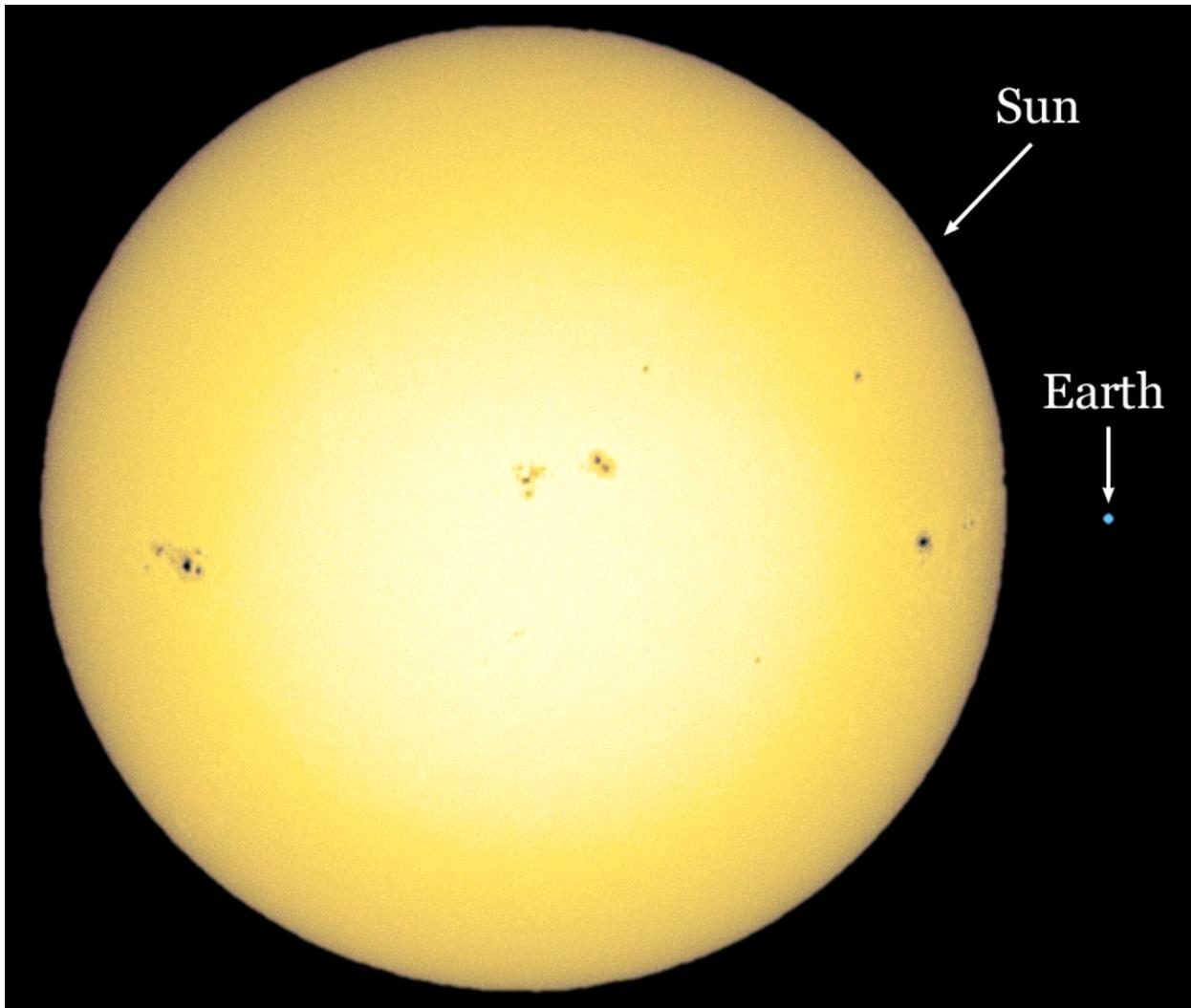


Plate 3: The Sun



(Earth is shown at the correct size, but not at the correct distance. It ought to be about 60 feet to the right.)

The Sun is, of course, our friendly neighborhood star. It is a remarkably mundane, middle-aged, milquetoast specimen that has changed so little over the past 60 million years, you could swap it with the one that lit the dawn when dinosaurs walked the Earth and neither we nor they would notice a thing. (If stars were cars, then the Sun would be a 1961 Rambler stationwagon.) And that is exactly the way you want it: violent, dynamic, "exciting" stars are great fun to watch, preferably from a vast distance, but for growing a rose garden, very steady and very boring is just what you need.

That said, the fact sheet even for a star as ordinary as the Sun is still astounding. The Sun is 865,000 miles across, large enough to hold 1,304,000 planets the size of Earth. Its incandescent surface blazes away at a temperature of 5,780 °K (9,940 °F), far higher than that needed to instantly vaporize any material known to science. Unless you have been struck by lightning, you have never been anywhere near temperatures this high. It would take our human civilization nearly 800,000 years (at present levels of consumption) to use all the energy produced by the Sun in one second, and the total power of the sunlight falling on the Earth equals 185 petawatts! In other words, it is a very good thing that the Sun is 93 million miles from Earth, for as it turns out, all stars are best observed from a vast distance.

And just for the record, here are the Sun's numbers:

Mass: 1.989×10^{30} kg = 332,900 Earths

Average radius: 696,000 km

Surface gravity: $274.0 \text{ m/s}^2 = 27.9$ Earth gravities

Luminosity: 3.846×10^{26} watts

Central temperature: 15.71 million K°

Central density: 1.622×10^5 kg/m³

Rotation period: 609.12 hours = 25.38 days

Speed relative to nearby stars: 19.4 km/s

Average distance from Earth: 149.6 million km

Minimum distance: 147.1 million km

Maximum distance: 152.1 million km

Visual magnitude: -26.74

(These two numbers are for the hard-core astronomers
in the audience.)

Absolute magnitude: +4.83

Typical magnetic field strengths for various parts of the Sun:

Polar Field: 1 - 2 Gauss = 2 to 5 times Earth's magnetic field

Sunspots: 3000 Gauss

Prominences: 10 - 100 Gauss

Chromospheric plages: 200 Gauss

Bright chromospheric network: 25 Gauss

Ephemeral (unipolar) active regions: 20 Gauss

Solar Atmosphere

Surface Gas Pressure (top of photosphere): 0.868 mb

Effective temperature: 5778 K

Sun Spot Cycle: 11.4 years

Photosphere Composition:

Major elements (by mass): hydrogen - 73.7%, helium - 24.7%

Minor elements (by mass): oxygen - 0.8%, carbon - 0.3%, iron - 0.2%, neon - 0.1%, nitrogen - 0.1%

All data courtesy of NASA.