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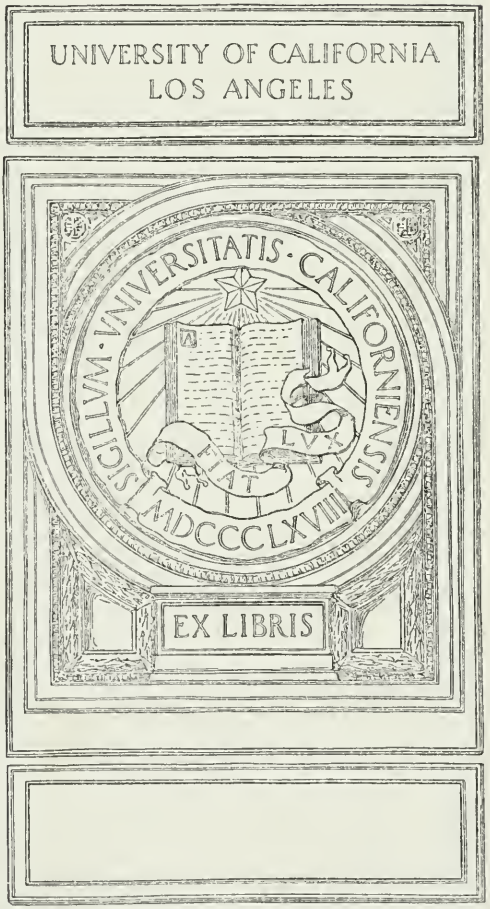


with whom one deales a far off, then to fall vpon the point at first, except you meane to surprise him by some short question. It is better dealing with men in appetite then with those which are where they would be. If a man deale with another vpon conditions, the start or first performance is al, which a man cannot reasonably demaund, except either the nature of the thing be such which must go before, or else a man can [illegible]

not vpon facility. It is a good precept generally in seconding another: yet to adde somewhat of ones own, as if you will graunt his opinion, let it be with some destinction. If you wil follow his motion: let it be with condition: if you allow his counsell, let it be with alleadging further reason.

Of followers and friends.

not to doe the same things still. Beware of any suddaine change in any great point of diet, and if necessity inforce it, fit the rest to it. To be free minded and cheareful ly disposed at houres of meate, and of sleepe, and of exercise, is the best precept of long lasting. If you fly physick in health altogether, it will bee too strange to your body when you shall need it. If you make it too familiar it wil work no extraordinary effect when sicknes commeth. Delpise no new accident in the body but aske opinion of it. In sicknesse respect health principally, and in health action. For those that put their bodyes to endure in health, may in most sicknesses which are not very sharpe, be cured onely with diet and tendring. Physitians are some of them so pleasing and comfortable to the humours of the patient, as they presse not the true cure of the disease: and some other are so regular in

proceeding

stoupe to pettye gettinges. A man ought warily to begin charges, which once begunne must continue. But in matters that returne not, he may bee more magnificent.

Of Regiment of health.

Here is a wisedome in this beyond the rules of Physicke. A mans own obseruation what hee findes good of, and what he findes hurt of, is the best Physicke to preserue health. But it is a safer conclusion to say, This agreeth not well with me, therefore I will not continue it, then this, I finde no offence, of this therefore I may vse it. For strength of nature in youth passeth ouer many excesses, which are owing a man till his age. Discerne of the comming on of years, and thinke

not

Of Regiment of health.

proceeding according to art, for the disease, as they respect not sufficiently the condition of the patient. Take one of a middle temper, or if it may not be found in one man, compound two of both sortes, and forget not to call as well the best acquainted with your body, as the best reputed of for his faculty.

Of Honour and reputation.

THe winning of honor is but the reuealing of a mans vertue and worth without disaduantage, for some in their actions doe affect Honour and reputation, wh ch sorte of men are commonly much talked of, but inwardly litle ad[illegible]ed: and some darken their vertue in the shew of it, so as they be vnder-valued in opinio. If a man performe that which hath not beene attempted before, or attempted

Of Expence.

and not subiect to deceite and abuse of seruants, and ordered to the best shew, that the billes may be lesse then the estimation abroad. It is no basenesse for the greatest to discend and looke into their owne estate. Some forbeare it not vpō negligence alone, but doubting to bring themselues into melancholy in respect they shall find it broken. *But woundes cannot bee cured without searching*

He that cannot looke into his own estate, had need both chuse wel those whom he employeth, yea and change them often. For newe are more timerous and lesse subtle. In clearing of a mans estate he may as well hurt himselfe in being too suddaine, as in letting it run on too long, for hasty selling is commonly as disaduantageable as interest. He that hath a state to repaire may not dispise small things: and cōmonly it is lesse dishonorable to a bridge petty charges, then to

Of Negociating.

IT is generally better to deale by speech then by letter, and by the meditation of a third then by a mans selfe. Letters are good when a man would draw an aunswere by Letter backe againe, or when it may serue for a mans iustification afterwards to produce his owne Letter. To deale in person [illegible] breedes

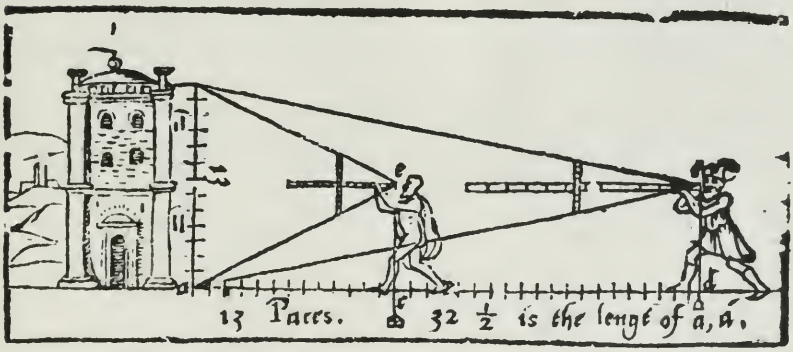
Of followers and friends.

on to him with whom they range thēselues, but vpon discontentment conceiued against some other, wherupon commonly insueth that ill intelligence that wee many times see between great personages. The following by certain States answerable to that which a great person himselfe professeth, as of souldiers to him that hath been imploied in the wars, and the like hath euer beene a thing

A BOOKE NAMED TECTONICON,

Briefliе ſhewing the exact meaſuring, and ſpeedie reckoning all manner of Land, Squares, Timber, Stone, Steeples, *Pillers, Globes, &c. Further, declaring the perfect making and large vſe* of the Carpenters Ruler, containing a Quadrant Geometricall: comprehending alſo the rare vſe of the Squire. And in the end a little Treatiſe adioyning, opening the compoſition and appliancie of an Inſtrument, called the profitable Staffe. With other things pleaſant and neceſſarie, moſt conducible for Surueyers, Landmeaters, Ioyners, Carpenters, and Maſons.

Publiſhed by LEONARD DIGGES *Gentleman, in the yeere of our Lord,* 1556.



Imprinted at London by FELIX KYNGSTON, dwelling in Pater-noſter row, ouer againſt the ſigne of the Checker. 1605.

L. D. To the Reader.

ALthough (gentle Reader) many, excellent in Geometrie, vpon infallible grounds haue put forth diuers moſt certaine and ſufficient Rules, touching the meaſuring of all manner Superficies: yet in that the Art of numbring hath been required, yea chiefly thoſe Rules hid, and as it were locked vp in ſtrange Tongues, they doe profit (or haue furthered) very little the moſt part: Certes nothing at all, the Landmeater, Carpenter, Maſon, wanting the aforeſaid. For their ſakes, I am here prouoked not to hide, but to open, and ſo encreaſe the Talent which I haue receiued: yea to publiſh in this our tongue very ſhortly (if God giue life) a volume containing the flowers of the Sciences Mathematicall, largely applied to our outward practiſe, profitably pleaſant to all manner men in this Realme. In the meane time I ſhall deſire the Artificers aboue named, to be contented with this little Booke (a taſte of my good will towards them) which I wiſh euen ſo to further the Readers, as I know it ſufficient for the true meaſuring and readie account of all manner Land, Timber, Stone, Boord, Glaſſe, Pauement, &c.

Here mine aduice ſhall be to theſe Artificers that will profit in this, or any of my bookes, now publiſhed, or that hereafter ſhall be, firſt confuſely to reade them through, then with more iudgement. Reade at the third reading, wittely to practiſe: So few things ſhall be vnknowne. Note, oft diligent reading, ioyned with ingenious practiſe cauſeth profitable labour.

Thus moſt hartely farewell (louing Reader) to whom I wiſh my ſelfe preſent, to further thy deſire and practiſe in theſe.

THE PLEASANT PROFIT OR content of this little Booke, and in what it *exceedeth all other publiſhed.*

OTher bookes tofore put forth in our Engliſh tongue, contained onely the bare meaſuring of Land, Timber, and Boord: how agreeable in all places to the rules of Geometrie, let the learned iudge. Here (gentle Reader) thou ſhalt plainly perceiue through diligent reading, how to meaſure truly, and very ſpeedily all manner Land, Timber, Stone, Steeples, Pillers, Globes, Boord, Glaſſe, Pauement, &c. without any trouble: not painted with many rules, or obſcure tearmes, nor yet with the multitude of Tables, as heretofore hath been: in which not a few errors were committed: for that cauſe no iuſt account might any way be had. Further, ye ſhall by this booke vnderſtand the whole making and comely handling of the Carpenters Ruler, with the true meaſure, &c. And his vſe appointed to the readie meaſuring of all kinde of Timber, Stone, Boord, &c. Alſo the leuelling of grounds, and taking of heights, is pleaſantly and diuerſly practiſed by the Ruler. Ye haue here not the common, but the rare vſe of the Squire, applied to heights, lengths, &c. And to the finding of the iuſt houre of the day diuers waies, through the aide of pleaſant Tables newly adioyned to my generall Prognoſtication: by the which the proportion of things, direct or ſquire-wiſe ſtanding, are by their ſhadowes knowne.

To conclude, in the end of this Booke is added a Treatiſe, ſhewing the making, and vſe of an Inſtrument, by which yee ſhall get lengths, heights, breadths, wideneſſes, where or howſoeuer they ſtand. Other neceſſarie things are contained in this little volume, which I commit to the diligent Reader.

DIVERS THINGS CONDVCIBLE TO THE ARTE OF Measuring.

The first Chapter.

AS there are fewe Craftsmen which haue all the kindes of Arithmetike readily: so I doe suppose none so ignorant, but that they doe, or may easilie perceiue the simple significations of these Characters or figures, 1.2.3.4.5.6.7.8.9.10. And also their strength in the first, second, and third romes placed. Character numerall.

Besides that, they must bee familiar with these and such like fractions.

$\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{13}$ $\frac{1}{32}$ $\frac{1}{4}$ $\frac{4}{5}$ $\frac{9}{10}$. The first leftward betokeneth one second part of an whole, be it Pearch, Inch, or any other measure: the next, one third, then one seuenth part: the other ensuing, one sirteenth. So one thirtie and two parts of an Inch. Then follow three fourths: foure fifths. The last is nine tenths of an Inch: that is nine parts of an Inch, diuided into tenne portions. Fractions.

These I doe intende to put in my examples, and in my tables and margines following, to represent parts of Pearches or Inches. As if I would write halfe an Inch, after

this manner ¼. Three quarters of an inch thus ¾. One eight of a Pearch, on this wise ⅛. So of the reſt.

It is requiſite alſo here to open what a Pearch, a Day worke, a Roode, and an Acre is.

Although there are diuers opinions engendred through long cuſtome in many places, of the length of a Pearch (vpon which our cheefe matter dependeth) yet there is but one true Pearch by Statute appoynted to meaſure by. Wherein is ordained three Barly cornes drie and round to make an inch: twelue Inches, a Foote: three Foote, a Yarde: fiue Yardes, and ½. a Pearch: fortie Pearches in length, and foure in breadth an Acre. So an Acre by Statute ought to containe 160. Pearches; the halfe Acre 80. Pearches; a Rode commonly called a quarter 40. Pearches, a day worke 4. Pearches. Lo here the Acre expreſſed with his length, and breadth.

Acre.

Breadth.		Length.
1		160
2		80
4		40
5		52
8		20
10		16

Inſtruments to meaſure with Poales Cord knotted. Profitable ſtaffe.

I muſt not omit here to tell you what thing is meeteſt to meaſure land with. They vſe commonly in the countrie two Poales, either of them the length of a Pearch. They are very good. Yet for all kinde of Land, a Corde fiue Pearches in length, well ſeared with ware and roſen, knotted or marked at the end of euery Pearch, is more méete and readier. But in my fantaſie, the inſtrument Geometricall, which is put forth in the end of this booke, paſſeth them all and other, for the exact truth and quickeſt ſpeede. This Inſtrument is ſo generall and auailable to ſo ſundrie things, that it alone requireth a large booke, if it ſhould be ſufficiently ſet forth.

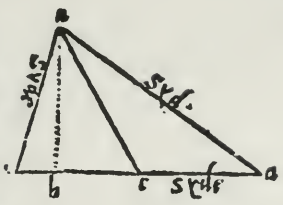
Triangle.

Alſo I would not haue you ignorant what peece of Land is called a Triangle, which often ſhall hereafter be named. It is ſuch a faſhioned péece as hath (or is imagined to haue) three ſides, and three Angles onely: whether the ſides be equall or otherwiſe, as this figure ſheweth. Againe, note that a line is ſaid to fall Squire wiſe, when it cutteth any thing, or any ſide of a Triangle full croſſe, like vnto a Squire: As the

Line falling ſquirewiſe.

hanging

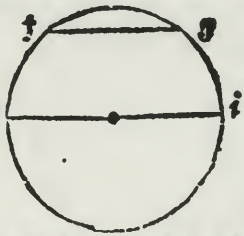
hanging plomet line a. b. in c. d. the base line of the Triangle. So it cutteth the side squirewise, or full crosse in the poynt b. and not as the other line a. c. doth. The base of anie Triangle is here called that side, which is cut squirewise of the hanging line.



Base line.

Concerning a Circle, knowe that the compasse of anie Circle is named a Circumference: the middle poynt in him his Center: the right line h. i. that goeth overthwart that Center touching the Circumference on both sides is his Diameter: the halfe of that line, the Semidiameter. Also an Arch is a peece of the Circumference cut away, as ye see the Arch above the line f. g. Also f. g. h. i. in this Circle are named Parallels: for that they differ equally in all places, the one from the other.

Circle.



Circumference.
Center.
Diameter.
Semidiameter.
Arch
Parallels.

Note, because practise and experience sheweth me, that there is almost no Land, but it may easily bee brought by imagination to a Triangle or Triangles, and so most truly measured: therefore, to be short, this order shall be taken. I will first figure and set afore your eyes Triangled Land, and other which by imagination shall be brought into Triangles. Then I shall teach the true measuring of them: I meane, how to finde a length and breadth, with which ye shall enter the table of account following, where the Acres and odde Pearches (if there be any) shall appeare. As these figures are measured, so all Triangled Land, and other brought into Triangles, of what fashion so ever they be, shall be measured. And because it is requisite for true measuring of all Triangles, to finde a streight hanging line, I shall shew first how that line is to bee found, imagined, or drawne.

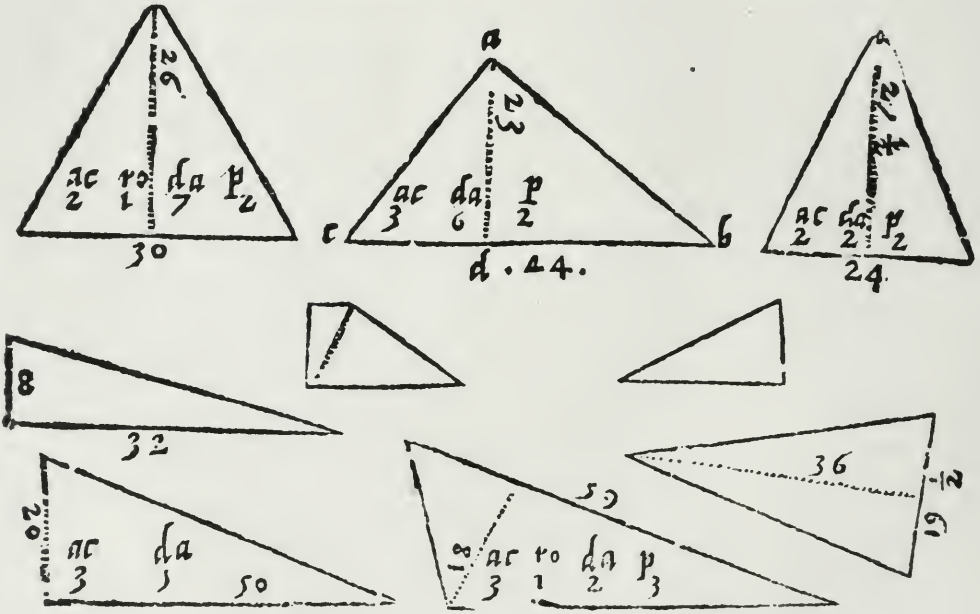
How

How the right hanging line in Triangles is drawne.

The ij. Chapter.

To draw a hanging or plumbe line.

THis straight hanging line in all Triangles is euer drawne or imagined from any Angle, cutting some one sloe of that Triangle squirewise: as yée may perceiue the pricked lines in the Triangles following. By the helpe of this line, all Lands of Triangle fashion, are brought to bée measured as ensueth.



How

How to measure all manner Triangled Land.

The iij. Chapter.

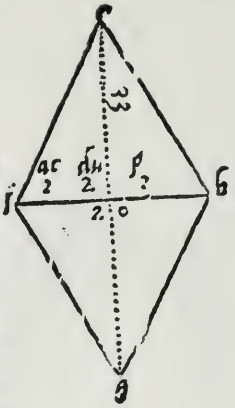
IF thou bée an Arithmetician, multiplie this Euclid the 1. Booke. 41. pro. streight hanging line, drawne, as aboue is shewed, in halfe the number of Pearches of that side, which it cutteth squirewise. For want of the knowledge, take the aforenamed Pearches (I meane of the hanging line, and halfe the side which he cutteth) and with that length and breadth enter your table of account, as there is set forth. So shall ye perceiue the number of Acres, Rods, Dayworks, &c.

Example.

FOr the perfect measuring of Triangles afore figured, and all other, suppose the second of these last nine figures of the other side, hauing written aboue it a. b. c. d. to bee a peece of land, whereof I would haue the true measure, I finde by a Corde, otherwise, the pricked hanging line a.b. to bee 23. Pearches: the side b.c. which it cutteth squirewise 44. Pearches, whose halfe is 22. With these 22. and 23. the conuenient length and breadth, I enter the table of account. There I finde by that Table at the corner where both the lines of conuenient length and breadth dw meete 3. Acres, 6. dayworkes, and two pearches to be in that Triangle. Thus of all before figured.

Here note your Table must euer bée entred with all the Pearches of the hanging line, and with halfe the side that he cutteth squirewise. Or with the halfe hanging line, and the whole side cut. This Table followeth.

A figure of a double Triangle.

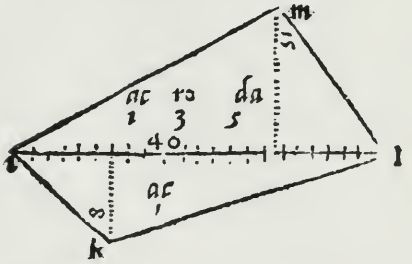


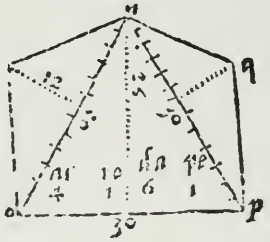
THis figure e.f.g.h. is but two Triangles: and therefore measured as aboue in two parts. Or thus: The hanging line, e.g. is 33. Pearches: the side f.h. that hee cutteth squire wise 20. Pearches, the halfe of the which is 10. Now enter your Table as afore, with 33. and 10. the conuenient length and breadth. So shall ye finde two Acres, two Dayworkes, and two Pearches, the true content of this figure e.f.g.h.

Another example.

Figures of many Angles.

ADmit i.k.l.m. land to be measured. Because it is no manner Triangle, it must be brought by imagination, as I haue said, into a Triangle or Triangles. Which imagination is heere signified by the line dashed i.l. Then as aboue is





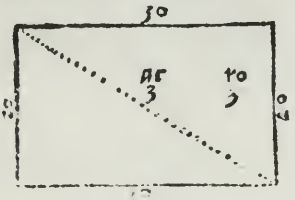
declared, it ought to bee measured (according to the rule of Triangles) in two parts, because there are two Triangles in that land. So by proofe ye shall finde in the vpper i. m. l. one Acre, 3. Roodes, and fiue Dayworks: in the other i.k.l. one Acre. Thus I gather the whole content of that Land, to bee two Acres, three Roodes, and fiue Dayworks.

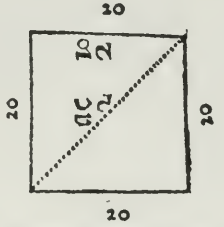
None

None otherwise of the adioyned n.o.p.q. and all other figures following: and other whatsoeuer they are, that by any meanes may be brought into Triangles.

Furthermore know that the figure i.k.l.m. is readily thus measured. Adde the Pearches of both the hanging Lines together: so haue yee 23. With this number, and with halfe the Pearches of the side, i.l. which bee cutteth squire wise, being 10. Pearches, enter your Table. So is found as afore.

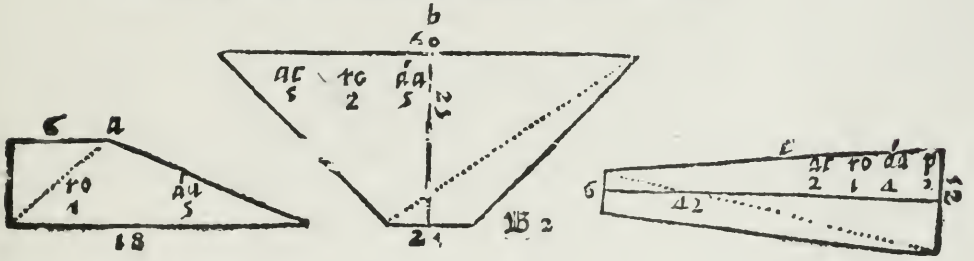
These two figures following may also bee thus measured, otherwise then by the rule of Triangles. Enter your Table with their conuenient length and breadth. So shall you finde the contents of all such.





These three figures following, although they may be measured by the rule of Triangles, yet for quicker speede, they haue also their proper measuring as ensueth.

Lay together the two sides which are parallels of the first figure a. that is 6. & 18. making 24. the halfe is 12. the breadth 5. Enter with 5. and 12. your table. So haue you one rod, and fiue day works. For the other two b.c. and such like, ioyne the heads or ends in one: and enter your table with halfe of those Pearches, and with the whole number of the middle line.



How by ſupputation to meaſure all triangled land.

To meaſure triangled land by ſupputation.

IOyne all the ſides together: take halfe out of that halfe, pull euery ſide, noting the difference. Then multiplie the differences, the one in the other, and the third difference augment in the product. That which encreaſeth, multiplie in the halfe of all the ſides ioyned. Then the Radix of the ſurmounting ſumme is the content of that Triangle.

Foure rules following.

Now reſt foure Rules to be treated of. The firſt for all manner Regular ſquare Superficies. The ſecond for round Land, and her parts. The third for Steeples, Columnes, Globes, and their parts. The laſt for Mountaines, and Valleys. Here they ſhall in order follow.

A rule for all maner Regular or right ſquared Land of many ſides, as 5.6.7.8.9.10.20 100.&c.

The iiij. Chapter.

To meaſure land of many ſides.

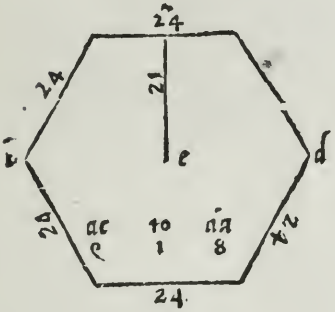
MEaſure and lay all the ſides together, taking the halfe number of Pearches there contayned. Then draw a right hanging line from the Center or middeſt of that figure, or the middeſt of ſome one ſide. And with that length and the other, enter your Table. Note that the Triangle of all ſides like, and the Quadrate figure are alſo meaſured by this rule.

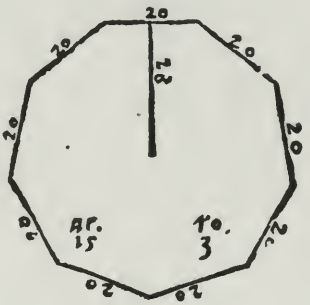
Example.

SUppoſe this figure a.b.c.d. to bee a fire ſquare peece of Land, and euery ſide 24. Pearches. The halfe ſumme of all

all ſides is 72. Pearches: the right hanging pricked line a.c. 21. Pearches. With theſe two numbers ye muſt enter your Table of account following hereafter. And doe as is opened in the declaration there adioyned, when Numbers ſurmount the Table as they doe here.

So ſhall ye finde 9 Acres, 1. Rood, and 8. Dayworkes, the content of this figure a. b. c. d. Euen thus is the other nine ſquared figures meaſured, and ſuch like.





A Rule for round Land, and the parts thereof.

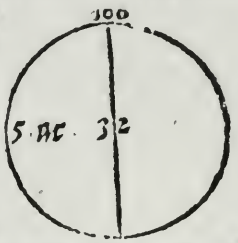
The v. Chapter.

HAlfe the Diameter multiplied in halfe the Circumference, ſheweth the content of any Circle. Archimedes in libello circuli menſurationis.

Or thus more plainly. Ye ſhall enter your Table with halfe the number of pearches of the whole Circumference or compaſſe, and with the number of halfe the Diameter or breadth. So haue yee the content.

Example.

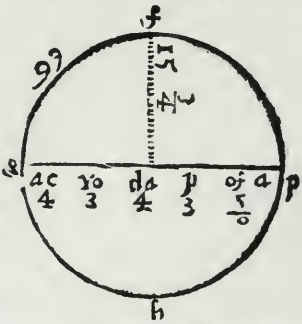
Suppose a peece of land, whereof the compasse is 100. pearches, the breadth 32. Pearches, I would know how much Land is in this figure. Enter your Table with halfe the compasse, that is 50. and with halfe the breadth, that is 16. Pearches. Because in the Table I cannot finde 50. for the greatest length is 40. (therefore I enter with 40.) and 16. So is found foure Acres. Then I enter againe with 16. Pearches remayning, and 16. the breadth as before, that bringeth 1. Acre. Now to conclude by addition of 1. and 4. I finde fiue Acres in that round Land, whose halfe compasse is 50. Pearches, and the breadth 16. Pearches.



How parts of Pearches are to be counted in measuring.

For perfect knowledge and vse of this Table following, when parts of Pearches are adioyned, note well this other example that ensueth, and also what is said of the declaration annexed vnto the table, when parts of Pearches are in the length, breadth, or both.

Imagine f.g.h. to be a round peece of Land: I finde by measure the whole compasse, 99. Pearches. The halfe is 49. $\frac{1}{2}$. The hanging Line or halfe breadth is 15. $\frac{1}{4}$. Enter your Table with the whole Pearches, that is 49. and 15. leauing out $\frac{1}{2}$. and $\frac{1}{4}$. which were but parts of pearches. So haue

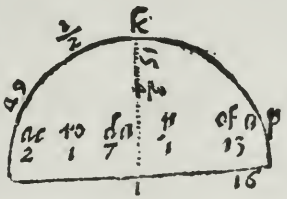


ye

ye 4. Acres, 2. Rods, 3. Dayworks, and 3. Pearches. For those parts of Pearches omitted, at your first entring the Table, worke thus. The halfe Pearch, Quarter, or other part of a Pearch in the length, must bee reckened by themselues in the whole breadth, and those of the breadth contrariewise in the length. If there bee such odde parts in both, then recken them of the length in the whole breadth, and them of the breadth in the whole length, ioyning to the other afore gotten, remembring the product of the one fraction multiplied in the other, to be pulled from the encrease. To make this matter plaine; I will take this last example before. The one number wherwith I should haue entred my table, was 49. $\frac{1}{2}$. the other 15. $\frac{1}{4}$. I found first by entring with 49. and 15. (omitting the odde parts) 4. Acres, 2. Roods, 3. Dayworks, and 3. Pearches. Now for the encrease of the Parts of Pearches left out, I must (as I said) recken them of the length in the breadth, and contrariwise them of the breadth in the length. Halfe 15. $\frac{1}{4}$. is 7. Pearches, and $\frac{3}{8}$. Three quarters of 49. is 37. Pearches, $\frac{1}{8}$. Which added, makes 45. Pearches. This adioyned to the number afore gotten, bringeth the whole content of the round figure, which is 4. Acres, 3. Roods, 4. Dayworks, 3. Pearches, and $\frac{1}{8}$. of a Pearch, the product of the one fractiō multiplied in the other subducted. What must be done when the numbers wherewith ye should enter, exceede your table, counsel the declaration of your table there adioyned.

Of the halfe Circle.

For this halfe circle, enter the Table with halfe the compasse, and with halfe the Diameter of the Circle, or with the length of the pricked hanging line, k.l. So the content of this halfe Circle is 2. Acres, 1. Rod, 7. Dayworkes, 1. Pearch, and $\frac{1}{16}$. of a Pearch.



To measure halfe circled Land.

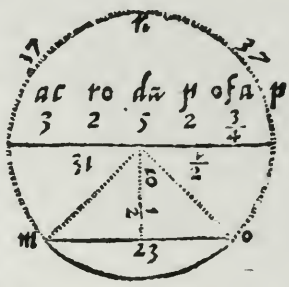
Another

Another example of Portions and parts of a Circle.

Suppoſe n.m.o. following, were a part of a Circle or peece of Land, whoſe Content ye deſired. The whole Compaſſe of the Circle which this portion repreſenteth, is (as afore-ſaid) 99. Pearches: his Diameter or breadth 31. ½. The pricked Arke or Compaſſe, n.m.o. is 74. Now with the halfe Breadth or Semidiameter of the Circle, 15. ½. and with 37. the halfe of the pricked Compaſſe: enter your Table. So haue ye 3. Acres, 2. Roodes, 5. Dayworkes, 2. Pearches, and ¾. of a Pearch, the Content of the peece of Land full of pricks, to the ſides of the Triangle pricked.

To meaſure parts of circled Land.

If ye deſire to know the ſum of Pearches in the other portion beneath the Triangle, ſeparated by the Line m.o. ye muſt adde the Content of the Triangle (which is 3. Roodes and ¼. of a Pearch, found by the Rule of Triangles) to the Acres and Pearches before ſearched. So haue ye 4. Acres, one Roode, 5. Dayworks, three Pearches, and ½. of a Pearch. This ſubſtracted or pulled from the number contained in the whole Circle, the remaine is the Pearches included in the ſmall peece beneath the Triangle. That is, 1. Rod, 36. Pearches, and ½. of a Pearch.



How mixed Figures are meaſured.

Land compounded of circles, or his parts.

I Thinke none now will doubt how theſe two figures following are meaſured, becauſe they are made of portions or parts of Circles, whoſe meaſure is before ſufficiently ope-

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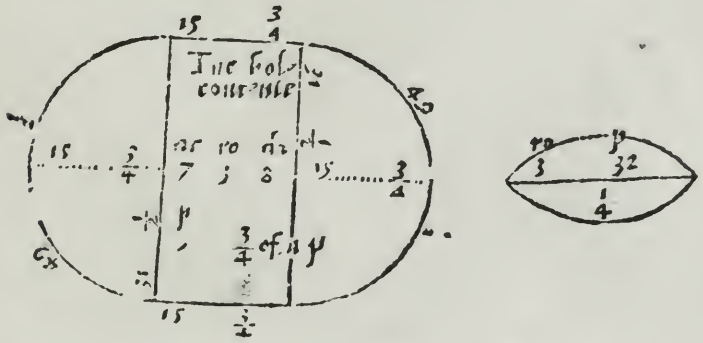
ned, the one consisting of two halfe Circles, & a Quadrangle: the other being the portions of the Circle, in o. doubled.



If any euill fashioned Land chance to be measured, which requireth to bee brought into many Triangles, to saue labour, yée may adde some portion vnto that, and make it square, or otherwise. So let it then be measured: and after, from the product pull away that ye added: the remaine is the Content.

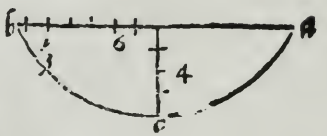
To finde the content superficiall of Steeples, Columnes, Globes, and their parts.

TO the Arithmetician I say: for picked Stéeples, multiplie the whole side in halfe the Circumference of the Base, adding the plaine of that Base. For pillers, augment the Circumference of the Base in the Heights, putting to the plaine of both Bases. For Globes, the Diameter in the Circumference multiplied: euen so of Fragments or parts. Let them that bee voide of Arithmetike enter my Table of account following, with such numbers as I now willed the Arithmetician to multiplie, not forgetting what I haue before written. So I serue their turne. To measure Steeples, Columnes, Globes, &c.

The Art of measuring

Or thus by the rule of proportion, the parts of a Globe are found.

To measure parts of Globes.



Suppose a. b. c. to bée a peece of a Globe, and 4. to be a proportion of the Diameter, the whole being 14. Thus I say, 14. the whole Diameter giueth 616. the Content superficiall of the Circle: what shall 4. bring? So haue ye 176. which is the content of that peece.

To find the Diameter by some knowne portion thereof.

To finde the vnknowne Diameter of a Globe.

If ye be ignorant what length the Diameter of the Globe is, whose proportion ye haue, the height or part of the Demecient being 4. foote, augment halfe the line a.b. which is 6. ½. in himselfe, and the product diuide by 4. So haue ye 10. ½ to be added to 4. which maketh 14. the whole Diameter.

The true measuring of Mountaines and Valleys.

The vi. Chapter.

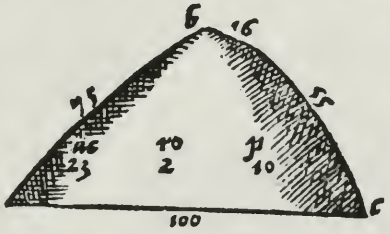
To measure Mountaines.

First ye shall measure the circuit of the Foote, or Base of the Mountaine: then the compasse of the Summitte or top, adding them together. So shal ye doe of the Ascenses, that is, the going vp from the foote to the top, ioyning the measure of the longer and shorter in one. Now take the halfe of the circuit added, and the halfe part of the Ascenses ioyned, and enter your Table: there shall ye see the Content.

Ensample.

Enſample.

A.b.c. is the Mountaine: a.c. the circuit of the Baſe, being 100. Pearches, b. the top 16. Pearches. Which ioyned together make 116. b. c. the one Aſcenſe is 55. Pearches: the other 75. Theſe added make 130. The halfe of the circuits is 58. the halfe of the Aſcenſes 65. With theſe two ſummes yée ſhall enter your Table of account, where yée ſhall finde 23. Acres, 2. Rodes, and 10. Pearches, the true content of this figured hill. Figure of a Mountaine.



Of the Valley.

AS in the Mountaine ye meaſured the circuit or compaſſe of the Baſe or Foote: ſo here contrarie yée ſhall meete round about the circuit or compaſſe of the height of the Valley. And as yée got the meaſure or compaſſe of the top of the Mountaine: ſo meaſure the circuit of the depth of the Valley. In like manner as yée meaſured the Aſcenſe, that is, the going vp from the foote to the top: ſo meaſure the Diſcenſe or going downe of the Hill, to the depth of the Valley. The reſt all worke, as I haue ſhewed you in meaſuring the Mountain. To meaſure Valleys.

For more plainnes, behold this enſample or figure. If ye lay together the circuites of the height & depth, which is 210. and 30, taking the halfe part of thoſe two Circuites, making

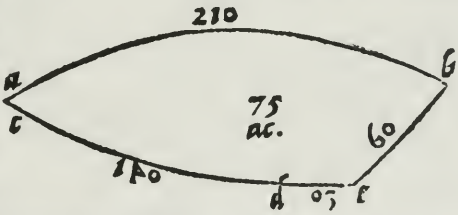


Figure of a Valley.

an 120: then the two Aſcenſes 140. and 60. added in one product 200. the halfe thereof being 100: with this and 120. the other halfe of the Circuite, ye may enter your Table. That doing, loe 75. Acres.

How the Table of account now following, is to be vſed.

What is to be done when numbers, with which you ſhould enter, exceede your Table.

When you haue gotten a conuenient Length and Breadth, (as I haue aboue declared by diuers Triangles and other figures) then you ſhall enter this Table. Seeke there the Length, and moſt number of Pearches in the higher margine, which beginneth at 1. and endeth rightward at 40. Looke the other ſumme of Pearches (I meane the Breadth) in the right ſide and hanging margine, from 1. deſcending to 30. Now at the meeting of the lines, where the one anſwereth the other directly in a ſquare, you ſhall finde the Acres, Roodes, Day workes, and Pearches. Note that the firſt number ſet on the left ſide, and vpper part in any ſquare, ſignifieth the number of Acres. The figure 1. ſet in the vpper part, and right ſide, doth betoken a Roode: the figure 2. there two Roodes, 3. three Roodes. And the figure in the left ſide beneath, ſignifieth a Day worke, or day workes. A figure in the lower part rightward, declareth Pearches.

A Declaration adioyned.

When it chanceth that the one number or both, with the which ye ſhould enter this Table, are greater than any here found: it behoueth you to take the halfe of the one, and the whole of the other, or what parts ye liſt of both, moſt commodious for your purpoſe, & ſo enter your Table. Looke then what is there found, and it ſhall beare his name of the parts multiplied in themſelues.

Enſample.

Enſample.

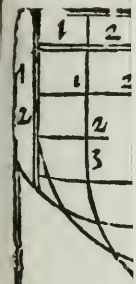
Suppoſe the number with the which ye ſhould enter your Table to bee 103. Pearches in length, and the breadth 60. neither of theſe may be found in the margines: wherefore I take the third part of an 130. which is 34. Pearches, and one remaineth.

The halfe 60. that is 30. I finde with entring them at the common meeting 6. Acres, 1. Roode, and 5. Day workes. This ſumme muſt haue his name of the parts augmented in themſelues. I tooke the third part of the one, and halfe the other number, therefore 2. muſt be multiplied in 3. or contrarie: ſo haue ye fire, which ſignifieth that ye haue found by entring, but the firſt part of the number ye ſhould finde. Wherefore I muſt take this ſumme before found (being Acres, 1. Roode, and 5. Day workes) fiue times as much. So haue yee 33. Acres, and one Roode. For the Pearch remaining in the length, reckon him in the breadth (as is afore declared) in the laſt Chapter of the Remaines: ſo haue ye 60. Pearches more to bee added. So the encreaſe of theſe two numbers, 103. and 60. amount to 38. Acres, two Roodes, and 5. Day workes. Thus any manner length and breadth is reduced to this Table following, which ſufficeth.

Looke what I haue ſhewed in the chapter of parts, that vnderſtand here of whole Pearches. leaſt ſubtracting, &c.

Thus with few words is ended the certaine meaſuring of all manner Land, touching the Superficiall Contents. Wherefore now ſhall follow the true meaſuring of Timber, Stone, Steeples, Pillars, Globes, according to their Craſſitude.

Such as are altogether ignorant of Arithmetike, may reckon by our Engliſh coyne, allowing for every Pearch in length or breadth a penie, and ſo euery Marke makes an Acre, euery Noble halfe an Acre, euery fortie pence or halfe Noble, a Roode, and euery pennie a ſquare Pearch. And ſo by memorie without Tables, may in ſome rude and groſſe maner, caſt vp reaſonable ſuft the true contents of all Cloſes, Medowes, Parſhes, Hils or Valleys.



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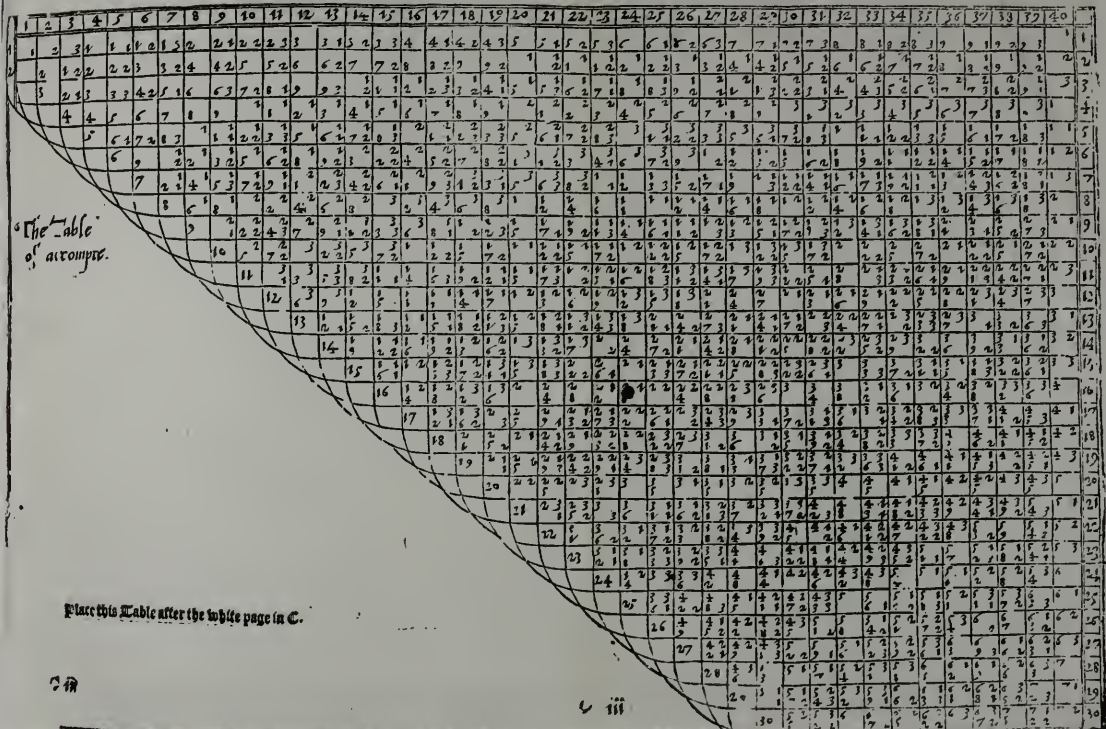

The Table of accompt.

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TO THE READER.

IT commeth commonly to paſſe, that Carpenters, Maſons, and ſuch like Artificers, are put either to meaſure timber euerie way ſquare, or ſquared logges, broader on the one ſide than on the other: yea, many times mutilate or vnperfect ſtuffe. Sometimes three, fiue, ten, or twentie ſquare in the head, and ſo through: oftentimes round Stone or Timber with hollowed, &c. Afore I ſhew vnto them what muſt be done with ſuch peeces of Timber or Stone, to get their true meaſure, my deſire ſhall be, that ſuch Craftmen will leaue to be heady or ſelf willed: yea ſo greedily to ſticke to their corrupted rules, that vtterly they refuſe to be taught.

Both learning and experience declareth vnto me, that the grounds which the beſt of them haue, are falſe. To open how and where, it needeth not: neither doth it appertaine to inſtruction, onely it may ſuffice him that liketh the true way, here to receiue it appointed to him. Yet to ſatisfie and content him which will not beleeue any ſuch errors or falſe grounds to be, I ſay (and truly) that the Ruler of Timber meaſure, which the moſt part of them hath, is not made by right Art. Beſides

ſides that, their craft in ſeeking the Square of ſome Timber is very falſe. They vſe in meaſuring, to lay the broader and narrower ſides together in a ſumme, and to take the halfe of that number for the Square. Then they ſeeke this vntrue Square vpon the falſe Ruler, and ſo meaſuring the Timber, they conclude of it vntruly.

As this is corrupted, ſo are other Grounds which they take to be infallible. Now to the purpoſe: touching the correction of thoſe Errors, with other not mentioned, whereby true meaſuring may enſue, this way ſhall be taken. After I haue opened how you muſt handle all ſuch faſhioned Timber (as afore is ſpoken of) there ſhall follow a Table, in which ye may finde (as I will declare) the Square of any Stone or Timber. That knowne, it is requiſite to haue another Table immediatly following, which may appoynt to all true Squares from 1. to 6. inches, the iuſt length to make a Foote euery way ſquare. With the length agreeable to your Square, your Logge muſt be meaſured. And as oft as ye find it from the one ende to the other of your Timber, ſo oft ye may conclude the Foote ſquare to be contained in that timber Logge, or Stone: that is, ſo many ſquare Feete there to be included. This Table of Timber meaſure ſtandeth in the place of a good Ruler, well decked with true meaſures. By this ye may make or correct Rulers at pleaſure, as after appeareth.

In a Foote ſquare is contained 172. Inches.

Now orderly followeth the true meaſuring of all faſhioned Timber or Stone aforenamed.

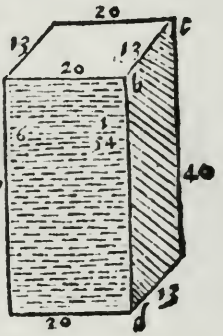
How Timber or Stone foureſquare euery way, or broader on the one ſide than on the other, is meaſured.

The vij. Chapter.

IF a péece of Timber or Stone, be either equally ſquare, broader on the one ſide, than on the other, yee ſhall take the iuſt meaſure. I meane, how many Inches the broader ſide containeth: euen ſo of the narrower. This done, yée muſt ſeeke in the Table of Squares following, the meaſure of the broader ſide of the Timber or Stone, in the vpper margine of that Table. Then looke for the number of Inches, of the equall or narrower ſide in the right part and hanging margine. At the common meeting where the one number anſwereth directly to the other, there your true Square ſhall appeare. This Square ſo found, ſhall be referred to your Table of Timber meaſure: in the which yée may plainely ſee (if you runne downe by the left margine, vntill your Inches ſquare appeare) how many Feete or Inches of your Ruler belonged to a Foote ſquare. As often as that meaſure there found is contained in the Timber or Stone, ſo often and as many Feete ſquare yée may conclude (without doubt) the peece of Timber or Stone to haue.

Enſample.

Suppoſe this ſquared Timber or Stone a. b. c. d. were to be meaſured, the broader ſide a. b. 20. Inches, the narrower ſide b. c. 13. Inches, the length 40. Inches. Now I muſt ſeeke the broader ſide 20, in the vpper margine of the Table. The narrower ſide 13, muſt bee found in the right ſide and hanging margine. At their common meeting, 16. Inches, and $\frac{3}{4}$. part of an Inch ſhal appeare. This true ſquare muſt be ſearched for in the Table of Timber meaſure. Therefore looke for 16. in the margine of this Table. In the Squares with him rightward, ye ſhall finde 6. Inches, and $\frac{3}{4}$. which is three quarters of an Inch. Some deale leſſe of your Ruler than 6. and $\frac{3}{4}$. laid out vpon the Timber, maketh a Foote Square. And that meaſure ſo directly handled, is contained in the length of your Timber fiue times. Wherefore affirme fiue Foote there to be, beſide that is left $\frac{1}{44}$. part of a Foote. Note becauſe the Squares at all times (in this Enſample) riſe not to euen Inches, but ſometime to odde parts: therefore according to your diſcretion, adde or take away ſome part more or leſſe in ſetting foorth the Foote ſquare, as aboue is performed.



It were intollerable tediouſneſſe, yea impoſſible to ſet foorth the true quantities of Timber meaſure, to all odde quantities of Squares. The diſcreete handling of theſe, the wittie ſhall bring to a ſufficient exactneſſe.

Of

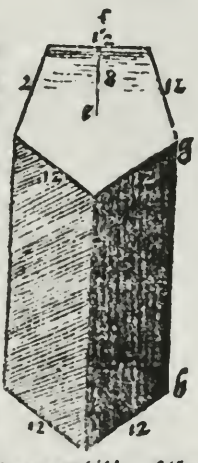
Of Timber or Stone, 3. 5. 10. 20. or moe ſides Square, &c.

The viij. Chapter.

When Timber hath diuers equall Squares in the head, and ſo through: firſt meaſure all the ſquare ſides round about the head or end of the Timber. Then take halfe the number of the whole meaſure for one breadth.

Then meaſure from the Centre (which is the middle of the head, or end of the Timber) to the middeſt of the ſquare ſide, betweene the two Angles, and take the meaſure of that diſtance for the other breadth. Now reſort with the meaſures of theſe two breadths, (as toforе) to the Table of Squares: ſeeking the bigger number or breadth in the vpper margine, and the other leſſer in the ſide margine. With the Square there found, haue recourſe to the Table of Timber meaſure, and doe as I haue inſtructed.

Enſample.



Admit this ſmall peece of Timber fiue ſquare, e. f. g. h. ſhould be meaſured, euery ſide being 12. Inches. If ye adde together in one ſumme all the fiue ſides, they make 60. Inches. The halfe is 30: that ſerueth for one breadth. Then the Line e. f. which goeth from the Centre or middeſt of the Square to the middle of one ſide, is 8. Inches. The two numbers 30. and 8. muſt be ſought (as before) in the table of Squares following. At the common meeting, your ſquare ſhall appeare 15. Inches, & ½. This ſquare 15. ſeeke in the Table of Timber meaſure. There yée may ſee right with it 7. Inches, and ½. Now becauſe of ½, the odde quantitie of the

Square aboue 15. Inches, lay something lesse. Then see how oftentimes that measure (so with discretion handled) is from the one ende of your Timber to the other: and affirme so many times a foote square there to be, as that measure is found in the length of your Logge.

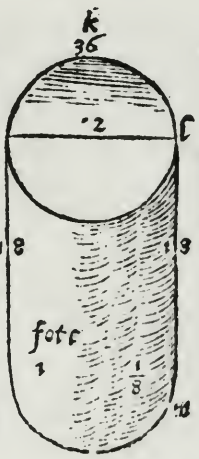
How round and hollow Timber, Steeples, Pillers, Globes, &c. are to be measured.

The ix. Chapter.

FIrst gird the Logge round about with some line: then diuide the line which compasseth that timber in two equall parts: kéepe the one part for the bigger breadth. After, ye shall diuide againe that whole length (the two and twentith part cast away) in three parts, and take the halfe of one of them for the other narrower breadth. With the measures of these two breadths, hast to your table, performing all things as afore is opened.

Ensample.

Suppose this little péece of Timber, i. k. l. m. were to be measured, the compasse or girding 36. Inches, the halfe of that is 18. being the one breadth: then the third part of 36. is 12: the halfe of it is 6. which is the other narrower breadth, with these two numbers 6. and 18. enter the Table of Squares following, and so the Table of Timber measure. At the last (all things performed as before) yée shall finde in this round Log, the length l. m. being eightéene Inches, one Foote, and ⅛. part of a foote. This is sufficient for all such like.



A note of hollowed Timber.

IF it chance that hollowed timber be to be measured: measure the whole Logge as though it were not hollow, as aboue is declared. Then measure the narrower and broader side of the hollow, and see what is contained in that, as though it were massie Timber. Now pull out the Content of it, from the whole aboue measured: the remaine of force must shew what timber is included in that hollowed body.

I Am vnable in few words to expresse to the vnlearned, by what meane Pyramidall, or picked regular Steeples of al fashions are measured. Also how Pillers, how the Content of Globes or Bowles are searched, vnlesse the Art of numbring were talked. That being knowne: thus (as now followeth) I teach.

How the crassitude of picked Steeples is knowne.

MUltiplie the plaine of the Base in the third part of the Height: so ye haue the Crassitude. Or multiplie the Content superficiall (found as I haue instructed) in the height of the Steeple, taking for your purpose the third part of that product.

How the Content of Pillers is knowne.

ENcrease the Base plaine in his Altitude or Height: so haue ye your desire.

How the Cubicall bodies of Globes are searched.

The Content Superficiall found, (as I haue opened) muſt be multiplied in the firſt part of the Diameter: the product is that ye require. Or the third part of the ſuperficiall Content in halfe the Diameter. Or multiplie the plaine of the Circle in the whole Diameter: then take two third parts, which added, make the Craſſitude.

Of the halfe Circle.

His Superficial Content multiplied (as I ſaid) bringeth the magnitude of him. If any man require enſamples of theſe laſt matters, or more ſufficent handling: let them reſort vnto my bookes publiſhed of Geometrie, where they ſhall be ſatiſfied. Theſe little appertaine to Carpenters or Maſons: therefore not by enſample declared.

A generall note.

When thou ſhalt be put to meaſure ſome Body, without order or faſhion, lacking part of his Square, or hauing more than his Forme: if it lacke, thou ſhalt make it perfect by obſeruing diligently the running together of the ſides. The parts wanting ſhall be meaſured, as though they were there, which portions muſt be taken from the whole Bodie meaſured.

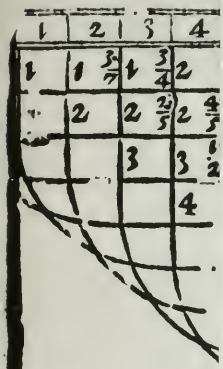
Alſo when there reſulteth any more than the forme or regular Square: firſt meaſure the ſquare Bodie: then the Craſſitude which aboundeth. All put together, doe ſhew the whole irregular Bodie. This ſufficeth.

A Table to finde the iuſt Radix or Square of any Timber or Stone.

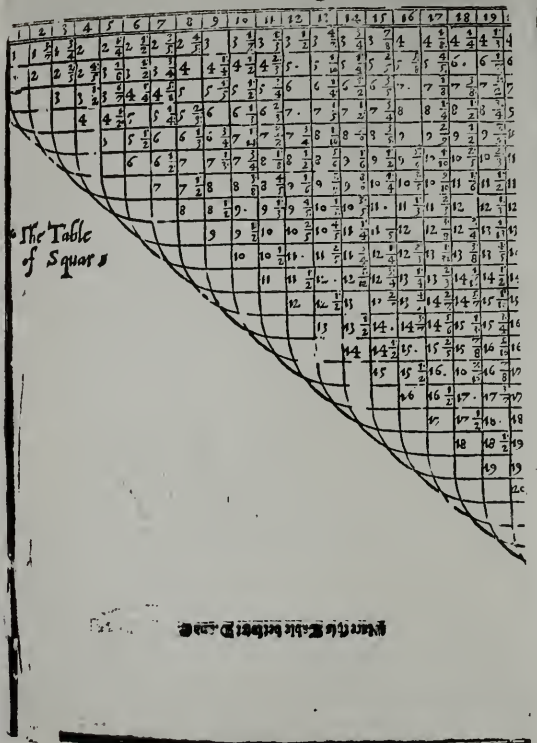
IT behoueth you to know that this Table following is made for the true ſquare of any maner Timber. Therefore vnderſtand that the numbers from 1. to 40. ſet aboue in the high margine, betoken the inches of the broader ſide of the Timber. And the numbers from 1. and ſo downward to 30. put in the right part & hanging margine of this table, ſignifie the inches of the narrower ſide: and to conclude briefly, the Element or figure ſet in euery ſquare roome, betoken the iuſt ſquare. The bigger figures leftward in euerie ſquare place, ſignifie the whole inches. And the other leſſer rightward in the ſame ſquare diuided by a line the parts of inches, as ½. &c.

This firſt Fraction toward the left hand betokeneth one halfe part of an inch: the other two fifts of an inch, and euerie figure or fraction hauing a point adioyned vnto him, ſome deale leſſe than that part is: as this part, ½ repreſenteth ſcant halfe an inch, a very little quantitie leſſe. And if it had two pricks by him, he ſhould haue declared ſome quantitie more: as this other fraction or part, ⅖ : which is more than two fifts, a ſmall deale.

It had not been needfull to haue put the parts of the Square ſo preciſely as they are here: neither is it requiſite ſo curiouſly to take them.



The Table
of Squar


The Table
of Squars

The Table of Timber measure, with the declaration and vse of it.

The x. Chapter.

THis Table (as yee see) is diuided into two Columnes or Rowes: the one very short, the other longer. In the head of the first, I haue put this word foot: in the second row, Inches, and parts: to signifie Feete, Inches, and parts of Inches. The summes in the margine and left part of the first and second columne, declare the quantitie of the square of Timber or Stone, from 1. to 36, Inches square. Within the rowes you may finde the iust length to a foote square, if yee enter into them in right order according to the square.

Example.

SUppose the square of your Timber were 7. Inches, and that yée desired to know what measure or length of the ruler would make a foote square: seeke in the left margine, seuen Inches: and with him in that order toward the right hand, ye shal find 2. foote, 11. Inches, and $\frac{2}{7}$. of an Inch. Note because the fraction $\frac{2}{7}$ hath a prick by him, it betokeneth some small quantitie lesse then $\frac{2}{7}$. of an Inch. If it had 2. prickes or points thus: $\frac{2}{7}$ it shuld signifie some little quantitie more. Neither maketh it matter whether ye obserue this pricking or no, the quantitie is so little to be added or pulled away.

Note what hath béen spoken of Timber, the same also is to be vnderstood of stone, likewise to be measured.

Thus is finished the measuring of Timber.
Now ensueth of Boord.

Square of the Timbre.	Foote	Inches	Partes
1	144		
2	36		
3	16		
4	9		
5	5	9	$\frac{1}{25}$
6	4		
7	2	11	$\frac{2}{7}$
8	2	3	
9	0	21	$\frac{1}{3}$
10		17	$\frac{2}{7}$
11		14	$\frac{2}{7}$
12		12	
13		10	$\frac{1}{5}$
14		8	$\frac{13}{16}$
15		7	$\frac{2}{3}$
16		6	$\frac{3}{4}$
17		6.	
18		5	$\frac{1}{3}$
19		4	$\frac{25}{32}$
20		4	$\frac{5}{16}$
21		3	$\frac{11}{12}$
22		3	$\frac{4}{7}$
23		3	$\frac{1}{4}$
24		3	
25		2	$\frac{3}{4}$
26		2	$\frac{9}{16}$
27		2	$\frac{3}{8}$
28		2	$\frac{1}{5}$
29		2	$\frac{1}{16}$
30		1	$\frac{11}{12}$
31		1	$\frac{4}{5}$
32		1	$\frac{11}{16}$
33		1	$\frac{5}{8}$
34		1	$\frac{1}{2}$
35		1	$\frac{3}{7}$
36		1	$\frac{1}{3}$

How Tables, Boords, Glasse, or any such like, are measured, according to their length and breadth, onely to the foote square.

The xi. Chapter.

This thing is performed by the helpe of a large Table following, diuided in fiue small Tables, and as many Margines. The first and left Margine beginneth at ¼. which is one quarter of an Inch, and extendeth to fiue Inches, as ye may plainely perceiue if ye runne downe by that Margine. This hath his Table on the right side adioyning vnto him. The other taketh his beginning at fiue Inches, ¼. and endeth at twelue, hauing his proper Table also. The third from 12. ¼. to 18. And so from 18. ¼. to 24: from 24. ¼. to 30. The last Margine is from 30. ¼. to 36. and there endeth.

Of this that is said, you may gather that euery Margine hath his Table on his right side. Also you must know that in the top, and beneath, I haue put (as in the Table of Timber measure) these words, Foote, Inch and Parts, to signifie Feete, Inches, and parts of an Inch. Whensoeuer ye list to measure Boord, Glasse, or any other such, with the breadth of it, enter this Table, and seeke that breadth in his proper margine: there yee shall finde in right order how many Feete, Inches, or parts of an Inch, belong to a Foote square. So often as the measure is in your stuffe, iust as many Fæte haue ye in that Boord, or such like. If the breadth exceede this Table, then diuide the breadth in parts, and worke as is and shall be declared. So the ingenious appliеth this Table for all manner breadths, most exactly.

Example.

Fo	Yn	Fo	Yn	Yn	Par	Yn	Par	Yn	Par	Yn	Par
1/4	48	6 1/4	1 11 1/25	12 1/4	11 3/4	18 1/4	7 7/8	24 1/4	5 15/16	30 1/4	4 3/4
1/2	24	6 1/2	1 10 1/2	12 1/2	11 1/2	18 1/2	7 4/5	24 1/2	5 7/8	30 1/2	4 5/7
3/4	16	6 3/4	1 9 1/3	12 3/4	11 2/3	18 3/4	7 2/3	24 3/4	5 4/5	30 3/4	4 2/3
1	12	7	1 8 4/7	13	11 1/13	19	7 4/7	25	5 3/4	31	4 5/8
1 1/4	9 7 1/5	7 1/4	1 7 7/8	13 1/4	10 7/8	19 1/4	7 1/2	25 1/4	5 2/3	31 1/4	4 5/8
1 1/2	8	7 1/2	1 7 1/5	13 1/2	10 5/6	19 1/2	7 3/8	25 1/2	5 5/8	31 1/2	4 4/7
1 3/4	6 10 2/7	7 3/4	1 6 4/7	13 3/4	10 1/2	19 3/4	7 2/7	25 3/4	5 5/8	31 3/4	4 1/2
2	6	8	1 6	14	10 2/7	20	7 1/7	26	5 1/2	32	4 1/2
2 1/4	5 4	8 1/4	1 5 3/7	14 1/4	10 2/7	20 1/4	7 1/8	26 1/4	5 1/2	32 1/4	4 1/2
2 1/2	4 9 3/5	8 1/2	1 4 15/16	14 1/2	9 7/8	20 1/2	7 1/7	26 1/2	5 3/7	32 1/2	4 3/7
2 3/4	4 4 3/8	8 3/4	1 4 2/7	14 3/4	9 3/4	20 3/4	6 15/16	26 3/4	5 3/8	32 3/4	4 3/8
3	4	9	1 4	15	9 5/8	21	6 6/7	27	5 1/3	33	4 1/3
3 1/4	3 8 1/3	9 1/4	1 3 4/7	15 1/4	9 3/7	21 1/4	6 4/5	27 1/4	5 2/7	33 1/4	4 1/3
3 1/2	3 5 1/8	9 1/2	1 3 1/7	15 1/2	9 2/7	21 1/2	6 3/7	27 1/2	5 2/7	33 1/2	4 2/7
3 3/4	3 2 2/5	9 3/4	1 2 3/4	15 3/4	9 1/8	21 3/4	6 5/8	27 3/4	5 1/3	33 3/4	4 1/4
4	3	10	1 2 2/5	16	9	22	6 1/2	28	5 1/3	34	4 1/4
4 1/4	2 9 2/3	10 1/4	1 2 1/21	16 1/4	8 6/7	22 1/4	6 1/2	28 1/4	5 3/32	34 1/4	4 3/13
4 1/2	2 8	10 1/2	1 1 3/4	16 1/2	8 3/4	22 1/2	6 3/8	28 1/2	5 1/16	34 1/2	4 1/6
4 3/4	2 6 1/5	10 3/4	1 1 1/8	16 3/4	8 5/8	22 3/4	6 1/5	28 3/4	5	34 3/4	4 1/8
5	2 4 4/5	11	1 1 1/11	17	8 1/2	23	6 1/4	29	5	35	4 1/8
5 1/4	2 3 3/5	11 1/4	1 4/5	17 1/4	8 1/3	23 1/4	6 1/5	29 1/4	4 7/8	35 1/4	4 1/9
5 1/2	2 2 1/5	11 1/2	1 1/2	17 1/2	8 1/5	23 1/2	6 1/8	29 1/2	4 7/8	35 1/2	4 1/10
5 3/4	2 1 1/23	11 3/4	1 2/3	17 3/4	8 3/32	23 3/4	6 1/16	29 3/4	4 5/6	35 3/4	4 1/12
6	2	12	1	18	8	24	6	30	4 4/5	36	4
Fo	Yn	Fo	Yn	Yn	Par	Yn	Par	Yn	Par	Yn	Par

Enſample.

Suppoſe I haue a pane of Glaſſe or a Boord, whoſe breadth were 22. inches, ⅓. the length 16. foote. In the fourth margine, I finde this breadth, 22, and ⅓. And euen with it in the Table rightward, I ſee 6. inches, ⅓. So much of my Ruler wanting ſome ſmall quantitie, maketh a foote.

Now becauſe in the length of my boord (which is 16. foot) that meaſure is found 29. times, and ⅔. parts: I conclude 29. foote there to bee, and two third parts of a foote Square, according to the length and breadth. I ſaid (wanting ſome ſmall quantity) becauſe of the point ioyned to this fraction ⅔. which is put to diminiſh the fraction ſome little thing, as is declared plainly in the other Tables before put forth.

HE that deſireth to meaſure chamber flores, pauements, or ſuch like, let him onely multiplie the breadth with the length, ſo the product ſheweth the Content.

Enſample.

IF there were a pauement 100. foot long, and in breadth 50. I muſt needes conclude (by multiplication of the length in the breadth) there to be contained 5000. foote.

Or thus without Arithmetike, when the breadth exceedeth the Table.

DIuide the breadth in parts (as is opened in the Declaration of the table of account) and worke as I haue before inſtructed. So for Pauements all manner waies it ſerueth your turne. Of this matter to put forth Tables, were ſuperfluous tediouſnes and folly. The ingenious with theſe few, will be ſatiſfied.

The

The Carpenters Ruler.

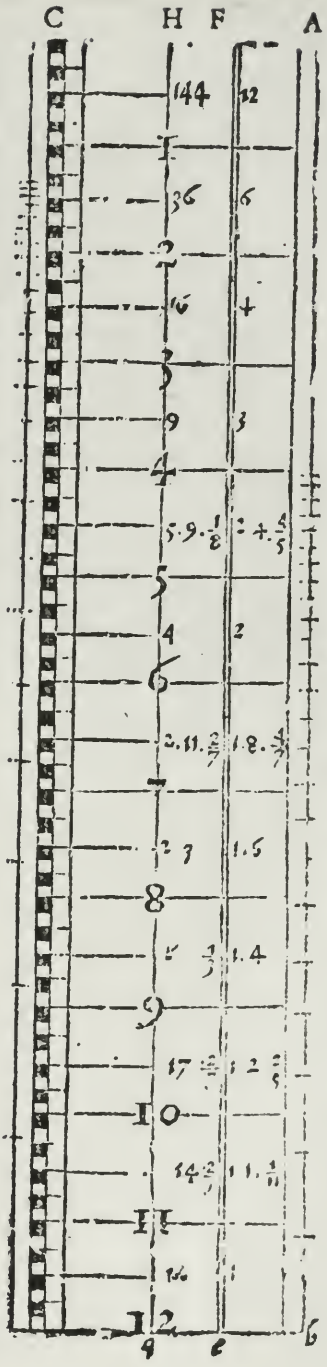
The face of the Carpenters Ruler, figured with the true measures, and other things neceſſary.

The xij. Chapter.

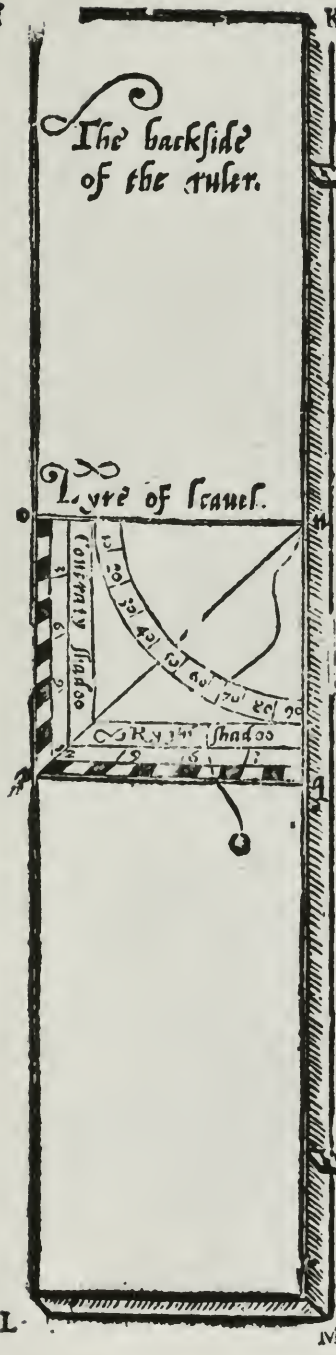
BEcauſe the effect of this ruler is aboue declared by tables, an inſtrument alſo well knowne and common among good Artificers, I will not ſpend many words in opening it. Behold the figures & learne by thē how ye ought to make, and commonly to decke your Ruler, both with timber and boord meaſure.

Enſample.

Admit the Ruler to be a.b. c.d. well plained, twelue Inches long, a quarter of an Inch thick, & two inches in breadth. Truly it were more commodious, if it had two foote in length. This ruler here imagined, but a foote in length is diuided firſt in 12 euen parts called inches: then euery inch in halfe, or two equall portions: each half in two quarters: euery quarter in foure or 2. parts at the leaſt: as in this enſample. Then are the figures placed from 1. to 12. manifeſting the inches. Thus your Ruler is readie to receiue the meaſures which are marked or figured on your Ruler thus. Add firſt the timber meaſure as followeth.



E ſhall reſort to your table of Timber meaſure, and ſeeke how many feete belong to one Inch ſquare: there ye ſhall finde 144. This number note, write, or rather graue, where this figure 1. repreſenting one Inch, is figured as ye may ſee in the middeſt betweene the line c.f. and the line of the figure g. h. This done, reſort to your table againe, and behold how many feete and parts two Inches ſquare requireth. So ſhall ye finde 36. foote, which is placed in the nert roome leftward, vnder the Character 2, ſignifying two Inches. Thus the reſt, feete, Inches, and parts, found in your table, vntill you come to the 12. Inch, where ye ſhall perceiue twelue Inches onely to be ſet in his proper roome, &c. Then ſeeke further in your table what belongeth to 13. Inches. Loe tenne Inches and ½. This muſt be numbred in the line c.d. from c. which line betokeneth the thickneſſe of the Ruler. Make there a little ſtrike, vpon that groſſeneſſe, euen or right againſt the meaſure 10. What needeth many words? Thus doe vntill you come to 36. Inches, and that is noted (as the table of timber meaſure ſheweth) right with one Inch, and ½. from c. No otherwiſe is performed of bord meaſure, as ye may behold ſet forth by the helpe of his proper table in the Square roomes beneath the line c.f. and alſo the other thickneſſe or line b.a.



The backside of ẏ Ruler, with the quadrant Geometricall.

The xiij. Chapter.

The making of a Geometrical quadrant.

This other figure i.k.l.m. is the backside of your ruler, hauing in ẏ middest of Geometricall quadrant n.o. p.q. whose making in few words is thus expressed. The line or breadth of your ruler n.o. ẏ line o.p.p.q.q.n. ought to be of one equal iust lẽgth, cutting ech other squirewise. And from the centre n. vnto p. is drawne another line, which is called the line of height. So is o.n. the line of leuel, q.n. the line of heights vpright. This known I opẽ my compasse, one foot remaining. In ẏ centre n: the other extẽded in the line of leuel almost to o. making a circũferẽce to q.n. which is a portiõ of a circle named a quadrãt: & ought to be diuided into 90. equall parts, as yée may behold, euery of thẽ called a degree. Ye may diuide the lines o.p.p.q. named the Scale, ech in 12. as here, or in 60: yea in 100. equall portions is more mẽt for the vse of shadowes, heights, lengths, &c. Note ẏ the side or halfe Scale o.p. is called ẏ contrary shadow p.p right shadow. Remẽber that vpon the thicknesse m k. yée ought to haue two fine equal square sights well bored, represented here by r. s. made of wood, or rather mettall to bee fastned there when time requireth: let this satisfie.

Note these three principal lines.

The Line of heights vpright.

The diuided sides o. p. and o.q. are called the Scale.

The Carpenters Ruler.

The common vſe of the Carpenters Ruler, touching the Face afore put foorth.

The xiiij. Chapter.

The eight Chap ſheweth how the true ſquare is found.

Uppoſe a peece of Timber to be moaten, whoſe true ſquare is 7. Inches, this ſquare appointed you to the figure of 7. in the line g. h. vnder whom right ward in the place aſſigned to Timber meaſure, is written 2. foote, 11. inches, ½. As often as that meaſure is found in the length of your timber, ſo many foote of timber is in that peece.

Another Example.

IMagine your Square to be 22. Inches: ſeeke in the line a. c. Note then how much of your Ruler is left from that to the end of your Rule c. and ſo much belongeth to a Foote. Therefore lay out the meaſure vpon your Timber, & reckon how many times ye may finde it, from the one to the other of your Log: for ſo many foote of timber is there. Euen thus of boord. Seeke the breadth vpon your Ruler, in the roome or place of boord meaſure, & immediatly before your eyes there remaineth what is to be laid out to make a iuſt foote of boord.

The vſe of the principall lines in the Geometricall Quadrant on the backſide of the Ruler, and firſt of the leuell line.

The xv. Chapter.

IT behoueth you to looke through your ſights q. n. placed in the thickneſſe of line k. m. a fine thred and plummet falling at libertie out of the Centre n. If this plummet and thred chaunce preciſely on ỹ line of leuel (which is n. o.) whatſoeuer ye ſee through ỹ ſights, is leuel with your eye: if otherwiſe

wiſe the thing that ye loke vnto is not leuell, either more or leſſe than the height or leuell of your eye: More, if the plummet fall to you ward: leſſe, if contrarie.

How by the line of Leuell to foreſee whether the water of any Spring or head is poſſible to be brought to a place appointed, and alſo to iudge the holeſomnes of it.

The xvi. Chapter.

E ſhall goe to the head or Spring, and ſet your Ruler to your eye (being in height equall with the water) ſo that the fine corde and plummet fall preciſely in the line of leuel. Now if through the ſights ye may ſee aboue the place, know and iudge the water poſſible to be brought: if your ſight fall vnder, impoſſible. It commeth commonly to paſſe, when the place to the which ye would haue water conueyed, is of any great diſtance from the head, then Hilles, Valleys, and ſuch like impediments, let the Line viſuall to haue his free courſe: wherefore this remedy is prouided. At the head of the ſpring, ye ſhall loke thorow the ſights (as before) and note a marke in the nert Hill toward the place, then goe to the marke in like manner obſerue another in ſome hill: ſo forth vntill by any of them ye may perceiue the place deſired. If then your ſight running through the pinnes of your Ruler, (the thred euer falling on the Line n.o.) exceede that place, the conueying of your water is poſſible. Otherwiſe not.

Now by the way briefly ye ſhall be inſtructed how ye may know the holeſomnes of water.

How good water is knowne.

TAke a cleane pot, and put water in it: ſo ſet it on the fire: after a little boyling, powre it out: if then no filth re-

maine in the bottome of the pot, it may bee iudged the holſomer. Or thus. Let fall drops vpon metall, or rather on Glaſſe (any of them being poliſhed) and ſuffer that to drie by it ſelfe: if after there remaine no ſpot or ſigne, it is a good token. Moreouer, if your water bee ſweete, pure, cleare, light, or of little weight, it followeth the water to bee holſome for the vſe of man.

Of the Line of height.

WHenſoeuer the Thred and Plummet doe chaunce iuſtly on the Height, whych is n.p. the Altitude or height that ye ſée is euen with the diſtance from the middle of your Foote, to the nether part directly vnder the toppe, equall with your ſtanding, adding the height of your Eye downeward. Knowe that yee muſt euer ſtand vpright with bodie and Necke, your Feete iuſt together, the one Eye cloſed, &c.

The Line of vpright Altitudes.

IUdge alſo any thing plumbe vpright when the thickneſſe of your Ruler i.l. is cloſely thereon, the plummet then at Libertie falling on q.n. named the Line of Heights vpright. Now followeth the vſe of the Scale.

To ſearch out Heights by the Scale with the ayd of two places.

The xviij. Chapter.

SEt the Thred and Plummet fall in the one, on the 12. poynts: in the other Station, on the 6. of the right ſhadow: double the diſtance betweene the two places, the ſummitie appeareth from that part of the thing meaſured, which is equall in Height with your

eye

eye. Or the one in the 12. the other in 8. of right ſhadow: then triple the diſtance. The one in 12. the other in 6. of right Quadruplate, the ſpace. The one in the 12. the other in 6. of the contrarie ſhadow, then the ſpace betweene both the Stations is equall with that pee meaſure, euer vnderſtanding from your eye vpward. Euen that ſame commeth to paſſe, if in the one the Thred be found vpon the 6. of the contrarie, in the other on the 4. of the ſame, or the 4. and 3. of the contrarie. In all theſe the ſpaces are equall with the Altitudes. So then in meaſuring the diſtance betweene the two places, pee haue the height from your eye vpward, putting to it the length from your ſight downeward, the whole Altitude appeareth: the Baſe being equall with your ſtanding.

I would not haue you ignorant heere how to knowe lengths which bee in height not eaſie to come vnto. For (as before) get the height of the toppe, the Altitude of the Baſe or longeſt part of your length. Subduct the leſſe height out of the more, of force your deſired length remaineth. Or thus: Let the plummet and thred fall in the 12. Marke your place: goe in toward the thing (the thred as it was) vntill ye ſee the Baſe of that length: the diſtance betweene the two ſtaddings, is vndoubtedly the Length. How lengths in height are knowne.

How with the Scale direct or vpright heights by their ſhadowes are declared.

The xix. Chapter.

TVrne your left ſide vnto the Sunne, ſuffering the Beames to pearce both your ſights q. r. placed (as afore is ſayde) in the thickeneſſe or line k.m. The Thread or Plumet then hanging at libertie, out of the Center n. ſheweth as well the Degrees

of height to be counted from o. as the parts of the Scale cut. If your thred be found in the 12. part or line of leuell, shadowes of all things being perpendicular eleuated, are equall with their bodies. If the plummet with the thred bee perceiued, cutting the parts next to the sights, which I name poynts of the right shadow, then euery thing direct is more then his shadow, by that proportion which 12. exceedeth the parts, where the thred was found. If it fall in 1. that is the first part of the right shadow, take the shadow twelue times to make the height. In two, that is the second part, fiue times, in the third, foure times: in the fourth, three times: in the fift, twise: and $\frac{2}{3}$. of the shadow, in the first, twise, in the seuenth once, and $\frac{3}{4}$. in the eight once, and $\frac{1}{2}$: in the ninth once, and $\frac{1}{3}$: in the tenth once, and $\frac{1}{8}$: in the eleuenth ye shall take the shadow once, and $\frac{1}{11}$ part of it.

Right shadow. If the Arte of numbring weze had, I would will you to multiplie the length of the shadow by 12. and the product diuide by the parts, in the which ye found the thred.

Contrarie shadow. But and if it bee in the parts of the contrary shadow, augment the length of the shadow with the parts declared by the plummet: and the increase diuide them by 12. so commeth the altitude also.

Thus the composition and whole appliance of the Carpenters Ruler is shewed: therefore somewhat shall bee now said of the Squire.

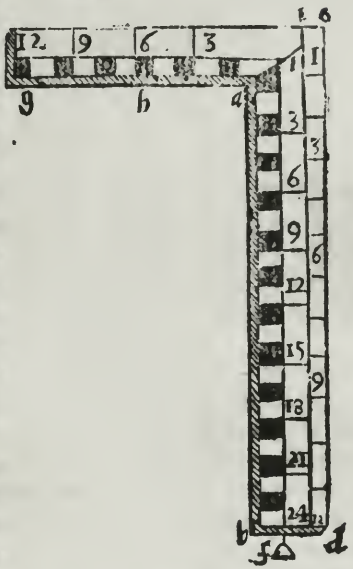
I am not ignorant that the common vse of him, is better knowne then I can with many words expresse, wherefore I leaue to write in that behalfe. Notwithstanding I will declare how Heights and Lengths are taken, &c. matters rare and knowne of few Artificers.

Also by tables to get a true knowledge of the day houre, and that diuerse waies, with the helpe of the Squire, as is opened in my generall Prognostication, augmented in the yeere of our Lord 1556.

What

What length the ſides of thy Squire ought to be, and the diuiſion of him.

The xx. Chapter.



I Méde not to put forth the exact making of this Inſtrument ſo well knowne. Lo therfore the figure. One ſide ſuppoſed two foot from the inward Angle: and the other a iuſt foote from the ſame. The longer a. b. inwardly diuided from the Angle a. vnto b. into 24. equall principall parts, and euerie of them into a leſſe (if ye liſt) each containing 10 minutes. Alſo the ſide c. d. in the outward contrarie, plaine from the top c. vnto d. is diuided into 12. euen portions: and againe (if yée require exactneſſe) euery of them into 6. each of value 10. minutes: Beholde a line and plummet falling from e. to f. a Parallell to c. d. and a. b. Thus this ſquire is well framed for the vſe of diuerſe Tables put forth in my generall Prognoſtication, and alſo for the finding of Altitudes and Longitudes, which here I purpoſe now briefly to open.

How by the Squire heights are knowne.

ALtitudes or heights are found, the line or plummet centred in the firſt poynt, cutting h. the middle of a. g. The

moueable ſights placed in a. g. or a parallell from that line, not vnlike, as is opened of the line of height, in the backe of my Ruler.

How Lengths in plaine Ground are ſearched by the Carpenters or Maſons Squire.

The xxi. Chapter.

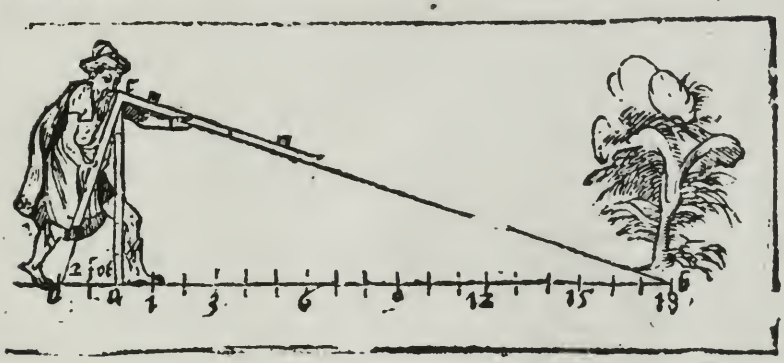
TAke a ſtaffe diuided into certaine portions as ye liſt, in a 100. or a 1000. parts. At the beginning of your length, vpon the very top directly ſtanding, ſet the inward Angle of the Squire: lift vp or put downe this inſtrument, vntill you ſee the furtheſt part of your Longitude, I meane vntill your ſight running from that Angle, to the end of your Squire, come vnto the furtheſt part of that length. The Squire ſo remaining, and the Staffe not remoued from his height. Marke where the other ende of the Squire nert vnto you noted vpon the ground. See what proportion the Staffe then beareth to the part of the ground, which the necreſt end of the Squire poynted vnto from the Staffe: the ſame ſhall the Length haue to the quantitie of the ſame Staffe.

Example.

The cauſe is taken out of Euclid 33. pro. 1. booke and the 4. pro. 6. booke.

THe Staffe a. c. in this figure is imagined 6. Foote, and the ſpace a. d. 2. Foote. Conſidering now that 6. the length of the Staffe containeth 3. thrice, therefore the Longitude deſired, a. b. of force muſt containe three times the Staffe (which Staffe is 6. Foote) that maketh 18. Foote. As this is proued true by a ſmall ground in the figure following: ſo the arte falleth not in a greater ſpace, which the good Speculator

Speculator and diligent Practiſer by any way cannot denie. Yet experience willeth me this to confeſſe, that the Squire is not conuenient for any long diſtance, but the Inſtrument Geometricall: whoſe making and vſe ye may perceiue in the Treatiſe following) vnleſſe ye aſcend ſome Tree or Turret for your ayde, which length knowne, ſhall ſtand in ſtead of your Staffe.



A Note.

IT behoueth you to haue a fine cord, made faſt in the vpper part of your Staffe c. which ſhall be tied euen with the inward edge of the Squire, and ſo drawne to the ground, where the neere end of the Square from the Staffe pointed, as yée ſee d.c. the other end then truly directing to the furtheſt diſtance.

Know that the ground muſt be very plaine and leuell, otherwiſe error enſueth.

Thus the vſe of the Squire is here ſomewhat declared, but more in my generall Prognoſtication, yea moſt plentifullie hereafter (God ſparing life) in a Booke titled, The rare vſe of the Squire in practiſes Mathematicall. In the which Booke, profitable pleaſant experiences ſhall be plainly opened (only of me practiſed) as well of Perſpectiue, as of the Mathematicals in generall.

A little

A little Treatiſe, declaring the making and vſe of an Inſtrument Geometricall, ſo farre as it furthereth the Landmeater or Carpenter, named the profitable Staffe.

To the Reader.

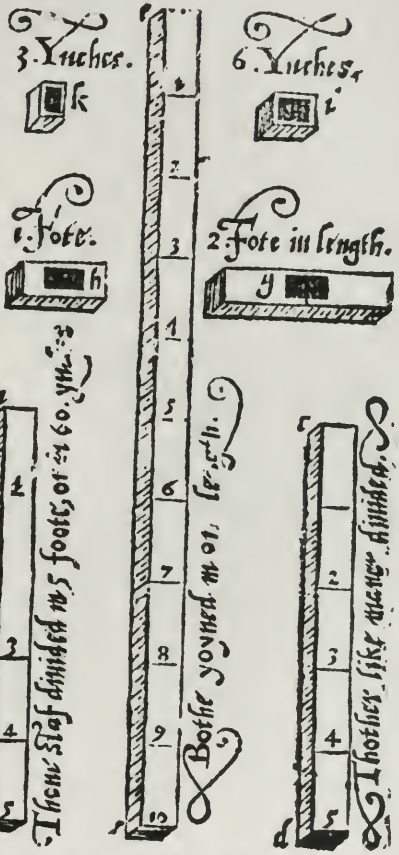
I Said in the beginning, that no little Booke would containe the making and manifold fruits of this princely Inſtrument, if it were ſet foorth as it ought to be in his perfection. Certes the trueth euen here maketh me confeſſe the ſame: yea that there is no Inſtrument ſo generall and profitably pleaſant: Notwithſtanding know (gentle Reader) that the occaſion of his chiefe vſe and profit is not here miniſtred: neither, to ſay the truth, doth it appertaine to, or agree with the capacitie of ſuch Artificers. Therefore I ſhall leaue to intreate of his ample large vſe and beſt making, and will ſet him forth in few words: yea ſufficiently for the Land-meaters capacitie or Carpenters purpoſe, that at the leaſt they may receiue ſome kinde of fruite with the Geometrer. And in time to come (by other meanes) as I ſee cauſe, I will largely declare, and there decke him with his proper beauties. Here now followeth the making, and ſo briefly, how he is applied for the profit of the aforenamed Artificers.

The

The making of this profitable Rodde or Staffe.

The first Chapter.

E shall prepare two small, streight, stiffe, roūd, or rather square rods, of mettall or of wood, well plained, of like bigneſſe and length. Although it make no matter of what length, yet to auoyde the errors, which little instruments, & short staues bring, and also to beare with the rude vnwonted handling of such Artificers: let your Rods be each fiue, or at the least three foote, and euerie foote diuided in 12. euen parts or Inches, as ye see a.b. and c.d. These Rods must bee forged with a vice in the end of them to ioyne readily tenne or fiue foote in length, (when time requireth) as the figure e.f. sheweth. Also ye must get (by the helpe of some Craftsman) foure other like Rods, the longer g. 2. Foote: the nert h. 1. foote: the other i. 6. Inches, then k. 3. Inches, the last and shortest l. 1. Inch, and ½. Each of these must haue in their middest a hole, that the long staffe of ten foote may be put through them, and they moued on him at pleasure vp and downe, alwaies cutting the longer staffe e.f. Squirewise, and made to tarry on any diuision,



as occaſion ſhall be giuen: which all are eaſily to be perceiued by the figure following, although my rude declaration hath not expreſſed my meaning.

Here note in the ſtead of your ſhort ſtaues, yé may haue one croſſe ſtaffe two foote long, with currant ſights, ſo artificially made, that alwaies the ſhort ſtaffe ſhall run ſquire vpon the longer, and the ſights diſtant, as ye liſt to place them.

Things needfull to be knowne before the vſe of this Inſtrument is opened.

The ij. Chapter.

BEfore I intreate of this vſe, it behoueth to know things neceſſarie, and firſt which of the fiue little ſtaues g.h.i.k.l. mentioned in the making, is to be put vpon your long ſtaffe e. f. according to the diſtance of the marke. Note if your marke be neere hand, be it length, breadth, or height, the longer g. doth ſeeme meetest to haue the roome, if more of length, the other h. and ſo the further diſtance, the ſhorter the ſtaffe requireth to be, which ſhall occupie that place. Oft practiſe sheweth this better than many words. Alſo note, if chance be to goe in toward your marke, (as after ye ſhal ſée how) you muſt remoue the ſhort ſtaffe inward more neere to the end of the longer e. If ye be compelled to goe from it, then put it from e. toward the end f. Alſo remember when ye are appointed to meaſure any breadth or length (as ſhall be declared) it behoueth you to ſtand right with, and againſt that breath: yea and the longer the breath, or larger the widenes or length is, the better the thing will come to paſſe. And for heights it is neceſſarie (if ye regard all preciſenes) to haue the height ſtand directly vp.

Note this that followeth to be generall in all workings.

YE muſt ſtand right vp with your Bodie and necke, your féete iuſt together, your hands not much mouing, the one

eye

eye closed, and euer marke your standing right with the midst of your feete. Be not ignorant here, that I call the extremes of the little staues, the very ends where the sight euer runneth. And no difference betweene the Altitude and height, betweene the Longitude and length: the Latitude & breadth. The short staues I name by the letter figured ouer them. Your eye must euer be placed in the end of the longer staffe e. and with the other eye ye ought to winke.

What these words meane, Longitude, Latitude, Altitude.

These trifles and such like omitted, letteth the trueth to come to passe, and make men to suspect the Ground, which is most certaine.

How heights standing directly vp, are measured by the Instrument.

The iij. Chapter.

PVt the staffe g. vpon the longer e. f. and moue him his iust length from the beginning of the longer e. turne the ends of g. toward you, and according to that height placing your eye (as is sayd) euer at the beginning of the longer e. with the other eye winke. Then goe backe vntill ye may plainely perceiue the very vpper part of that Altitude, and also the lower end by the extreames of your shorter staffe g. Now the space of the middle of your sote to the base of the height is equall with the Altitude.

Or thus.

When ye shall see any Altitude, whose measure ye require. imagine by coniecture how oftentimes that height is found in the space from it vnto your standing. Then moue your shorter staffe (chosen as aboue most conuenient) euen as often his owne length from the beginning of the longer e.

where your eye is euer placed. This done, turne the ends of your little ſtaffe, your eye being in e. according to the height: looke whether ye may ſee by the extremes of your ſhorter the very top, and alſo the loweſt part of the height. If not, moue the ſhorter a length further toward f. or neerer to e. as ye ſee cauſe, and as your coniecture failed. Or let your little ſtaffe remaine, as by coniecture hee was put, and goe toward or from that height, vntill the Altitude agrée iuſtly with the extremes of your ſhort ſtaffe. Then marke that place with the middeſt of your foote.

Now ye may conclude, that the height is as often contained in the diſtance, which is betweene the marke and it, as the length of that little ſtaffe is found removed from the end of the longer, &c.

Example.

How the iuſt height is knowne.

If the ſhort ſtaffe be ten times his owne length from e. affirme the height contained in that diſtance ten times only.

The Altitude is thus gotten. Moue your ſhort ſtaffe from his late being a length either toward or from e. as ye liſt to goe in or backe. Then goe fro or néere vnto it (as before) vntill the very ſummitte, and alſo the loweſt part of the height agrée with the extremes of your ſhorter ſtaffe. The ſpace then betwéene your marked place and this latter, declareth the iuſt height. Oftentimes through impediments, ye ſhall not haue rome to goe ſo farre backe or forward, as the height commeth vnto. This remedie is prouided. Moue the little ſtaffe halfe his length, and ſo ſéeke two ſtations (as before) vntill the extreme of the ſhorter ſtaffe be found iuſtly to anſwere either end of the height. Then the ſpace betwéene the two ſtandings muſt be doubled to haue the iuſt height: or if ye liſt, ye may moue the ſhorter, according to the fourth part of his length, or to any portion, as to the fift, ſixt, twenty, &c. then ſhall ye haue that part of the height betwéene the two ſtations.

A remedy prouided for want of ground.

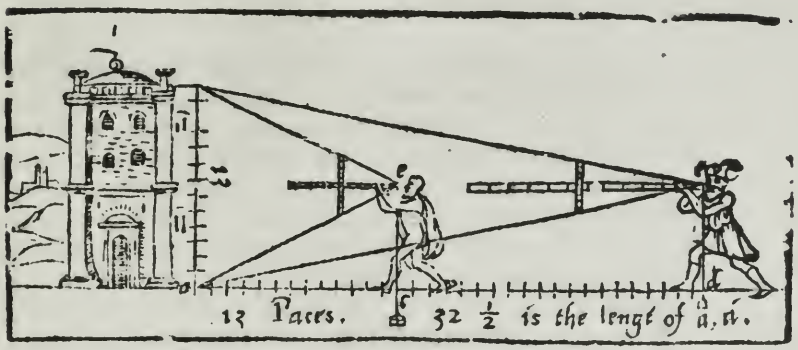
Yet

Yet know this (which experience by diligent practise will shew) the bigger parts ye take, the lesse error ye commit. A little error often multiplied, encreaseth to a great.

Now that all the aforespoken may the better be perceiued, behold the example ensuing, as ye may see by figure declared, in the which the height is imagined a.b. the first station c. the short staffe g. is moued from c. iust his length. I am forced to conclude, that the Base of the height a.b. is from my standing c. euen his precise length. So then if ye measure that distance of a.c. being 13. paces, ye haue the true height of a.b. as many. In the other standing place d. the shorter staffe is found from c. twice his length and a halfe, wherefore I must affirme the height a.b. to be contained or found in the distance a.d. twice and a halfe: which length a.d. is apparant 32. paces. All this that is spoken of the height, may well be vnderstood of Latitudes or wideneſſes, and lengths following.

The ground of this may be gathered of Euclide in his perspectiue. 21. Theo.

In Altitudes this rule is not perfect, except the eye be leuell with the middle of the Altitude.



How the breadth or widenes of things are found, and by them, Length or any diſtance at pleaſure.

The iiij. Chapter.

WHatſoeuer I haue inſtructed afore of heights, the ſame vnderſtand here of widenes, lengths, &c. For none otherwiſe are Latitudes or wideneſſes ſearched by this Inſtrument, then before is declared of heights, onely this excepted, that the ſhort ſtaffe muſt lie contrarie, the ends according to the breadth, ſeeing by the extreames of the ſhort ſtaffe, the verie vttermoſt parts or ends of the Latitude, noting your ſtations right with the midſt of your foot. And ſo performe all as afore. And as I ſaid, thereof the parts of the height found betweene your ſtandings, euen the ſame things is well vſed here, for all manner parts of the breadth.

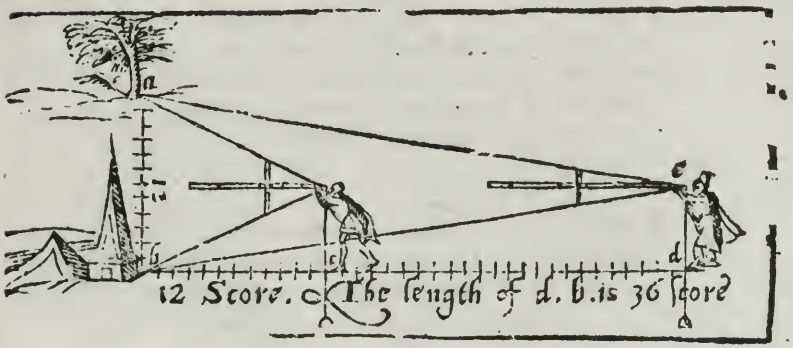
Example.

THe breadth in this figure following ſuppoſe a. b. Alſo the firſt ſtation c. the nert d. My deſire is to know the wideneſſe a. b. and the length or diſtance d. b. Marke how the ends of the leſſer ſtaues are turned to the extreames of the wideneſſe. Then behold how the ſhort ſtaffe in c. is but once his length remoued from c. Wherefore (by the inſtructions of heights afore) ye may boldly ſay, that the widenes a. b. is but once contained betweene d. and b. and that meaſure is found 12. ſcore, as much as is the other a. b. In the ſecond ſtanding d. the little ſtaffe is remoued three times his length from c. For that cauſe I conclude (and truly) from b. to that ſtation three times the breadth, which breadth is 12. ſcore. So by the widenes I haue found the length of b. d. 36. ſcore, my deſire. Thus are Latitudes found, and by them Lengths, &c.

Behold

Behold the figure.

Ye muſt alway ſtand directly againſt the middle of the Breadth.



Whenſoeuer any diſtance is put, whoſe certaine length ye require: meaſure (by the art expreſſed) either the height of any thing there found, or the breadth, and ſee how often times that wideneſſe or length is contained vnto your ſtanding: which knowne, the length cannot bee hid, as is declared.

NOw in few words to conclude, ye may by this Inſtrument meaſure the diſtance of Houſes, Steeples, Trees, the length of Walles, the breadth of Ditches, Images in height, and ſuchlike. The good wittie Carpenter ſtanding in a place, where hee may plainly ſee a whole houſe, or any manner frame with great pleaſure, may by this get ſpeedilie the true proportion of that houſe, which he ought to note in a Table, and when time commeth (not without his great praiſe) may make, reare and ſet vp the like. This I take to be ſufficient for theſe Craftſmen. A more larger vſe of this Inſtrument.

Ihaue

How the length of land is exactly found.

I haue perhaps forgotten to admonish you whensoeuer ye list to measure any land exactly, by the instrument Geometricall, namely the profitable Scale, to set vpright a Rodde, the length of a Pearch. Or if the distance be long, to passe out, or rather iustly meate fiue or moe Pearches at the end or head of your length, the extreames noted with two visible marks. Then goe from thence, and seeke the lengths by that certaine witnesse, as is declared: so shall yee not faile to bring verie true land. Note that a little error found on the breadth, oft multiplied, encreaseth to a great, yea, to an intollerable fault in the length, therefore the breadth or wideneſſe ought truly to be searched. This I take sufficient for these Craftsmen.

I would desire where my grosse writings seeme to be obscure, that I were present the instructer: for truly a liuely voyce of a meane speculator somewhat practised, further eth tenne fold more in my iudgement, than the finest writer.

Farewell. Accept my good will, and looke shortly (if God spare life) for a profitable encrease of these matters

FINIS.

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Of Expence.

some kind of tutors, but doeth quicken and awake others. But tyming of the tutes is the principall. tyming I say not onely in respect of the person that should graunt it, but in respect of those which are like to crosse it. Nothing is thought so easie a request to a great person as his letter, and yet if it bee not in a good cause, it is so much out of his reputation.

Of Expence.

Riches are for spending, and spending for honour and good actions. The fore extraordinary expence must bee limited by the worth of the ocasion, for voluntary vndoing may be as well for a mans countrey as for the kingdome of heauen. But ordinary expence ought to be limited by a mans estate, and gouerned with such regard, as it be within his compasse and

Of Honour.

tempted and giuen ouer, or hath been atchined, but not with so good circumstance, hee shall purchase more honor, then by effecting a matter of greater difficulty or vertue, wherein he is but a follower. If a man so tempe. his actions as in some one of thē he do content euery faction or combination of people, the Mvsicke will be the fuller. A man is an ill husband of his honor that entreth into any action, the failing wherin may disgrace him more, then the carrying of it through can honor him. Discreet followers help much to reputation. Enuy which is the cāker of honor is best extinguished by declaring a mans se fe in his endes, rather to seeke merite then fame, and by attributing a mans successes rather to deuine prouidence and felicity, then to his vertue or policy.

The true Marshaling of the degrees of Souerainte Honour are these

Of Factions.

to partie[illegible] persons one by one. But I say not that the consideration of Factions is to be neglected.

Meane men must adheare, but great men that haue strength in thēselues were better to maintain themselues indifferent and neutrall, yet euen in beginners to adheare so moderately as hee be a man of the one faction, which is passablest with the other, commonly giueth best way.

The lower and weaker Faction is [illegible]

Of followers and friends.

content, because they may claime a due. But in fauours to vse men with much difference & election is good, for it maketh the persons preferred more thankful, and the rest more officious, because all is of fauour. It is good not to make too much of any man at first because one cannot hold out that proportion. To be gouerned by one is not good & to be distracted with many is worse: but to take aduise of friends is euer honor.

For lockers on many tim[illegible]

and reputation.

these. In the first place are *Conditores*, founders of states. In the seconde place are *Legislatores*, Law-giuers, which are also called second founders, or *Perpetui principes*, because they gouern by their ordinances after they are gone. In the third place are *Liberatores*, such as compounde the long miseries of ciuil wars, or deliuer their countries from seruitude of strangers or tyrants. In the fourth place are *propagatores*, or *propugnatores imperii*, such as in honorable wars inlarge their territories, or make Noble defence against inuaders. And in the last place are *Patres patriæ*, which raigne iustly, and make the times good wherein they liue. Degrees of honor in subiectes are first *Participes curarum*, those vpon whom princes do discharge the greatest weight of their affaires, their *Right hands* (as we call them.) The next are *Duces belli*, great leaders, such as are Princes

Lieute-

Of Sutors.

or disabling the better deseruer. In sutes a man doth not well vnderstād, it is good to refer them to some friēd of trust & iudgment, that may report whether he may deale in them with honor. Sutors are so distasted with delates & abuses, that plaine dealing in denying to deale in sutes at first, and reporting the successe barely, and in challenging no more thanks then one hath deserued, is growen not only honorable, but also gratious. In sutes of fauor the first cōming ought to take little place; so far forth consideration may be had of his trust, that if intelligence of the mater could not otherwise haue been had but by him, aduantage be not taken of the note. To be ignorant of the value of a sute is simplicity, as wel as to be ignorant of the right thereof is want of conscience. Secrecy in sutes is a great mean of obtaining, for voycing them to bee in forwardnesse may discourage

Of Sutes.

brace Sutes which neuer meane to deale effectually in them. But if they see there may be life in the matter by some other meane, they will be content to win a thanke, or take a second reward. Some take hold of sutes only for an occasion to crosse some other, or to make an information, whereof they could not otherwise haue an apt pretext, without care what becōe of the sute, when that turn is serued Nay vndertake sutes with a ful pur-

Offaction.

Lieutenantes, and do them notable seruices in the warres. The third are *Gratiosi*, fauorites, such as exceed not this scantling to be solace to the Soueraigne, and harmles to the people. And the fourth *Negotijs pares*, such as haue great place vnder Princes, and execute their places with sufficiency

Of Faction.

Any hau[illegible] ewe wise

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