FINAL LIST OF ERRORS IN ASTROPHYSICAL QUANTITIES.

Chapter 2:

On page 8 the electron charge in coulombs is 1.602 176 462(63) not 4.803 206 8(15), both $\times 10^{-19}$.

The most modern fundamental constants can be obtained from http://physics.nist.gov/cuu/Constants/index.html.

On page 15, the ΔT in Table 2.2 is the actual applied leap seconds time increment rather than the observed values, most commonly named ΔT, given in Table 2.1.

The length of the sidereal day should be 86164.09052 SI seconds or 23^{h}56^{m}04^s.090524 UT for the epoch 2000 (JD 2451545) rather than those two values given for epoch 1990.

On page 20, the m$_V$ for the number of candelas outside the Earth atmosphere should be noted as M$_V$ instead because it is an absolute magnitude.

On page 20, the Lumen of maximum visibility radiation at 5550 $\AA$ (5.40 $\times 10^{12}$ hertz=5552 $\AA$, standard adopted in 1979) has the newly measured factor of 1.464 rather than 1.470, and therefore, below, 1 W at 5550 $\AA$ is 683 lumens.

On page 24 in the "in esu" column, on the Potential, EMF line should be +8 not –12; on the Electric field line should be +6, not –14; in the Resistivity line should be +11 not –11; on the Intensity of Magnetization line should be +4, not +16.

Chapter 3:

On page 39 in Table 3.6, the electron affinity for Na should be +0.5479 ev not +0.479 ev.

Chapter 5:

Tables 5.15, 5.16, and 5.17 on pages 111-113 have been set incorrectly. For the temperature (in millions of Kelvin) above 3.000, all table entries should be moved to the right by 5 columns. Thus, the first entry for 4.000 should obtain for log density of –5.0. The five needed columns for the hotter temperatures are for densities 1.0, 2.0, 3.0, 4.0, and 5.0.

On page 118, the luminous energy (in lumergs) has a factor of 683 from new measurements and new value adopted in 1979, not 680. This changes the previous 0.00147 number to 0.00146 and the following 4.11 to 4.08, and the 1.34 to 1.30.

Chapter 10:

The Preface of Astrophysical Quantities states that the optical detection of cosmic gamma bursts came after publication. Note however that Table 10.7, footnote d on page 224 does include references to optical fading, usually observed at less than one day, for 6 sources.

Chapter 11:

On page 245 at the bottom, three coefficients are wrong by a factor or 100. They are 0.0067395, 0.0033698, and 0.0017033.

On page 257, the refractive index equation has been set incorrectly. See a similar correct equation for this quantity on page 262 in section 11.20.

Chapter 12:

The gas components for Jupiter in Table 12.10 on page 301 were incorrectly copied from the given references. They are:
CH$_4$ (1.8$\pm$0.3)$\times 10^{-3}$
NH$_3$ (7$\pm$1)$\times 10^{-4}$
H$_2$O $\le$ (5.2$\pm$2.6)$\times 10^{-4}$ (at 19 bars pressure)
$\le$ (4.8$\pm$2.1)$\times 10^{-5}$ (at 12 bars pressure)
$\le$ 6.9$\times 10^{-7}$ (at 3.6 bars pressure)
H_2 0.862$\pm$0.027 (or 0.845$\pm$0.003)
He 0.1359$\pm$0.0027 (or 0.136$\pm$0.003)
Ar $\le$ 9.06$\times 10^{-6}$
Kr $\le$ 3.2$\times 10^{-9}$
Xe $\le$ 3.8$\times 10^{-10}$
H$_2$S 6.7$\times 10^{-5}$ (at pressures greater than 16 bars)
6 $\times 10^{-6}$ (at 8.7 bars)
PH$_3$ $\le$ 5.2$\times 10^{-6}$ (at pressures greater than 16 bars)
An important additional reference with precise data is
VonZahn, U. et al. 1998, JGR,103,22815

On page 310 the Moon backside surface temperature at night should be –153 C.

Chapter 14:

On page 340 the solar constant S is given as 1.365-1.369 watts/ square meter, but the value should be 1.365-1.369 kilowatts/square meter.

On page 353 in the Spectral Distribution section, the text should read:
6.80$\times 10^{-5}F_\lambda=$ solar flux outside…

Ten lines below, delete the hyphen and make it (100 $\AA$).

Below Table 14.13, on page 354 the first reference should only be to Sec. 82, and the second reference should be to volume 107, page 203.

On page 355 the third column head of Table 14.15 should have the μm changed to μ^{-1}

Below Table 14.15 there should be two references:

1. Labs, D. et al., 1987, Solar Phys, 107, 203
2. Neckel, H. and Labs, D. 1984, Solar Phys., 90, 205

On page 359 in the last equation, the independent variable is ρ not r in four places.

Chapter 21:

The names W44=3C392 should be deleted in the parentheses after Pup A in Table 21.25 on page 541. For a very comprehensive list of galactic supernova remnants see http://www.naic.edu/~pulsar/catalogs/snrs.data.html.

Chapter 27:

27.1 THE JULIAN DATE

by A. D. Fiala

The system of Julian day numbers is a continuous count of days elapsed since the beginning of the Julian period as defined by the sixteenth century chronologist J. J. Scaliger. The beginning of the count was chosen to be well before the historical era. His original idea was to introduce a count of years, but nineteenth century astronomers adapted his system to create a count of days. For any calendar based on fixed, consistent rules, the calendar date can be converted to a Julian day number, and a Julian day number converted to a calendar date. Days begin at Greenwich noon. The Julian day number, expressed as an integer, denotes the number of complete days elapsed since the initial epoch. The Julian date (JD), specifies a particular instant of a day by ending the Julian day number with a decimal fraction. The midnight of the civil day is specified by subtracting 0.5 from the Julian date at noon. A count of days (1 – 365) from the beginning of the year is sometimes erroneously called a Julian date, confusing the meaning.

There are many calendar systems used today or in the past. The two calendar systems most important to astronomers are the Julian calendar and the Gregorian calendar. They have fixed consistent rules. The Julian calendar was introduced in the year –45. It is based on the assumption that the average length of the tropical year is 365.25 days. To match this to a calendar based on seasons, years are 365 days long, except that those years evenly divisible by 4 are 366 days long, with an intercalary leap day included as February 29. These rules can be applied to times before the introduction to produce a proleptic Julian calendar. Julian day 0 commenced at Greenwich noon on –4712 January 1, Julian proleptic calendar.

The Gregorian calendar today serves as the international standard for civil use. It was the result of a perceived need to reform the method of calculating dates of Easter. The length of the tropical year is fractionally less than 365.25 days, and the Julian calendar was shifting with respect to the seasons, so that in the sixteenth century the date of the March equinox had shifted by 10 days. Pope Gregory XIII convened a commission to consider calendar reform. Their recommendation in 1582 was to adopt the following rules:

Years are divided into two classes: common years and leap years. A common year is 365 days long, a leap year is 366 days long, with an intercalary day inserted as February 29. Leap years are determined by the following rule: Every year exactly divisible by 4 is a leap year, except for years that are exactly divisible by 100; these centurial years are leap years only if they are exactly divisible by 400.

In a 400-year period, there are three fewer days in the Gregorian calendar system than the Julian calendar system. In addition, to introduce the system and move the equinox back, 10 calendar days were simply omitted in October 1582, but the day of the week was not interrupted. Thus Thursday 1582 October 4 was followed by Friday 1582 October 15. In this system, Julian day 0 commenced at Greenwich noon on –4713 November 24, Gregorian proleptic calendar. The difference from the value for the Julian proleptic calendar is found by adding up the number of extra leap years in the Julian calendar in the 16 400-year blocks preceding adoption of the Gregorian calendar and subtracting the 10 days omitted from the Gregorian calendar.

27.1.1 Julian Dates of Specific Year

A minus sign has been omitted in definition of the Modified Julian Day at the bottom of page 667, where the constant should be –2400000.5

27.1.2 Conversion Algorithms

Several algorithms for converting among Julian Calendar Date, Gregorian Calendar Date, Islamic Tabular Calendar Date, Indian Civil Calendar Date, and Julian Day Number, and computing day of the week, are given in [1].

A conversion calculator based on the rules given in **27.1** is available at http://aa.usno.navy.mil. Click Data Services and then click Julian Date Conversion. This site uses the Gregorian Calendar on and after Friday, 1582 October 15, and the Julian Calendar on and before Thursday, 1582 October 4. The Julian day number epoch starts at Greenwich noon on –4712 January 1, and the days 5–14 October 1582 do not exist.

The above calculator involving two calendar systems requires several steps of calculation. For a single calendar system, a one-line algorithm can be written for converting calendar date, proleptic or current, to Julian day number. Here is one for the Gregorian Calendar system. Define integer variables as follows. Let JD be the integer Julian day number, Y be the integer year, M be the integer month, $1 \le M \le 12$, D be the integer day of the month, $1 \leq D \leq 31$. The equation is to be evaluated by fortran integer arithmetic, that is, after each division, truncate to the integer and discard any fraction. For example, (M−14)/12 has only two values, 0 or −1. *Do not expand, combine, or rearrange terms!*

$$JD = (1461 \times (Y + 4800 + (M - 14)/12))/4 + (367 \times (M - 2 - 12 \times ((M - 14)/12))) / 12 \\ - (3 \times ((Y + 4900 + (M - 14)/12/100))/4 + D - 32075$$

A fortran representation of the equation is:

```
JD=int((1461*(Y+4800+int((M–14)/12)))/4)+ int((367*(M–2–12*int((M–14)/12)))/12)–
   int((3*int((Y+4900+int((M–14)/12))/100))/4)+D–32075
```

This algorithm is valid for all JD ≥ 0 in the Gregorian calendar, proleptic or current. It is not valid for the Julian calendar, proleptic or otherwise. The computed integer Julian day commences at Greenwich noon. To get the Julian Date, subtract 0.5 to obtain Julian Date of midnight, and add the decimal fraction of the day.

27.2 STANDARD EPOCHS

by A. D. Fiala

[Revised sentence:]

Table 27.2 gives the Julian Date near the calendar beginning of several years, and also the Julian Date of several Julian epochs, used by astronomers, which are not identical to the calendar beginning in all cases.

Springer

http://www.springer.com/978-0-387-98746-0

Allen's Astrophysical Quantities
Cox, A.N. (Ed.)
2002, XVIII, 721 p., Hardcover
ISBN: 978-0-387-98746-0