Example 2
What time is local noon in DR longitude 73°E on 1st May?

Mer Pas at Greenwich	11 h 57 m
73E E = minus	4 h 52 m
Local noon	07 h 05 m GMT

If you happen to be sailing around within a few degrees of the Date Line on the opposite side of the globe from the Greenwich Meridian, a query may arise as to which day it is. If this is so, refer to Chapter 4, page 24. If not, just remember that you have calculated the Greenwich time of noon for your approximate longitude, and read on.

TAKING THE SIGHT

Once you know the approximate time of local noon, all that remains is to get up on deck ten minutes or so early and start shooting the Sun's altitude.

It should still be rising when you begin. As it approaches its highest point you'll be 'racking it down' slower and slower until finally it stands still for a moment or two. That is the noon altitude. Whatever you do, don't start to rack the Sun up again as it begins to fall. Wait until the lower limb bites positively into the horizon without altering the sextant again, and you know you have it. Noon is past and gone for another day. Note the log; go below, read the sextant, put it away, then work out your latitude.

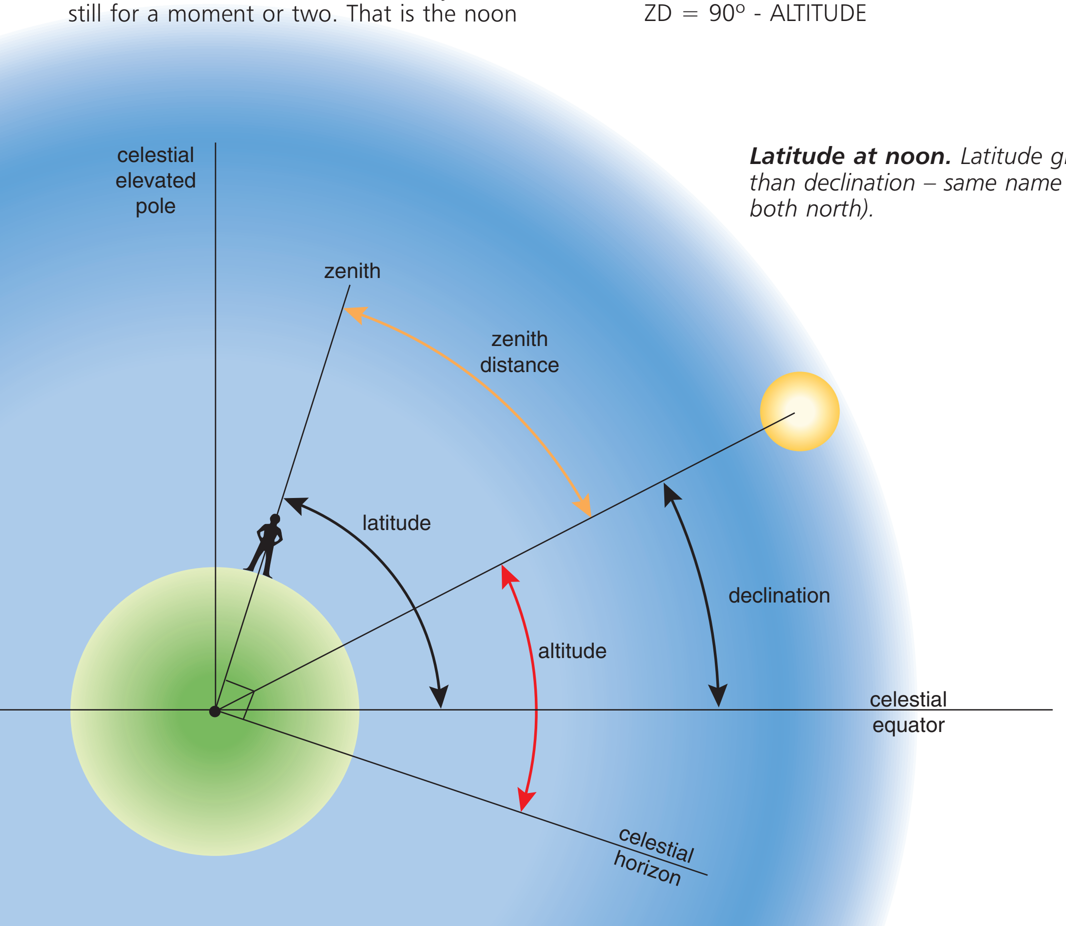
THE THEORY

The illustration on page 17 demonstrates the noon sight set-up when viewed from the celestial elevated pole.

The picture below shows it as seen from the celestial equator. Note how the celestial horizon makes a right angle with the line dropped from the observer's zenith, through his geographic position to the centre of the Earth. *Zenith Distance* (ZD) is the only new concept to grab hold of. It is, quite simply, the angular distance (measured in degrees) between the observer's zenith and the position of the Sun on the celestial sphere.

Since the line from the observer's zenith meets the celestial horizon at 90°, the zenith distance must equal 90° minus the Sun's altitude:

ZD = 90° - ALTITUDE



Latitude at noon. *Latitude greater than declination – same name (e.g. both north).*

PRO FORMA FOR POLARIS

Date	1 MAY
Approximate Latitude:	51° N
DR Long	20° W

Watch time	05 52
Correction	—
GMT	05 52

GHA ♈ (hrs)	293 50.0
+ Increment (mins/secs)	13 02
GHA ♈	306 52
DR Long (approx)	19 52
LHA ♈	287

Hs	51 21.6
Index error	+2.8
Dip	-3.8
Apparent Alt	51 20.6
Star Correction	-0.8
Ho	51 19.8
+ a_0 (LHA ♈ 287°)	1 13.3
+ a_1 (Lat 51° N)	0.6
+ a_2 (month MAY)	0.4
Sum	52 34.1
-1^0	-1
LATITUDE	51° 34'.1 N

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tables for Polaris immediately before the 'minutes and seconds' increment pages at the back of the almanac (see page 59). The page is divided into three sections, each dealing with a correction factor. These are called a_0, a_l, and a_2.

For a_0, enter the table with your LHA Aries.

For a_l, enter with your approximate latitude.

For a_2 you simply need to know what month it is.

The only work required here is to determine the LHA of Aries for your approximate position at the time of the sight – to the nearest minute of time is fine.

In order to keep the arithmetic simple, each of these corrections is made positive. After they have all been added, however, one degree must be subtracted from the final result to produce a latitude. The pro forma puts all this down in step-by-step form and should remove any doubts you may have about it.

Example

1st May. DR 51°N 20°W. Polaris is observed during morning twilight at 0552 GMT. Sextant altitude is 51°21′.6. Height of eye is 15 feet and index error is 2.8 off the arc. What is your latitude?

PRO FORMA FOR SUN SIGHT

Date 1 MAY

DR 49° 12′ N
05° 10′ W

Watch time	09 15 23
Correction	Fast 6
GMT	09 h 15 m 17 S

GHA (hrs)	315° 43′.4
+ Correction (mins/secs)	3 49.3
GHA	319 32.7
Assumed Long	5 32.7
LHA	314°

Assumed Lat 49° N

Hc	39 28
d +47	+2
Hc	39° 30′

z	116
~~180/360~~	
Zn	116

Declination (hrs)	15 02.1 N
d difference 07	+0.2
Declination	15° 02′.3 N

Hs	39° 28
Index Error	– –
Dip 8 FEET	-02.7
Apparent Alt	39 25.3
Main Correction	+14.8
Ho	39 40.1
Hc	39 30
Intercept	10.1 TOWARDS/~~AWAY~~

Use the blank pro forma on the opposite page for your own working.

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