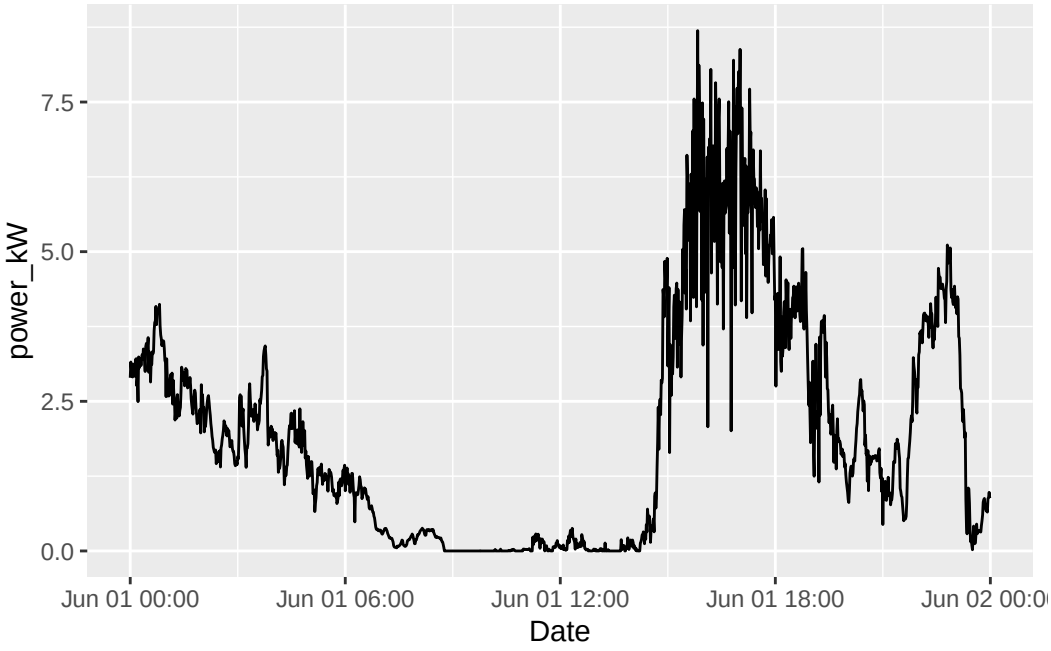
Figure 2: Artwork by @allisonhorst

Sometimes we need to pick out year, month, date so we can filter, sort, etc.

```
power <- power %>%
  mutate(Year = year(Date)) %>%
  mutate(Month = month(Date)) %>%
  mutate(Day = day(Date))
```

Suppose we only want the time series plot for June 1:

```
power %>%
  filter(Month == "6") %>%
  filter(Day == "1") %>%
  ggplot(aes(x=Date, y=power_kW)) +
  geom_line()
```



Portal Data

The Portal Project is a long-term ecological study being conducted near Portal, AZ. Since 1977, the site has been used to study the interactions among rodents, ants and plants and their respective responses to climate.

```
#LOAD DATA
portal_rodent <- read.csv("https://github.com/weecology/PortalData/raw/main/Rodents/Portal
```

Unfortunately, because the information about datetime is divided up into different columns, R does not recognize it as date/time data. What we need to do is combine and convert all of these columns into datetime. To do this, we can use the function `make_datetime()`

```r
portal_rodent <- portal_rodent %>%
  mutate(datetime = make_datetime(year, month, day))
```