

# Astronomy Lab for Windows

can be used for

## Accident Investigation

The accident investigator is interested only in the following items:

- (a) the position of the Sun at the time and place of the accident.
- (b) sunrise
- (c) sunset
- (d) the position of the Moon at the time and place of the accident
- (e) moonrise
- (f) moonset
- (g) the Moon's phase.

Let's take an example. An accident occurred at 6.15 pm at Stokesley in North Yorkshire on the 19th of April 1994.

**Step 1:** Obtain the appropriate Ordnance Survey map. Around the extreme outer edges of the map you will find angles of latitude along the vertical edges and angles of longitude along the horizontal edges. Hence, find the latitude and longitude of Stokesley. (54°28' North and 1° 11' West).

**Step 2:** The program assumes Universal Time. That is the same as Greenwich Mean Time or GMT. In the winter half of the year, local time and Greenwich Mean Time are the same. In the summer half of the year, Greenwich Mean Time is found by subtracting one hour from the local time. The change to summer time takes place towards the end of March and the change to winter time towards the end of October. Be very careful to check whether the accident occurred in wintertime or in summer time when the accident date is close to those changeover dates. In April it would be summer time and so the time of this accident was 5.15 pm GMT. Express this time on a 24 hour clock. (17.15 hours).

**Step 3:** Start the Astronomy Lab program. An almost empty screen appears with a menu bar at the top. Click on Location in the menu bar. Click on Set Location in the small pull-down menu. The Set Location screen now appears.

Type in the name of the location in the location bar near the top of the screen. Now type in the latitude and the longitude and whether the longitude is West or East of the Meridian. Longitudes east of London tend to be East and longitudes to the west of London tend to be West. There are also squares for the elevation of the accident Site above sea level and also for the time zone. For Sites in the United Kingdom, the time zone is 0.00. To be precise, the elevation of Stokesley is 70 metres. In this example, I have left the elevation as zero.

If you wish to Save this information for later use, click on Save. The location will be stored in the Cities list of locations. If you just click on OK, the program will assume the accident location just for the current computer session.

The blank screen now appears. Click on Movies. Click on Planetarium in the Movies menu. Several boxes appear. The first box is for Date and Time. Set 1994 in the year box, the month is 04 and the day is 19. The time is set to 1715.

In the Body box, select Sun. Click on Track Body so that there is an X in that box. De-select Planets, Stars and also Label Planets so that the screen is not cluttered with unwanted information.

In fact, we do not want a movie. We want a still from a movie which shows the Situation at the time of the accident. Select "Time Speed" and replace the 64 with 0. Now click on **OK**.

The correct still frame now appears. The data at the right hand side of the picture tells us the date of the accident as 19th April 1994, Greenwich Mean Time as 1715 hours, the Alt or Altitude of the Sun, which is the angle of the Sun above the horizon, as  $16^{\circ} 14' 00''$  and the Azimuth or bearing of the Sun from true north as  $266^{\circ} 41' 48''$ .

To obtain the time of Sun Rise and Sun Set we click on Stop and then on Stop Command Escape. Now select Reports from the menu bar. Select Calendar from the pull-down menu. Enter 1994 as the year, 4 as the start month and 4 as the stop month. Click on **OK** and the sunrise and sunset will appear for each day in the month of April 1994. On the 19th of April, the Sun set at 1915 hours GMT or 2015 hours local time.

The procedures for the Moon are very similar. The illuminated fraction of the moon can be found under Graphs, Moon Illum.Frac.. On the 19th of April 1994 about 30% of the Moon's disc was illuminated. At the time of the accident the Moon was above the horizon but the sky luminance would prevent it being seen.

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