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*A Regiment for the Sea*

1574

The sixt Chapter or rule she-

weth, how to take the heigth of the Sun

with the crosse staffe or with the Astro-

lobe, and also how to find the true

Meridian, with other neces-

sarie matters.

To take the true heigth of the Sunne at the Sea, beste way is,

to doe it with the crosse staffe: for that the Sea is moueable, and

causeth the Shippe to heaue, and sette little or much: and also

vpon the scrosse staffe the degrees be larger marked than the

Ring or Astrolobe: and in a large instrument an errour is seene

sooner and better than it is in a small instrument.

Nowe to take the heigth of the Sunne, to knowe they Alti-

tude of the Pole aboue the Horizon, doe this: Firste set the

Sunne with a compasse, to knowe when that the Sunne com-

meth near vnto the Meridian: as soone as you see that the

Sunne is come vnto the South and by East, then beginne to take

the heigth of the Sunne with the crosse staffe in this manner:

Put the Transitorie vpon the long staffe, then set the end of the

long staffe close at the corner of your eye, winking with your

other eye, and remouing the Transitorie forwardes or back-

wardes, vntill you doe see the lower end of if (being iust with

the Horizon\_ and the vpper ende of it, (being iust with the

middle of the Sunne) both to agree with the Sunne and the

Horizon at one time: and so haue you the true heigth of the

Sunne: this doe, stil ovserue ye same, vntil you see the Sunne

at the highest and beginning to descende, and they haue you

finished. Yest notwithstanding this is to be noted: that it is beste

to take the heigth of the Sunne with the crosse staffe, when then

Sunne is vnder 50. degrees in heigthe aboue the Horizon,for

two causes. The one is this: till the Sunne be .50. degrees in

heigthe the degrees be largely marked vppon the crosse staffe,

but after (the Sune being aboue .50. degrees high) they be

lesser marked. The other is, for that the Sunne being vnder 50.

degrees in heigth, you may easily take the height, bycause you

may easily see or viewe the vpper end and nether end of the

crossstaffe bothe at one time: but if it dothe exceede .50. degrees,

then by the meanes of casting your eye vpwardes and down-

wardes so much, you may soone commit error, and then in

like manner the degrees be so small marked, that if the Sunne

dothe passe .50. or .60 degrees in heigth, you must leaue the

crosse staffe and vse the Mariners Ring, called by them the

Astralaby, which they ought to call the Astrolobe. Nowe to

take the heigth of the Sunne with the common Ring or Astro-

love, doe thus: The Sunne being (as before is declared) neare

the Meridian or South, ovserue it (vntill you haue the greatest

heygth thereof) in this manner: Holde the Ring of the Astro-

lobe vpon one of youre fingers, and turne the Alhidada vppe

and downe, vntil you see the shadowe of the Sunne pearse or

passe thorough bothe the sightes thereof, being sure that the

Astrolobe dothe hang vpright, whiche you may proue in this

manner: Looke at mowe many degrees and minutes the Alhi-

dada dothe stande vppon the Astrolobe, then turne the Alhidada

vnto the same number of degrees and minutes on the other

sode of the Astrolobe, then taking the heigth of the Sunne

againe, if it doe agree as it did before, then the Astrolobe dothe

hang vpright. but if it doe not, then it dothe not hang vpright.

For knowledge of the true heigth of the Sun (the Astrolobe not

hanging vpright) do thus: if the Astrolobe be truely marked,

marke the diuersitie, that being knowne, rebate from the

greatest heigth halfe the diuersitie, or else adde vnto the lesser

heigth halfe the diuersitie, and that shall be the true heigth of

the Sunne, although that the Astrolobe doth not hang vpright.

The Astrolobe is best to take the height of the Sun, if the

Sunne be very high at .60.70. or 80. degrees, and the cause is

this: the Sunne coming so neere vnto your Zenith, hathe great

power of light, for to pearce the .2. sights of the Alhidada of the

Astrolobe, and then it is not good to vse the crosse staffe, for

that the Sunne hurteth the eyes of a man, and besides that it is to

high to occupy the crosse staffe, (as before is declared) so that

this way you may very much preserue your eyes. If you haue

not glasses vpon your staffe (to saue your eyes in taking the

heigth of the Sunne) but be vnprouided of them, to thus: take

and couer the Sunne with the end of the transitorie of the crosse

staffe, unto the very vpper edge or brinke of the Sunne (so shall

you not neede to heholde the brightnesse of it) and with the

other end of the transitorie to take the horizon truely, and that

being done, for that the Sunne is .30. or .31. minuts in diameter

or bredth, therefore you shall rebate .15. minutes from the

altitude or beigthe of the Sunne, and then that whiche shall

remaine shall be the true heigth of the Sunne from the center or

middle of the Sunne. And furthermore there is some error in

the taking Sunne or Starre with the Ballastel or crosse staffe,

and that groweth by this meanes: for that the true center

(which is the sight of the eye) is within the middle of the eye,

and not in the outside of the eye, so that the end of the long

staffe in the setting of it vnto the corner of your eye, dothe

stande somewhat further out than the sight of your eye, that is

to saye, that the sighte of the eye is somewhat further into the

head, than the ende of the staffe dothe come: wherefore you

must pare away a little of the ended of the staffe, for some mens

vses more, and some mens vses lesse, for that it is according as

you may set the staffe vnto your eye, for some men neede pare

away little or nothing, and some men must pare away .14. or

.15. minutes as you may set the staffe: bycause some mens eyes

be further into their head than other some mens are, and the

bones of some mens face stand further out than other some do.

It is moreouer conuenient to know the true meridian, or South,

whiche you must do, either with a good compasse or with a

perfyte diall or Needel: but if you be on the land this you may

do: on a peece of timber, or any other thing that standeth fast,

with a paire of compasses make a circle, then in the midle or

center where the foote of the compasse did stand set a wire

vprigth (as circumspectly as you can) and then you may do this:

looke in the morning (so it be on plaine ground that you may

see the horizon circle, without any let) a the sunne rising, for

the shadow of the wier, and ther set a pricke: then at the

setting of the Sunne you shall set another pricke: euen at the

circumference of the circle, then diuide that with our com-

passes euen in .2. peeces, and strike a straight line for the wier

or center of the circle, to the middle or deuided prick, & that

shal be the true meridian. Or else (the wier standing vprigth) first

in the fore noone when the top of the wier doth touch, or is

ready to come into the circumference or edge of the circle, there

make a pricke: then in the after noone in like manner, at the

very comming out or touching of the wyer, of the edge of the

circle, there make an other pricke euen with the comming out

of the shadow: this done (as circumspectly as you can) deuide

these 2. prickes in the midle, then as before is said, drawe a line

from the center or wier, to the midle prick, and that shadow shal

be your true meridian. After another manner you may doe

this: looke and watch when the wyer giueth the shortest

shadowe, and there make a pricke: then draw a line from that

prick to the wyer, which shadow shall be the true meridian.

And yet furthermore, for yt it is most conuenient to know ye

true Meridian at the Sea, bicause in long viages going far vnto

the Westware or Eastward, the compasse doth varie: to find the

true Meridian do this. Set the Sunne with your compasse is hir

rising or appearing aboue ye horizon, & then (knowing what

point and part the Sune doth rise at) set the Sun with your

compas at hir setting or departing vnder ye horizon & (that

being known) you shal perfitly know, whether the compas be

varied & how much: for ensample this, I doe set the Sun at hir

rising with the compas & she doth rise vpon the East point: in

like maner also I do set the Sun with hir compas at hir setting, &

do find hir to set West Northwest: so I do see the compass to be varied one pointe, thst is to say, the North point doth stand

North and by East, &c. And furthermore (for that seldome

times the Sun dothe rise and set cleere by the meanes of the

cloudes, and other impediments neere the horizon) you may

get the true Meridian thus: at any time in the fore noone, first

set the Sunne with your compas, and then take the true heigth

of the Sunne. Now you (knowing how many degress ye Sun

was high at that point of the compas) may in like maner obserue

the Sunne in the afternoon, untill you do find the Sun iust at

that heigth that it was in the forenoone, marking at what point

of the compas the Sunne is, and so shall you see perfitely

whether the compas be varied or no, and also howe much: for

ensample thus: I take the Sun upon the Southest poynt .20.

degrees aboue the horizon, & then in the after noone I do ob-

serue the Sun vntil such time as I do find the Sunne iust .20.

degrees aboue the horizon again, & then I set ye Sun with the

compas and do find ye compas to be varied one point, yt is

to say the North point doth stand North & by East. &c.

Another way also to know ye true meridian, is by the Sun: that

is, to set ye Sun with ye compas at hir greatest heigth aboue the

horizon, & so you shall know whither ye compas be varied, &

how much: & looke what is spoken of ye Sun by day, you may

do the like by night by any of the Starres yt you perfectly do

know, doing as you do by ye Sun in all points: but you cannot

do it so well and truly by the Moone, by the meanes of the

swiftness of ye moones motion in the Zodiack, you may also

find the variation of ye compas by the North Starre, as thus: set ye

North Star with the compas, if the North point do stande right

with the Starre, then it is not varied: and that must be done

when the .2. Starres of Charles Waine called the pointes be

right vnder, or right ouer the North Star, but if that the Starres

be West from the North Starre, then the North Starre is the

third part of a point vnto the Eastward of the North pole. If the

.2. Starres of Charles Wayne called the poynters be due east

from the North Starre, then the North Starre is the third part

of a point vnot the westwarde of the North pole .&c. This

haue I saide bycause that sometine in sundry places, the com-

passe doth varie, & especially in the sayling of long viages run-

ning East and West, (called the Northeasting or Northwesting

of the compasse) therefore I would not wish them to meddle

with the mending of their compasse or whetting of the side of

the needell to the end to make it stand due North, but cir-

cumspectly to awaite the altering of the compasse, and what

quantitie it doth alter: as you may do very well, by the order

before rehersed, and then let your compasse alone: for although

that it dothe varie .2. or .3. poynts, you may make account

according to the variation as thus: I admit the Northwest point

standeth due North, and my course is to go due West, I will

occupy the Southwest pointe in this case for the west poynte.

And thus ( by oberuation and trying of my compass) I care not

what point standeth due North, for it is all one, so that you

consider what poynt standeth North. And now furthermore,

come are of that opinion, that (by the Northeasting or North-

westing of the compasse) you may knowe the Longitude: but I

am not of the opinion, for I admit that it be so (as some do

affirme) that the compasse doth varie, (as some haue said) that

is, that you being .90. degrees vnot the Westwarde (from the

place youre compasse was made at) youre North poynt should

stand Northeast: and in like maner you being .90. degrees East,

your North poynt shoudl stand Northwest: then by that order

the compasse should vary one poynt at .22. degrees and a halfe,

and that cometh vnto .450. english leagues (if you be neere

vnto the equinoctial:) wherfore no master or pilotte of a

shippe, doth keepe so simple account fo the shippes way, but

that he may knowe what distance he hath vnto any place better

than he shal know by the variing of the compas: & also

whether it be so or not yt the compas doth keepe any such pro-

portion in the variation, I do refer that vnto them that haue tried

the experience thereof: for I for my part can say nothing in that

matter. Wherfore I cease from writing muche thereof, al-

thoughe the Sea men by very desirous to haue some way to get

the Longitude. But if it be true that the compasse doth verie by

that proportion, then it were very good for them to practise

that matter, that shoulde make any discoury vnto the North-

wardes, for that the degrees be so short in those Paralels.