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A key to civil architecture, or the universal British builder

Skaife, Thomas

London, MDCCLXXIV [1774]

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Persistent Link: <https://doi.org/10.3931/e-rara-27180>

The practice of joiners-work.

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THE
PRACTICE
OF
JOINERS-WORK.

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T O

Mr. THOMAS HARDISTY,

Carpenter and Joiner, in YORK.

S I R,

HAVING no other inducement but gratitude, nor any motive but a willing heart, I humbly beg your acceptance of the following work, as a compensation for the sole produce of my labours; as I am not beyond acknowledging, that whatever progress I have made in the liberal sciences, as well as my own business, was chiefly through your kind incitements to the former, and well-grounded instructions in the latter.

With respect to the plan of my work, I submit to your candour, well knowing, from a thorough conviction of your goodness, that you will not condemn where there is the least room for applause.

Many who have seen and much approved the peculiar efforts of my studies, have, notwithstanding, alledged reasons against a work of this sort without lines.—I must confess, that in many, if not most of the practical essays, I could have been much clearer, by alluding to lines; and, moreover, given a greater variety of methods and observations; and must allow, that my first plan was with this intent: but, considering the vast expence the book would amount to, and the number of treatises of lines already extant, I contracted my scheme, and reduced it to the present state; well knowing that every journeyman (for whose benefit this work is intended) had rather be instructed in the modes and peculiar manners of doing a difficult piece of work, than have the pleasure of casting his eye upon a fine plate, that only represents such works when done.

As no settled standard can be made respecting the surveyors prices, and masters, or their mode of measuring, being all in some cases different

DEDICATION.

ferent; I hope you will give sanction to my proposals, which contain a medium of many, and the direct rules of some.

If I meet with the approbation of the world, and an encouragement from your judgment, I may, hereafter, offer to the public a system of matters (in store) never yet considered by any; and, in my own opinion, of the most essential utility both to the architect, builder, gentleman, and private workman.—In many of the topics I shall better my understanding by your opinion, as it is well known, that your practical methods are at least equal, if not superior to any of the present age.

Whatever the public may think of me, as one they call an author, I know not. Of this I am certain, that I shall not want your belief, when I assure you, that this dedication is the result of a profound acknowledgment, an artless inclination, proudly glad and grateful to have it in my power to offer my trifle to the acceptance of a man, whom I know to be meritorious without example; honest without pretence; and, what is more, never withdrew his hand from the pressing exigence of his friends.

I am, Sir, with the most profound respect,

Your most obedient and most humble servant, and very friend,

THO. SKAIFE.

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LECTURE XXII.

Of the CONSTRUCTION of DADO.

DADO is the die or intire part of an order, which is between the base and cornice of the pedestall; and by architects is attributed to that plain part of a room between the base and sur-base mouldings. This sort of work, in large rooms, should never be made of thinner stuff than what is called whole-deal.

The chief thing to be considered in the practice of dado is, the manner of putting up, which requires some thought, in order to secure it from casting; the method of keying only being found insufficient, without a proper manner of placing of them. There are a great many ways of doing this: but the best, in my opinion, is as follows, viz. when you key your dado, leave the keys long enough at the broad end to reach the joists, or floor; and put the broad-ends of the keys downwards, for this reason; there is a proclivity, or tending downwards in all work, which can never be detrimental to dado thus done; because if the key goes to the floor, there it

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stops; and if it should shrink, the proclivity of the dado will ever keep the work straight. If the broad ends were upwards, the dado might drop from the keys, and render them of no use. In putting dado round windows, mind to keep up the front of the elbow a little, that after the mouldings are on, and capped, the shutters may open easy.

Dado in all angles must be groved, and well nailed; observe also, that no nails be put in the bottom-edge of dado; let it receive no fastening but what it has from the keys; if it is confined both at the top and bottom, it is sure to break.

Observe, of dado for circular rooms, that you do not imbibe the wretched methods of contract-mongers and task-masters, of gluing your dado up and down; the genuine method of gluing circular dado, is to make a saddle to the sweep of your wall; if it is a large sweep you may make a finer half an inch thick, and bind it upon the cylinder or saddle; after glue backings to the sweep behind: leave it a few days to dry, and strike your work for putting up.

With regard to long lengths of dado, be careful in breaking the heading-joints, and, not like the task-masters, make a heading-joint quite through.

As to the height of dado, the window is the guide; leaving the same margin when the capping is on, as there is from the shutter to the bead; when there are backs and elbows, the dado may be put up at pleasure, or to the fancy of the builder. Some architects propose a fifth part of the height of the room; but this would not suit very low rooms; nor yet very high ones. I think dado should never be higher than 3 feet 9 inches, nor lower than 2 feet 6 inches. If rooms were all about twelve foot high, a fifth part would do very well; and so on to a room
of

of 15 feet high; what runs above this pitch, for every 6 inches in the room's heighth, I would add one inch more to the height of the dado. If there are columns or pilasters, the dado should in every respect be subservient to the pedestal of the order.

s. d.

The price of this work, charged by masters, is, per yard, with materials, from 4s. 6d. to

5 6

Surveyors allow for dado of whole-deal, per yard,

4 6

Inch and half ditto

5 0

Of inch ditto, per yard

4 0

The real value of dado as follows:

The stuff to dado, allowing waste, should be to a master per foot 2d. $\frac{1}{2}$; nine feet of which is,

1 10

Glue and nails to ditto, and keys, per yard

0 4

Labour to ditto, per yard

0 10

3 0

Some people will wonder how I can fix 10d. per yard for labour; those that do, I beg them to understand, that this is the neat price a master pays out of his pocket for such work, proved by the following example:

A journeyman of 17s. or 18s. per week will glue up six twelve-foot lengths per day, plain them the second, and put them up the third, with casual breaks, &c. Therefore we find that 2 lengths is one day's work to begin and finish; which two lengths when put up, may be 6 yards; and which, allowing the master for his man 3s. per day, is but 6d.

R 2

and

and 4d. more per yard I allow for keying ditto, which is 10d.

Therefore the universal price of dado of inch s. d.
and half deal, is, 5 0

Whole-deal should be per yard 4 6

Of inch ditto 4 2

Circular dado double measure, and paid for the faddle or cilinder extra, which it is glued upon.

LECTURE XXIII.

Of MOULDINGS in general.

THE guide and master-piece of all architecture depends, and that solely, on the magnitude and composition of mouldings; they are the summum bonum, or leading touches of art, which give force and beauty to whatever is intended; every thing, of whatever sort or nature, takes its semblance, or changes its effect, from the power that is contained in these governing principles: how cautious, therefore, should every artist be in the designing or composing of mouldings, since on those alone depends that splendid ease, required to attract the beholder's eye, and enliven the form of imitative nature.

The great and most sensible difference between ancient and modern architecture, is wholly comprised in the composition of mouldings. Notwithstanding so great and distinguishing an article to the beauty of all work, as mouldings are, we daily see such productions of this sort, that one would almost be persuaded to think that there was no cause for them but custom, nor any properties belonging but the form, which might be extended or contracted as ideas or fancy might guide the pen
of

of the artist; and, I believe, there are many who consider themselves as adepts in architecture, who vary but little from the above observation.

Those gentlemen who satisfy themselves with opinions of this sort, are as far from the comprehension of symmetry, and real effects, as the difference between right and wrong. I own, there is a thirst for variety peculiar to the English nation, that must be satisfied, or the works of art (like the continued form of a worn-out fashion) would quickly decline, and be disgustful: therefore it is highly necessary to strive at invention, to gratify the mutable taste of such a people. But even this should be done within the rule of propriety: for excesses in any art are obnoxious.

The invention of many new members of mouldings were well concerted and introduced, by the original authors of them; but they are now prostituted to such a pitch of extravagance, that I almost wonder the inventors do not leave this by-road, (which they first ventured upon, and made familiar and smooth, to their lasting praise,) and find out some other similar path, where they may move on, for a time, without let or molestation.

The field of nature will never be exhausted, nor propriety lose its power of guidance; therefore, whatsoever bears a semblance of the former, within the circumscription of the latter, is consistent with symmetry, and hath the advantage of sound reason to fortify the invention. Any thing estranged from the above observation, deviates from the real sense of all mouldings; which are intended to give force and elegance to all works, wheresoever applied.

The present taste of mouldings (as introduced by numbers) differs much from this; for, instead of giving force and beauty, they in many cases diminish

minish the natural grandeur, for want of proper dimensions.

Any moulding, of whatever sort or nature, above the eye, should have a projection, that the whole effect of the different members may be plainly discovered; else they serve to no purpose. It will be of little use to load a cornice with beads, and other similar quirked mouldings, if they lose their effect by the distance. I must, nevertheless, allow, that mouldings designed in the above manner in many cases are pleasing, but must be judiciously appropriated; for the learner must understand, that instead of less, those mouldings require more projection than others; for it is not how those things will or do appear close to the eye, but we must consider the distance at which they must of course be viewed; the altitude, and natural point of sight. If these things were maturely considered, I believe we should find, that cornices of all sorts should not consist of one of the above particulars: — architraves to doors, windows, &c. as well as base and sur-base mouldings, doors, window-shutters, bellexion and other mouldings close to the eye, may have these introductions: — cornices to rooms of all sorts should be free; yet, if they must be subjected in other respects to the taste of the times, the learner must observe, never to exceed the following bounds: To make the cornice less than the one 24th part of the height of the room, nor project less than two-thirds of its height: and if the mouldings laid down by some eminent architects are not sufficient for his taste, I must leave him in other respects to his own fancy; with this point in view, not to out-stretch the modesty of the above proportions.

Of the practice of mouldings.

The working, or rather the taking-off mouldings from drawings, is a matter of some consequence to learners; therefore I shall not spare to be as plain and particular as possible, to render this familiar to the weakest capacity: but must observe to the student, if he is a stranger to this matter, it will be requisite to proceed step by step by the following example, (as descriptions in writing are sometimes troublesome to remember) and then in this, as well as all other points of practice, he will be assured of success.

Example of taking-off a moulding.

Before you begin, draw a line close to the face of the moulding, (not interfering with any of the fillets) next from this face-line draw a line square at the extreme top and bottom of the moulding, which will give the width of your stuff to be plain-ed up; from the face-line draw a line parallel, for the thickness of the stuff; next continue all the lines of the drawing into this first face-line; and also at the projection of each annulet, or fillet, let fall perpendiculars into the face-line too, which will shew the wood to be taken out for working your squares; the same for springing both at top and bottom. Having done this, strike a line across your piece of wood, and with your dividers begin either at the top or bottom of the drawing, and take off these several marks of intersection, and prick them upon the piece of stuff for the moulding; likewise the springing both at top and bottom; then set your gauges to these several pricks, and run them
all

all along the piece ; then proceed to work it ; first taking off the springing, and set it upon the same position for working, it must be in when put up, by which means you will sink all your squares level. If there is an o-gee in the drawing, observe with your dividers to draw the curve of the hollow into the face-line, the same as the fillets, which will be your place for pricking off upon your stuff, and the extent of the hollow ; which, if your round is well fitted, and worked exactly to this line, your kindred hollow, will work the round to an intersection of the greatest nicety.

There is no other moulding, save this, that requires any observation in the taking or pricking off. O-gees and faint hollows are the only difficult mouldings ; with respect to the latter, whenever they occur, it is always upon a plain face, as architraves, &c. in which case, you must always leave a fillet at the bottom of the hollow, and rabbit the architrave, or other plain, where it is to be applied, because it would be impossible to work a moulding of this sort to an edge with any accuracy.

Of the value of mouldings.

Masters charge for all streight mouldings, s. d.		
as base and sur-base, plain cornices, &c.		
with materials, per foot superficial, from		
1s. 2d. to	—	1 6
Surveyors allow in general		1 2
Dentel cornices by masters		1 8
Surveyors	—	1 5
Block or modillion cornices, per foot,		
masters	—	1 8
Surveyors in many places		1 4
		Blocks

Blocks and modillions at per piece, according to their size, from $1\frac{1}{2}$ d. to	s. d.
	0 6

Small block cornices are valued all together, at	—	—	1 9
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Doric intablatures all together; with mutules, trigliffs, &c. at per foot superficial, masters	—	—	2 6
--	---	---	-----

Surveyors, from 2s. 2d. to	2 4
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But these are usually valued singly, the cornice at 1s. 2d. the trigliffs and mutules at per piece, which answers the same purport.

Architraves, at per foot superficial, by masters	—	—	1 0
--	---	---	-----

Surveyors, from 8d. to	1 0
------------------------	-----

The universal price of mouldings is as follows. To every superficial foot of moulding may be reckoned, in a general case, $\frac{3}{4}$ of a foot of stuff. In some cases it will require more, and others less, which, of good whole deal, as none else should be used for mouldings, we will call

Brads, glue, &c.	—	0 3
------------------	---	-----

The whole materials to a foot superficial, is	—	0 1 $\frac{1}{2}$
		0 4 $\frac{1}{2}$

The labour to all mouldings worked by hand, (as the others are not worth notice) stands a master in near 4d. per foot, which makes the labour and materials per foot

Therefore the universal price of all straight mouldings should be per foot superficial	—	—	0 8 $\frac{1}{2}$
			1 0

To prove the labour, 4 lengths of 10 or 12 feet,
S two-

two-membered mouldings, is one day's work, which may girt about three inches each, make twelve feet in the whole, which, at 4d. per foot, is 4s. above a journeyman's wages.

Circular mouldings are very badly regulated, having no more than double measure, which is in every case too little, both for materials and labour. The real value of circular work should be at least trebled; and, in many cases, double measure, and double price.

Architraves, double-faced, to masters should be the same as mouldings, as both stuff and labour have the same proportions.

Single-faced architraves are made of thinner stuff, with a moulding glued upon them; the materials are not worth more than 2d. per foot; the labour to ditto, 2d. more; therefore the real value should be to masters, per foot, — — —

Many masters charge for this work

Surveyors allow from 5d. to

s.	d.
0	6½
0	8
0	8

LECTURE XXIV.

Of DOORS.

THE nature of a door is too obvious to need a comment; therefore I shall immediately proceed to relate what is necessary to be observed in the practice of them.

Most kind of doors should be put into the hands of the best workmen, for they are a part of the branch, which requires great execution; being always in use, should be made particularly sound, and firm, and well handled, because they are ever opposed

opposed to the eye; the great principle or chief merit lies in the ploughing, and sticking the moulding upon the frame; for without masterly performance in these two points, all your care in plaining up your stuff, mortising, tenanting, &c. will be of little use; because in those two parts lie the great efforts to a well-executed door. There are different ways of putting a door together, but the best and surest is done after the following example.

When you have plained up your stuff, mortised the stiles and rails all the width, proceed to ploughing and sticking, and cut out what is called the haunching after; the method adopted by numbers, of haunching the stiles and rails before you plough or stick them, is a latent notion, invented by some who were fonder of studied maxims, than well-approved methods; if the principal effort to a clean door, lay in the mortise, and tenant, the maxim would be good; but as it depends solely upon the parts before mentioned, it is obvious, that our particular care should turn to these principles; which cannot so well be done to a certainty with the haunching cut out first; besides the inconvenience of spoiling the plain, by knocking the end against the notches.—There are others who pretend to be more sure and wise than the last mentioned, that put their work together square, and plain it off on both sides; then proceed to plough and stick, &c. but those are more intolerable than the other; having not one argument to support it: for if the stuff is reduced irregularly, (which must be the case so done) the moulding must consequently be so on one side, and palpably void of both truth and beauty.

There is another observation in scribing, that may not be amiss to mention, which is the common

error that many young men daily commit for want of thought; that is, the attempt of scribing a square or the level fillet of an ovolo on doors, or other framing of this kind: those that have this method, I beg of them to abolish it, and consider the inconsistency of mitring two level pieces of equal thickness, and to lap one upon another with a scribe.

As all framing is founded upon these principles, I think it unnecessary to say more of the practice of common work; though it may be requisite to say some little of bead and flush; after which I shall proceed to the value of doors, with some remarks of mahogany and wainscot ditto.

A bead is a moulding which cannot be otherwise framed than by a mitre: therefore hath a limit or certain extention, for every rail or muntin; and not like work that is scribed together, which may be moved to any length within the circumscription of the eye.

The best method of framing bead and flush for learners, is, to mitre his work square, and in this state put in the pannels, and after smooth all off together; then take it apart, and stick the bead; if the pannels are marked, and put to their places, and the bead well stuck, he will be assured of making clean work.

Of Mahogany doors.

Mahogany and wainscot doors differ from common framing of deal, by reason of the nicety of the mortises and tenons; which require great care, by reason that no pins are used in these sorts of work, which should be made as smooth as if the whole was executed by a plain. The manner of putting together is the same as other framing in every respect
 else;

else; except the double margin in the middle, which must always go through the top and bottom rail; also the top and bottom rail be continued, and instead of being mortised, that part where the mortise should be, must be left as a tenant; and the double-margined stile mortised in this place, and slipped on, both at the top and bottom.

The true meaning of this method is more forcibly to shew the effect of folding-doors, which could by no means be done, if this double-margined stile was to be tenanted into the top and bottom rail; and the bead run across the grain of the wood.

A mahogany door well executed, is, perhaps, one of the neatest pieces of workmanship that comes into the hands of joiners. There are many sorts of them; but I speak of the best; such as are worth labour only 10l. or 12l. making; numbers of which are in this metropolis, as well as in many noblemen and gentlemen's houses in the country.

As these sort of doors are unknown in some parts of the kingdom, I shall take the liberty to describe one of them. The best sort of mahogany doors are cased, having deal within both stiles and pannels; and are done in the following manner: First, upon the edges of the stiles and rails, glue slips of mahogany, of an inch and quarter each; also round the pannels must be put a margin of ditto, something broader than the raising, neatly mitred at the angles; when they are raised and fineered, a small artragel-moulding is put upon the top of the raising of the pannels; likewise must be cross-banded at both ends, and all the pannels fluted upon the raisings round; the stiles and rails fineered as the pannels: the reason of applying the deal, is, for the advantage of fineering; having more attraction than any other wood.

It

It is almost impossible to stipulate a price for one of those doors, without inspection, more than the labour; because it chiefly depends upon the value of the fineers; which are from 1s. per foot to 10s. ditto and more; therefore we must confine ourselves solely to the labour. A mahogany door, well executed in the above manner, is worth, per foot superficial, to a master, labour only, 12l. 10s. 6d. and will take a journeyman near nine weeks work; one of those doors with materials is worth 20l.

To the learner, who is not acquainted with the nature of fineering, I must observe to him to be particularly careful of his glue: for most of the errors that happen in fineering, are caused by laying on the glue too thin: glue for mahogany fineers should be at least of treble strength to what is commonly used for rubbing of joints; also be careful that no water gets under the finer, and that the iron you heat your work with be not moved to any dry place, but where your glue lodges; keeping still wetting every part where you have occasion to move it.

There are other mahogany doors, some fineered and others solid, from 2s. 6d. per foot to the above price.

	s.	d.
Mahogany doors solid, and flat pannel, are worth, with materials, per foot,	2	6
Surveyors allow, according as they are in goodness, from 2s. to	2	9
Masters charge	3	0

Those that are fineered vary according to the price of those materials, &c.

Wainscot doors are usually made with double margins in the middle, raised upon the pannel,
with

with an astragal moulding, and cross-banded, as mahogany ones.

Any executed in the above manner are	s.	d.
worth, per foot superficial,	3	6
Surveyors allow to ditto	3	6
Masters ditto	4	0
Ditto, with flat pannel, per foot superf.	2	3

The materials to a wainscot door, raised pannels on both sides, are worth per foot of good Norway oak, glue, &c.

Ditto, flat pannel,	1	4
	0	10

The labour to a wainscot door, raised pannel, double-margined, cross-banded, and an astragal mitred round the top of the raising, is about a fortnight's work; ditto, with flat pannel, 6 days; common doors, ovolo, and flat pannel on both sides, is $2\frac{1}{4}$ days work.

To a master are worth, per foot superficial, with materials,	s.	d.
Some surveyors allow	1	4
Masters charge	1	6
Ditto, with raised pannels on both sides, well done, are worth	1	10
Surveyors allow from 1s. 7d. to	2	0
Masters charge of good stuff, well done,	2	0
The labour to one of those doors is four days.		

Bead and flush doors of deal, 2 inch stuff, work on both sides, is worth per foot superficial,

Surveyors allow from 1s. to	1	4
Many masters charge	1	6
Bead and flush, 2 inch stuff of wainscot, work on both sides, surveyors allow from 1s. 9d. to	2	2
	Masters	

	s.	d.
Masters charge	2	2
The labour to one of those is 6 days.		
Bead and flush doors, on one side, per foot, by masters,	0	10
Surveyors allow from 7d. to	0	10
The labour to one of this sort is $1\frac{1}{4}$ day.		
Ditto, ovlo and flat pannel, of whole-deal, work on one side, square back, the masters charge	0	10
Surveyors allow from 8d. to	0	10
The materials to whole-deal doors, ovo-lo and flat pannel, are worth per ft. superf.	0	3 $\frac{1}{2}$
The labour to one of this sort of doors is $1\frac{1}{4}$ day.		
This sort of work, stuck with an o-gee, or any other moulding, the same.		
Whole-deal square-framed doors, and flat pannel, the surveyors allow, per foot single measure, from 5d. to	0	7
Masters charge	0	7
The labour to one of those doors is one day's work.		
The materials are worth per foot	0	2 $\frac{1}{2}$
The universal price should be per foot	0	5 $\frac{1}{2}$
Whole-deal ledged doors, stuck with a $\frac{7}{8}$ o-gee ploughed and tongued, the surveyors allow, per foot superficial, from 8d. to	1	0
Masters charge from 10d. to	1	1
The materials to one of those doors, of good yellow deal, nails, &c. are worth per foot superficial,	0	5
The labour to ditto, 1 day $\frac{3}{4}$; which may be about three-pence per foot more; therefore the universal price should be per ditto 9d. $\frac{1}{2}$.		

The

The learner muſt obſerve, that the ledgings or frame of one of theſe doors is mortiſed and tenoned together, and the frame ſo contracted, when nailed on, as to leave a rabbit both on the ſides and the top for a ſtop againſt the door-caſe.

Whole-deal doors, plain, with a bead upon the edges, and battens nailed upon the back, for warehouſes, &c. ſurveyors allow, per foot of yellow deal, from 5 d. $\frac{1}{2}$ to	s.	d.
	0	6 $\frac{1}{2}$
Maſters charge	0	7

The materials to one of theſe doors are worth, per foot,	0	3 $\frac{1}{2}$
--	---	-----------------

The labour 1 day's work. The univerſal price ſhould be, per foot,	0	6 $\frac{1}{2}$
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All half-inch batten-doors are worth per foot, ſtuff and labour,	0	3 $\frac{1}{2}$
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Some maſters charge	0	4 $\frac{1}{2}$
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Surveyors allow from 3 d. to	0	4 $\frac{1}{2}$
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Large coach-houſe doors, &c. yellow deal, of 2 $\frac{1}{2}$ inch ſtuff, bead and flush in front, and filled with flush behind, or framed ſo, the maſters charge per foot	2	0
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Surveyors allow from 1 s. 6 d. to	2	0
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The materials to this ſort of work are worth, per foot,	0	7 $\frac{1}{2}$
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The labour to theſe doors is worth, per foot, 10 d; therefore the univerſal price ſhould be, per foot,	1	8
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LECTURE

LECTURE XXV.

Of FLOORS.

A FLOOR is the plain area, or superficial content of a room ; of these there are divers sorts and qualities, as of Norway oak, clean deal, second best ditto, battens of three sorts, white deals, &c. but the best are of oak.

There is nothing very particular in the practice of floors ; though it may not be improper to make two or three observations : the first is, when he prepares his boards to be very careful not to shoot the edges too much under ; for, if so done, they are then sure to creak, a thing very disagreeable : the next is, that he be particularly careful, that the joists next the walls be directly streight, and that the boards in these places (when laid) be of an exact thickness, and streight across ; for if there are any defects, they are sooner discovered at the ends of the boards than in the middle ; besides, there is the disadvantage of their remaining so, because they cannot so well be smoothed off.

The next thing is, when you plough and tongue the ends of the heading-joints, lay that tenoned first ; in so doing you will have two-thirds of the board to nail through ; if you lay the ploughed one first, you have but one-third ; besides, you will have the disadvantage of making both your joints with a rabbit-plane, which is troublesome.

The next observation is, when you lay a dowel-floor, be sure to bore for the dowels, and utterly abolish the task-masters method of punching the edges ; also, when you mark them, do not be too anxious in giving too much draught to the pins, for
by

by so doing you not only take away the efficacy and strength, but bruise, and render the heading-joint more defective than if it was not close at all. With regard to the number of dowels, if the joists are no more than 10 inches apart, one between every joist will do; if 12 inches, or 13 inches, there must be two, and of oak-floors three.

The masters charge for dowel-floors of £. s.
Norway oak, from inch and eighth to inch and quarter stuff, per square yard 5 10

Surveyors from 4l. 10s. to 5 5

The materials, dowels, &c. are worth per square yard, of good Norway oak, inch and quarter stuff, 3 3

The labour to a square of wainscot-floor, well done, is six days work; therefore the universal price should be per square 4 15

Clean deal-floors, clear of sap, the masters charge, per square, from 4l. 10s. to 7 0
owing to a particular value they sometimes set on boards of an unusual length, which they get clean to lay through without any heading-joints.

I have known a master in London charge £. s.
for particular boards, per square, 10 10

The stuff unprepared cost 11d. per foot; and the master had kept it by him seven years, to serve a particular occasion.

Surveyors allow for clean-floors of deal, from 3l. 15s. to 4 15

The boards and dowels to a square shot, clear of sap, are worth per square 3 0

Labour to ditto, $4\frac{1}{2}$ days; therefore the universal price should be 4 15

Second best ditto, dowelled, masters charge — — 4 0

Surveyors from 3l. to 4 0

	£.	s.
The materials are worth per square	2	5
Labour, four days; the universal price should be per square	3	15
Common streight joint floors, the masters charge per square, shot clear of sap,	2	2
Surveyors allow from 1l. 15s. to	2	0
The materials of shot clear of sap, are worth per square	1	10
Labour to ditto, 2 $\frac{1}{2}$ days; therefore the real value should be per square	1	18
Common folding-doors of white deal, the masters charge from 1l. 10s. to	1	13
Surveyors allow from 1l. 5s. to	1	13
Good white stuff appropriated for floors, is worth per square, whole-deal,	1	5
The labour to ditto, 2 days; therefore the universal price should be at least	1	13

Note, the nails and furrings are included in the materials to all the above prices.

The quantity of nails to all floors is as follows: To folding and streight-joint floors, every square will take 250 nails; dowelled ditto, 130.

LECTURE XXVI.

Of GROUNDS in general.

GROUNDS are the level or plain surfaces on which all works are fixed, and require but little execution; though it is requisite all these things be noticed in the putting up; because on the just and exact form of grounds, depends the consequence of many material matters; as the hanging of doors, window-

window-shutters, &c. as well as fixing of architraves, mouldings, &c.

Grounds to doors must always be ploughed in the edge, if not mortised to receive dado, if any used.

In making grounds to windows, care should be taken that they are not bevelled too much, lest that should be an impediment to the back-shutters; which is very frequently the case.

Grounds to windows should be reduced to $\frac{1}{4}$ of an inch upon the edge, and should not be bevelled more than $\frac{1}{4}$ more, unless the window-shutters are in spacious buildings, and run from 12 to 16 inches wide; in such cases there is no difficulty.

Grounds in general are charged by masters, and allowed by surveyors, per foot, from 2d. $\frac{1}{2}$ to 3d. $\frac{1}{2}$; which is a fair price, if grounds to windows are included; if not 2d. $\frac{1}{2}$ should be the price. Grounds to windows should be 3d. double measure.

All grounds to chimnies are charged, by *d.* masters, from 6d. per foot superficial, to 8 $\frac{1}{2}$.

Surveyors allow from 5d. to 8

The materials, to chimney-grounds, with glue and nails, are worth per foot, 4d. labour to ditto, to a master, 4d. Therefore the real price should be 8d.

LECTURE XXVII.

Of WINDOW-SHUTTERS.

THERE is nothing particular in the practice of shutters, more than what has already been said of other framing of doors, unless they are made flat pannel, which is the present practice, with an astragal moulding mitred round, about the distance
of

of the supposed raising: what I mean by difficulty here, is to advise the learner to be careful to secure his pannels, lest they should cast, which will cause some trouble when he comes to put on his mouldings; the best method of doing this is to plough some pieces the thickness of the pannel; and, when you have planed and finished them, put those pieces to the ends, till you have put on the mouldings: this may be done as well after shutters or doors are together; but the other is the cleanest way, which will appear in practice.

Of hanging of shutters.

There is some difficulty in the hanging of shutters to learners, therefore I shall endeavour to be as clear as possible in this particular.

If shutters are hung double, that is, cut in the middle, they must always be hung the whole length first, and then taken down and cut; and observe, with regard to this last particular, that you do not cut the joint by the range of the middle bar, but square from each outward stile, till they both meet in the middle; the reason of this is obvious. If the sash-frames should incline either way, they would not open, if cut otherwise than square.

In order to hang shutters at the first trial, observe the following method: First, set off the margin from the bead on both sides: after prick upon the sash-frame half the thickness of the joint of the hinge; then drive in brads at those pricks; to which put the shutter, and screw it to; and when opened, will exactly turn to the place required.

Window-shutters are but very indifferently paid for; the masters charge per foot for front-

front-shutters, ovolo and flat pannel, bead s. d.
and butt on the back, 1 0

Surveyors allow from 10d. to 1 0

The materials to window-shutters, ovo-
lo and flat pannel in front, and flush bead
behind, is worth per foot superficial, with
glue, &c. 0 4

The labour to ditto, hung double, to a
master is worth per foot 9d. therefore the
price of front-shutters should be 1 3

Ovolo and flat in front, and square behind,
hung single, should be measured with the
back-flaps and linings; if they are framed,
and all reckoned as single work, at per foot
superficial, if well done, 1 0

There is no way for either masters to be paid for
their trouble, or gentlemen to have their work well
done, unless this way of settling the matter be adopt-
ed. The method by surveyors of measuring front-
shutters at value and half, and back-flaps but single
measure, at the price of 10d. the former, and 7d.
the latter, will in no-wise pay the labour and half
the stuff. For supposing a window of 18 feet,
the making the shutters, fitting in, and hang- s. d.
ing ditto, is at least five days work; which
we will call only 13 4

The stuff, glue, considering the disad-
vantage of cutting to waste, is worth, per
foot all together, 3d. $\frac{1}{2}$; which is 4 11

18 3

I will say, to front-shutters 9 feet, at 10d. 7 6

Back-flaps, nine more, at 7d. ditto 5 3

12 9

We

We find, by the above observations, that the labour to making and hanging shutters to a window comes to 18s. 4d. and that the price allowed by many surveyors is only 12s. 9d. with materials; therefore I will appeal to every sensible man, if this matter does not require a better stipulation.

Some people may think that five days labour is more than these things will take; and so it is in some men; but we are not, in labour, to judge from the best workmen, but take the casual run in a shop: and if so, I believe we should find, to a window, well done, but little variation from the time above mentioned. Task-masters, indeed, would do the above work in three days: but work so done is of little use, when compared to, or placed near, something of the same kind from a capital shop.

The real price of window-shutters should be stipulated according to the following example:

Inch and half shutters, stuck with o-gee or fancy moulding mitred together, flat panel with moulding round ditto, flush and bead, or stuck with an ovolo, &c. should be per foot single measure	s. d. 2 0
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Ditto, raised in front on the panel, with astragal moulding upon it,	2 3
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Ditto, fluted upon the raising,	3 6
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Back shutters to ditto, framed bead and flush,	1 0
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All common window-shutters, fronts and back-flaps framed, should be valued all together at per foot superficial, with materials,	1 0
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Common ovolo shutters, square behind, back flaps plane, per foot all together,	0 10
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These prices are as low as any master, that does reputable work, can afford, to live by.

LECTURE XXVIII.

Of WAINSCOTTING.

WAinscotting, in this refined age, is quite obsolete, and seldom used, except in studies, or offices for servants, &c. therefore shall omit saying any thing of it more than its value.

Wainscotting with yellow deal, flat panel, per yard, masters charge from 4s. 6d. to 5 0

Surveyors allow from 3s. 9d. to 4 6

The materials, whole-deal, and $\frac{3}{4}$ pannels, are worth per yard, glue, nails, putting up, &c. 2 6

The neat labour to a yard of wainscot is, on the nearest calculation, valued at 1s. 2d. therefore the universal price should be at least 4 0

Square wainscot, whole white-deal pannels, of $\frac{5}{8}$ stuff, masters charge from 3s. to 3 6

The surveyors allow from 2s. 10d. to 3 3

The materials to a yard of white deal, square wainscoting, is worth 2 0

Neat labour to ditto, 11d. $\frac{1}{2}$; the general price should be per yard 3 3

2 inch partitions, square, and flat on both sides, masters charge per yard 4 6

Surveyors allow per yard from 4s. to 4 6

The materials to a yard of this sort of work are worth, per ditto, about 2 6

The labour to ditto, at the nearest calculation, a master must pay, is, 1s. 6d. therefore the universal price cannot be less than 4 6

Square wainscot, framed flush for hanging canvas against, for paper, &c. the masters charge	s. d.
	2 9
Surveyors allow from 2s. 4d. to	2 8
The materials to a yard of this are worth	1 6
Neat labour to ditto 1s. therefore the universal price of this sort of work should be	2 9

Of backs and elbows.

These are a good invention of wainscotting, appropriated to the back and elbows of windows, and framed after the manner of the shutters, which make not only the windows of one connected form, but also give more room, by the advantage of the projection of all the base and sur-base mouldings, which stop against the architraves, and in this case go down to the floor, or finish upon a square plinth the height of the skirting.

This sort of work is but poorly paid for; *d.*
the price by masters is, per foot 6 $\frac{1}{2}$

Surveyors allow from 5d. to 6 $\frac{1}{2}$

The labour to one foot of this work is 3d. neat; materials are worth, per foot, ovolo and flat, 3d. $\frac{1}{2}$; therefore the universal price to masters should be 7d. $\frac{1}{2}$, or 8

LECTURE XXIX.

Of SASH-FRAMES and SASHES.

Sash-frames are a part of the business easily understood, and require but little merit in the execution; the principal care should lie in the dividing the pulley-piece, so that there be room for the sashes to move; observe also, that if your sashes are
to

to be hung with iron weights, that the pulley-block be put within 3 inches of the top; else if your frame is short you will not have room, on account of the length of the weights. Observe, with regard to the inside linings, that they are not less in width than $4\frac{1}{2}$ inches. By so doing you will oftentimes prevent a great deal of unnecessary trouble in hanging the back-shutters, and also have sufficient room for bars, &c.

Sashes, well made, require good execution, and should always be put into the hands of men of merit and experience, by reason they are a part of the branch that is ever opposed to the eye, therefore should be made particularly clean; especially that sort which is stuck with an astragal and hollow.

There are many particulars to a well-made sash which the learner must be apprized of; first, the planing up the stuff; secondly, the setting out; thirdly, the mortising; fourthly, the fillisting, and sticking the moulding; and, fifthly, the great principle or master-stroke, which is the wedging up; for on this depends the beauty, or real effect.

The learner must understand that the chief merit of a sash is attributed to the straightness of the bars, and superficies, which may be totally disconcerted by an unnecessary blow at one single wedge, though the whole work to it beside is ever so well done; therefore great care should be taken of this matter, as well as the forementioned observations.

There are many ways of putting an astragal sash together; the best method is to mitre the whole moulding, not through into the mortise, but a little lower than the face of the moulding, on both sides, to the extreme point at the top.

The rail or bar that is tenoned must be mitred, as if for scribing; and then cut under with a saw,
U 2 from

from the point to the tenant. Observe, in dowl-
ing fashes, that the dowles be not shorter than four
inches.

Sashes and frames are generally valued *s. d.*
together, from 1s. 2d. per foot to 2 0

Sash-frames with oak-foils, pulley-pieces
and outside linings of ditto, inside ditto of
deal, the masters charge, with astragal sashes
of good Norway oak, from 1s. 6d. to 2 0

Surveyors allow from 1s. 4d. to 2 0

The materials of sash and frames together,
to the above particular, are worth per foot 0 7

Neat labour to ditto, the sash hung dou-
ble, is about — — 0 6

Therefore the real or universal price
should be per foot together 1 4

Astragal sashes alone are worth per foot,
with materials, and well made, 0 9

Ditto, stuck with an ovolo, 0 7

The masters charge for the former 1 0

The latter from 10d. to 0 11

Sash-frames, with oak pulley-pieces and
foils, the out and inside linings deal, the
head fineered, and oak sashes, stuck with
an ovolo, the masters charge 1 9

Surveyors allow from 1s. 3d. to 1 8

The materials are worth per foot 0 6

The labour — 0 5

Therefore the price should be 1 3

Deal sash-frames and sashes the masters
charge per foot — 1 0

Surveyors allow from 7d. to 1 0

The materials are worth per foot 0 4

The neat labour 3d. $\frac{1}{2}$; therefore the ge-
nuine price should be per foot 0 10
Deal

	s.	d.
Deal sashes alone are worth per foot to a		
master — —	0	5
Sashes to fronts of shops, of mahogany,		
fluck with an astragal and hollow, to a mas-		
ter are worth per foot superficial	1	0
Masters charge from 1s. to	1	3
Surveyors allow from 10d. to	1	0
The materials to mahogany sashes are		
worth per foot —	0	6
Ditto, all shop-fronts that are made out		
of the common method, as octagon, figures,		
&c. are worth per foot	1	8
The neat labour to ditto	1	11
Circular figures double measure.		
Ditto, of wainscot or deal, the same as common		
sashes, to a double price.		

LECTURE XXX.

Of DOMICAL SKY-LIGHTS.

A Domical sky-light is a part of the branch that requires a great deal of practice, or at least if it is put into the hands of a person unacquainted with its principles, he should be a tolerable adept in other particulars of practice, as well as having a profound knowledge of lines, not that there is any thing very extraordinary belonging to it, more than other circular work; after the consequence of the weather is guarded against, which must be maturely considered before he cuts one piece of stuff.

The best method of doing this piece of work, in my opinion, is to make stiles of the upright ribs, (though it is not a common rule) having by this
a better

a better opportunity of rabbeting the rails, which must be done for the upper end of every pane of glass, so that the pane above shall reach over $\frac{3}{4}$ of an inch, for the clearer effect of discharging the water. The mode of making a skylight, in point of workmanship, is to make them exactly domical within, and stick them as another sash, making the stuff no thicker at the bottom than the top; the outside (for my own part) I would always make streight with the glass both ways, and cut the stiles out in notches, which will appear like stripes one above another, as the dome naturally rises: if the plan is an exact circle, and hath a concentric crown, one templet will do for all the stiles.

The way to get the size of all the rails, to every different sweep, as the dome diminishes to the crown, is, first, draw the size of two ribs, with the outside marked to the glass; and on those ribs set out the section of all the rails; from which draw perpendiculars into the ground-plan, which will give you the exact size of every circle to the crown; to every one of those it may not be amiss to make moulds, which will more pertinently point to the learner the length of the rails, because upon each mold, and at every stile he can set out the exact size of the stuff, and be more sure of his lengths: when these things are once got, he may proceed with the same accuracy as in other circular works.

The value of a domical sky-light, if mea-	s.	d.
fured single, is worth to a master per foot	5	6
Materials to ditto, of wainscot, per foot	2	0
Of deal	—	1 8

Sash-makers can afford them considerably cheaper.

LECTURE XXXI.

Of STAIR-CASING.

OF all things to be considered in a building, there is nothing so material as stairs, nor any thing that requires half the abilities, either to plan or execute, and may justly be called the masterpiece of accommodation in every edifice; for, on a proper disposition, or disposal of stairs, depends (in a great measure) not only the strength and beauty, but the chief ease and deportment of the whole structure.

A whole volume might be written upon this subject, and, when done, so various and extensive the manner, as well as mode of execution, that this so essential a point must unavoidably be left to the builder's judgment at last, without it were possible to define every plan and situation that could in any wise happen; a thing totally beyond the power of art. However, it will not depreciate the judgment of any architect, to give this point a particular thought, before one stone or brick is laid; and not (as many do) leave an article so material to the whole, to be jumbled up without either grace or freedom.

Many people are of opinion, that there is no difficulty in stairs, provided there be room enough. I must allow, that to the workman it is much easier, when the place assigned is spacious, the stories high, and entirely void of impediment; but, at the same time, I must also observe, that it will require a masterly thought in the architect, to allow such a vacuum or opening, without endangering the strength of the structure; this particular must be maturely

maturely considered, and not for the sake of this necessary part sacrifice the consequence of the whole building: notwithstanding, it would be (on the other hand) the height of imprudence, to construct, or design, any insufficient or inelegant to the purpose; and in order to avoid one error, plunge into similar absurdities; it is therefore upon these principles that our judgment should operate; studying first their intent, properties, and convenience; the nature of the building will pertinently point out the mode of execution, and what will be adequate to the rest of the works proposed; the whole of which, more than the executive part, must depend, and that solely, upon the builder, or surveyor's judgment.

Several rules and precepts might be laid down, concerning the form, as well as the management of stairs, such as to have a liberal light against all casualties of slips and falls; that head-way, or space above, in every respect be free and lofty; that half paces be judiciously distributed, and at competent distances; that the breadth of steps be never more than seventeen inches, or less than eleven inches; and, that they exceed not by any means seven inches in height, in order to prevent our legs from labouring more in elevation than distinction; that to prevent encounters by the way of passing, stairs should never be less in latitude than four feet six-inches; and many more of the like observations might be alluded to, though they cannot be strictly adhered with, for this special reason, because every situation of stairs is tied down to the rules of discretion, and under the necessity of providing against their own inconveniences.

Though it may not be amiss, for every surveyor or builder, in the first designing of a house, to consider

sider the nature of the work itself; what sort of stairs have the best effect, both in form, and when executed; he perhaps might avoid in some measure those technical contracted plans, which are treble the expence of elegant stairs, and which often destroy that gracefulness which should consist in an analogy, or correspondence, with the beauty of the whole building.

It is from the forementioned observations, that the principles of stairs will ever be a matter of the first consequence in every age and to every student; for without it were possible to communicate wisdom, some people would not be benefitted by a volume written upon the subject of planning stairs.

There are many more observations, touching the practice of stairs, which I shall treat of as they may occur to my memory; omitting nothing that may conduce to the benefit of mankind, to whom I humbly dedicate my endeavours.

Though there is as great a variety of forms of stairs, as there are situations; yet their principles of practice are generally reduced to three, viz. geometry, bracket ditto, and what are called dog-legged stairs.

Geometry stairs are of that construction which seem, to the illiberal and vulgar, to have no support for the steps, having neither carriages, or leading-pieces to bear them; the properties of which I shall hereafter define.

Bracket ditto, are such as have strings and newels, and are supported by carriages and leading-pieces of timber; the bracket of which is mitred to the end of the riser of the step, and finishes upon the string-board, which is moulded like an architrave, &c.

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What are called dog-legged stairs, are such as have no vacuum or space between the leading or returning flight, but wind round one newel to the top; these, if there is room, have also leading-pieces for their support; if not, are sometimes fixed into strings on both sides, and put to the bearers for the winders.

LECTURE XXXII.

Of the PRACTICE of STAIRS.

BEFORE I begin to define the practice of stairs, I beg my reader to divest himself of all superfluous notions, such as unconnected lines laid down by many architects, as well as the studied maxims practised by numbers, and follow the sense of his own reason, close by the instructions I shall point out, and I make not the least doubt, but he will (after he has maturely weighed the practical methods I shall allude to) be capable of executing any thing that may occur in the course of the whole.

If he is totally unacquainted with this matter, I must intreat of him, (if it may not be convenient to take my instructions to his bench) to study them till he can rote them by heart; by so doing, he will have the advantage of pursuing his work without let or molestation.

LECTURE XXXIII.

Of the Practice of Dog-legged Stairs.

THE elevation of dog-legged stairs depends solely upon the nature of the size of the place they are to be fixed in, as length and width of the plan, as well as the heights of the different stories; but the chief article to be considered is the height; for let your plan as to length be ever so short, you must have a sufficient tread for the steps; therefore the advantage for getting up must be taken in the half space, which may be divided into any number of winders required; for the better understanding of which, mark the following examples.

First, Upon a board, make a scale the size of the ground plan, viz. the length and width; in the middle of the width set out the newels; this done, you will have the length of the steps.

2dly, Divide your length to the half-space for the number of streight fliers, both going to the half-pace, and returning from it, to the first story; and leave the half-pace till you have divided your height.

3dly, By the side of the ground-plan continue up your newels; and, having divided the height into the nearest number of steps you can have, count the number of streight fliers, both going and returning; the remains, to make up the height of the story, must be had in the half-pace, equally divided.

4thly, Continue the lines of the width of the steps upon the plan of the first streight flight, and likewise meet them from the different heights marked upon the newel, which will form the section of

the ends of the steps; after, to the treads, set on the projection of the nosings, and with a streight edge, draw a line close to them, which will be the upper-edge of the string; then set out the width of the string, allowing for the thickness of leading-pieces, laths, and plaister, &c. After draw the side of the rail parallel to the string, two feet wide upon the square, with knee, &c. if there is one, which will complete the geometrical section of the first flight.

5thly, Count the number of winders in the half-pace; at the top of which draw a base line, equal to the length of your returning flight; which may, perhaps, consist of one or two less than the first flight, as may be convenient for the advantage of the landing; then proceed with drawing the section in every respect as before.

The use of drawing the section of stairs is only to give the learner a clearer light into the nature of setting out his newels for mortising, which may be done equally as well by setting out the height and width upon a rod: but this is only to be done by people who have had some practice, or at least are in possession of fertile ideas.

When you only use a rod without drawing the section, as before observed, count the height of the steps in the first streight flight; from which set out the width of the mortise downwards; next set out the height of the winders, and the first step of the returning flight, with the rake of the nosings, which will give you the top of the mortise for the returning flight; and proceed with the rest as before.

The learner must observe, with regard to fixing his middle newel, that the nosing of the first winder be exactly flush with the inside newel, that the whole thickness may be into the half-pace; also on
the

the returning flight, that the nosing of the first freight flier be flush with the outside of ditto into the half-pace: and this order must be followed with respect to newels in all stairs whatsoever.

LECTURE XXXIV.

Of setting out a Newel for Turning.

THE way to make a proper limit for the bottom of the turning, is to take the rake of the steps nosings, allowing thickness of the capping; and where that falls upon the inside of the newel, is the mark for turning: the newel of the returning flight must have the addition of one step in height, and then the rake of the pitch-board, or nosings, as before observed.

LECTURE XXXV.

Of setting out a cap, and mitring ditto square, before it is sent to the turner's.

FIRST, draw the width of the hand-rail, and add to this the projection of the mouldings on both sides, for the outward diameter of the cap; to which draw a circle: then set within this circle the projection of the mouldings transferred from the freight rail, and draw inner circles to the different members; and also from the freight rail draw the same lines of projection into those circles; and where they intersect, will be the points for the mitring the cap, drawn by a freight edge to the point, through different intersections; then cut out the piece neatly, flick it in again with glue, and send it to the turner's.

LECTURE

LECTURE XXXVI.

Of BRACKET-STAIRS.

BRacket-stairs differ nothing from what has been already defined of dog-legged ditto, with regard to newels and strings; only those have a well-hole between the leading and returning flight; some square others circular or oval; and, instead of the ends of the steps fitting to the string-board, (as before observed) the strings are cut for the reception of the steps; not through any motive of strength or bearing, but ornament, that the bracket may be fixed, and mitred to the end of each riser, against the string, with the nosings of the steps continued round, which covers the joint of the bracket to the end of the step, and which hath a beautiful effect when well executed.

The same method, with regard to drawing the section of stairs, as before observed, I would still propose to learners in every respect, both for strings and rails, as well as ramps and scrolls, which will answer every point, both with respect to knees, ballusters, &c.

There is no difficulty in these stairs more than the clean execution; ballusters exactly dove-tailed into the ends of the steps, within the nosings properly divided; the risers all glued to the covers, with backing-pieces glued on the inside of the step; and, when put up, the underside of the step nailed or screwed into the under-edge of the riser; and, when finished, put on the brackets of strength under the steps, well nailed to each leading-piece.

Those that are unacquainted with the method of gluing risers to steps, I must inform them, that the best

best method is to make a frame, or templet, to fix them in, with a place cut out for the projection of the nosing; after glue on the hollow under the nosing, and work them when together.

I hope my reader will understand what I mean by a templet: it is only fixing two upright pieces in any thing, with notches cut out of each, the exact projection of the nosings, to which put the front-edge of the step, and then glue the riser to the cover close to the above pieces, &c.

LECTURE XXXVII.

Of GEOMETRY-STAIRS.

THE practice of geometry-stairs, which hath ever been considered as a master-piece of art, is founded upon as great a principle of strength, as is requisite for the consequence of the invention; which is only to carry a certain weight, or vibrating ponderosity, in any case inferior to the power that doth sustain it.

In order to prove this, we have only to measure the length of the step, and weight of ditto and riser, added to what we propose to go into the wall; then measure in the nature of continued quantity, as I have already defined in the lecture of the lever; similar to the following example.

The power that doth equi-ponderate with any weight, must have the same proportion unto it, as there is between their several distances: therefore if a step be 4 feet long clear, and six inches into the wall, the weight upon the end in the wall must be as eight to one.

Suppose we say the weight of the step and riser, with the weight of a man, which we will call 20 stone;

stone; that multiplied by 8 gives 20 hundred, for the power to sustain a man upon the end of one step naked in the wall; but we must consider that three fourths of this weight will be taken off by the support of the under-step; therefore if we divide 20 by 4, we shall find, that 5 cwt. or 70lb. placed upon the end of every step loose in the wall, will be sufficient to carry the weight of any man, without either wedge or nail; provided any thing is placed to keep the steps in their proper position; but what is this trifle in comparison to the pressure of a wedge, and the weight of a wall, or trussing of a partition? which, with interstices properly framed, will be adequate for the consequence of any stairs thus constructed.

My reader must observe, with regard to steps of longer bearings than 4 feet, it will be necessary to augment the thickness of the covers, according to the following proportion.

All steps of four feet clear should not be thinner than $1\frac{1}{8}$ inch stuff; and for every six inches more of length, one-eighth more should be added to the thickness; also that geometry-steps go into the wall one tenth part of their length.

There are a kind of geometry-stairs that wind round a column or pillar, whose bearing or certain gravity tends to one center; those must be a little mortised into the pillar, the riser about an inch, and the tread as much as the square of the end of the cover will require, to be just clear at the points.

These sorts of stairs are most frequently used for pulpits, &c. and would almost hang with the common support at the top and bottom; however, the additional bearings into the pillar are of great service.

The

The method of putting those steps together, if they are clean worked on the under-side, is to dovetail the risers into the cover: and when put up, screw the step to the under-edges of the risers all the way up; after fit in pieces of wood, neatly matched, in the holes made by the screws; the brackets are mitred to the riser, and the nosing of the step continued round. This is much the cheapest way of doing geometry-stairs; but there is a great defect of weakness in the brackets hanging in the above manner, loose as it were, having nothing to support them from every casualty; and yet to me the ancient method of moulding the steps underneath, in the form of the bracket, is heavy, unnatural, and very expensive, especially to winders.

There is another method by some made use of, which is putting up blocks, and screwing them well together; and after covering them with riser and tread, instead of brackets, frame the under-side of them, so that each step appears as solid: these sort have not a bad effect, were it not that the expence is so very extravagant.

The best and simplest method of doing geometry-stairs, is, to put up a string as in others; mitre the bracket to the riser, and finish to the string; then lath and plaister underneath, and finish with light belexion mouldings of plaister; and if the building is elegantly finished, it may not be amiss to introduce a light ornament in basso relievo.

It may be necessary to observe, that the risers of 2 inch stuff, to geometry-stairs of this sort, would greatly add to their solidity.

I think it needless to say any thing more relative to the properties or practice of stairs, since the fore-mentioned hints, with a little experience, must be sufficient for a very ordinary capacity; therefore

shall instantly proceed with my remarks on the nature of hand-rails, &c.

L E C T U R E XXXVIII.

Of HAND-RAILS to STAIRS.

THE manner of gluing up a twist to a scroll of a hand-rail, hath ever been (by workmen) esteemed a master-piece of the branch, and is considered by numbers as an incomparable piece of art; therefore in order to render this piece of practice as suitable as possible to the different capacities of workmen in general, I shall be as circumspect as the subject will allow, through an earnest desire that no man shall lack any thing in my power to communicate.

The first thing the learner should consider, is the nature of a scroll; its extent, and the cause of the twist. These things once understood, the practice of it will be obvious, and rendered very familiar. Whoever the first inventor of a scroll to a hand-rail was, I will affirm, that he was a man of enlarged ideas; and, though the invention be rather inadequate to an elegant structure, and inferior to something which might be proposed for the purpose, it is, notwithstanding, judiciously contrived, and hath an ease in its mode of finishing, that will ever render it an object of notice in every age.

A scroll is the periphery or circumference of a number of circles in a declining state, each less than another; therefore to draw this, is no more than to find out the centers, from whence lines laid down to various points, shall have given differences; which once found, will always be the centers

ters required to form the volute; and may be in number at the discretion of the workman, or as the size of the plan may require, either extended or contracted.

The cause of the twist is the geometrical elevation of the hypotenuse of a right-angled triangle, and must of course turn up when moved from its direct line of elevation; and will be more or less according to the height or raking-line of the pitch-board, the pitch-board being the right-angled triangle above-mentioned, which is made from the height and width of the step; and, being cut diagonally, gives the hypotenuse or rake of the rail.

The intent and nature of a scroll, is to finish upon a level the raking of the rail; which, if not brought to this conclusion, must either be ended in a newel, or would finish on the ground; because every raking-line hath an intent or tendency to a point of rest; therefore, in this case of a hand-rail, it is wittingly stopped in its course, and brought to the above judicious conclusion: so that in the simple practice of this, the learner has nothing to consider but the height he hath to rise, which is one step, from the level part of the eye to the height of the pitch-board, which will directly meet the raking of the straight rail, and must be effected with an easy decline, in the natural winding state, to the very edge of the scroll.

To the gluing this up there are three principal things to be considered:

The first is the matching or appropriating the stuff, so as the straight rail and grain of the twist shall unite, and appear as if cut out of one intire piece of timber.

The second thing to be considered, is the situation of the raking part, and how much is added or augmented to it by the elevation, which bears the same proportion as a raking-moulding to a level one.

The third and last consideration is the falling of the twist from the freight rail to the eye of the scroll, which must be done in such a manner that it shall appear with ease and beauty.

People who have had practice in gluing up hand-rails, must have acquired every tenet relative to it, and have no occasion to gather the least instructions that may or can be proposed by any author. To solve this particular for practice, is the great source of this article to those who have not; I will therefore propose the simplest method in art and nature, in order to form a proper conception suitable to the weakest capacity.

LECTURE XXXIX.

A Definition of Gluing-up HAND-RAILS without Lines.

Supposing a man had a thing of this sort to do in a remote part of the kingdom, where there was not an architect-book in possession of either the master or himself, and the whole idea they can form of this matter, is, that upon the first step the hand-rail turps round to an eye or cap of a newel, and forms a scroll; to such a person I propose the following method:

After he has put up the steps, and cut out the first by his eye to the best appearance he can, let him plane up the freight part of the hand-rail, and lay it down upon the nosings of the steps: secondly, let

let him also cut by his eye a mould to the size he proposes his hand-rail, observing to give the easiest turn to the rail he can; not abridging the sweeps, but bring it down within two inches of the front of the step, and turn it round to the eye, after the best manner he is able: thirdly, let him cut by this mould a piece or block for the eye thicker than the depth of the side of the rail, by so much as the thickness of the pitch-board is, from the base line to the rake, two inches from the first point; which will be as much as the rail hath to fall, from the square of the twist to the eye: fourthly, let him get out one or two pieces to make out the width of the twist, and glue them against the side of the straight rail, and to this block, which will make the whole; observing that these pieces, which make the twist, are to be cut with the pitch-boards raking-line; which, when glued, or proffered to, will be answerable to the block and straight rail, and also give the rise of the twist.

When these pieces are held against the rail, the learner will find, that he will want wood upon the top-side of the straight rail, and the under-side likewise; these must be glued on, or left upon the straight rail solid before it is planed up; I say, if he glues the pieces on, and cuts the outside of the rail by his eye, as near as he can, square from the ground-plan, and from the outside squares the top of the rail, and gauges the width and thickness, from these two sides, neatly cut by his eye, I propound this method will do; and, if the man hath a good eye, will have a pretty effect without ever a line.

Though some adepts in the practice of hand-rails would laugh at such a method, I beg leave to tell them, that I have laid down the lines to several people,

people, and shewed them their properties, yet have not been able to make them understand, without having recourse to some similar practices of this kind; not that I propose this scheme to men that have either seen, or have the least conception of stairs, or hand-rails; but to learners that have had no practice, and who may not have the least idea of it.

To people who have a knowledge of business, there are other considerations: First, the raking-mould, which must be made adequate to the length and width of the twisted part when held upon the rake, and perpendicular to the ground-plan; likewise the mould for the back or fall of the twist, from the straight part to the level part of the eye, both outside and inside.

Many people use no mould for the inside of the rail, but make the top or back of the rail square from the outside. But this method is not so well; for if it is done so, when you mould the rail, the fall from the straight part will be too rapid, and will cause a sort of lameness.

The next method, or thing to be thought of, is the squaring of the pieces before they are glued on, which may be easily done, and is a common practice; and when they are glued on, to be finished and moulded, one joint is left open to be broke, for the better convenience of working the scroll.

The way to find the raking-mould for the curve or turn of the twisted part of the hand-rail, is, first to draw the ground-plan of the rail, and thereon represent the pieces which are to make the scroll, or twisted part of the rail; upon the ground draw the width of the first step; then laying the pitch-board down flat upon the plan of the first step, the base of the pitch-board against the rail, draw the
width

width of the rail into the raking part of the pitch-board, which will give the width of the end: likewise draw the height of the turn of the twist through the pitch-board, and square from the raking-line; and draw different lines from the plan drawn through the raking part, and take off the several distances with your dividers, from the base of the pitch-board to the plan, and transfer them from thence to the raking part, in the manner of an angle-bracket; and you will have the raking mould required.

But things of this sort are much better understood by lines, or inspection, than description; therefore I would in cases of this sort, as well as the manner of drawing a scroll, refer my reader to those things drawn, with their manner of performance, as shewn by architects.

Observe, if you make use of a raking-mould, (though many do without) you must make it of paste-board, in order that it may bend to the declivity of the rail; else you cannot so well mark the top of the rail by it. By the raking-mould your pieces must be cut for the turn and width of the rail; the mould for the fall of the twist, and regular curve for the top of the rail, is done in the following manner.

Upon the ground-plan, where your twist begins upon the streight rail, divide the outward curve-line into any number of parts, and transfer them upon a streight line; at the end of which place the pitch-board, which you will understand is the height you have to rise; then divide the raking-line of the pitch-board into any number of parts, and likewise the remainder of the streight line, from whence you began the first part you transferred from the plan; and after draw interfections of streight lines, which will exactly give the curve of the under-side of the rail; then set up the depth of the side of the rail parallel

rallel to this, and you will have the curve of the whole twist stretched out; with this mould you must cut your pieces both at the top and bottom; also the streight part of the rail that begins to turn up, right away to the level of the eye, and your work will be properly squared before it is put together; observe in the gluing of them, that you do not set them twisting one to another, and likewise perpendicular to the plan.

LECTURE XL.

The Method of drawing a Scroll.

THE method of drawing a scroll is to form a circle equal to the width of two steps, divided into eight parts: from the center draw a lesser circle, for the size of the eye, larger than the width of the rail by the addition of the mouldings, as a cap to a newel: from the first draw a tranverse diameter, and through the center again draw a conjugate one; then from the outside of the inner circle, to the large one of two steps, divide the upper part of the conjugal diameter into eight parts, for the diminishing scale; from the outward circle, upon the last mentioned diameter, draw a line to the outside of the streight rail to the point of the transverse diameter, set the other point of your dividers, and describe a sweep to the diagonal line, which will be the width of the scale; the eight parts drawn through this, to the point of the diameter at the outside of the rail, will give the different parts; all to be set upon the diameters, or eight parts, as they follow of course; when so much is done set your divider from the center of the eye, to the outward part of the circle, and move it to the first eighth part,
next

next the freight rail; and make a mark in the eye, and likewise from the diameter, or a little above upon the freight rail, set your point, and find the mark in the eye last made, which will be the center for the first eighth-part; then proceed with the second; and so on to the eye. If this is not plain enough, I must refer you to the drawing of a scroll.

Observe, that there is no necessity, to make a scroll equal to two steps, nor follow the manner I have said of the size of the eye; either of which may be made larger or less, as fancy moves the artist; only consider the size you make the outward circle, and from that to the inner one; divide the scale into any number of parts you choose to diminish by, and draw, or divide the greater circle into the like; proceed as before; sometimes a scroll is made equal to a step and a half; sometimes but one step; and sometimes but a quarter of a revolution; according to the taste of the surveyor or builder.

LECTURE XLI.

Of RAMPS.

A Ramp is a portion of a circle; the center of it is formed by a square line drawn from the rake of the rail, and likewise the level of the knee at the top of the half pace continued to this line, gives the center for drawing the curve of the ramp, which is in height the rise of two steps; sometimes ramps rise three or four steps, in particular cases, where there are winders; but those have a bad effect, owing to the upper part of the ramp having almost no curve.

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Ramps,

Ramps, if possible, should be cut out of the same plank with the freight rail; in the last mentioned case, the ramp must be glued on to the freight rail.

LECTURE XLII.

Of gluing up Hand-rails to circular Plans.

THE many various forms and modes of disposing, to the best advantage, a decrepped or bad concerted plan for stairs, often draws a fertile genius to wrestle with inconveniences more destructive to his tranquility, than matters apparently of much more consequence.

Stair-casing may justly be called an art of peculiar tendency, because the more labour is spent in the execution of its particular parts, the more it is subjected to bad causes and ill effects, from the very motives that should add grace and freedom to the nature of it, which is in the manner of the hand-rail, and can never by any scheme be made pleasing if stretched into any irregular form, as upon plans that consist of a compound or mixture of steps, that is, winders and fliers.

Stairs of this sort cannot, by any power in wisdom and nature, be made to have either a pleasing or a good appearance; notwithstanding it will not be possible always to avoid them.

It is greatly to be lamented, that the difficulty required to execute all irregular plans to stairs, should not make surveyors more careful in the disposing of them, since they have not one good quality either in circumstance or mode to recommend them; and yet so infatuated are the builders of this
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age to things of this sort, that we scarcely see one good building, but what is merely contrived for a pile of these unnatural productions.

However, since they are alone the taste of the times, it is fit we should endeavour to point out the most simple and judicious method for executing their hand-rails.

There are many ways of gluing up a hand-rail to a circular, oval, or eleptical plan; but the best, in my opinion, if you have but little ground or opening, is, to do it in thicknesses after the following manner; first, glue up a cilinder of a plank to the size of the well-hole, and having rounded it to fit the plan, draw upon it the section of the ends of the steps.

If it is an entire circular plan, a streight edge will touch all the nosings, and the rail will be in a proper natural rising position; but if you have any streight fliers before the winders, the same after to finish the story; the rail, instead of retaining its natural figure, will, through its own inconveniences, be transformed to the shape and almost figure of an S; for the learner must observe in hand-rails of this sort, there is obliged to be given an additional length to the banisters, in the circular part upon the winders, in order to remedy the defect, which is caused by the sudden elevation of the steps; and for want of distension, or breadth of covers, throws us above our natural position, in either ascending or descending, and obliges us, for the benefit of having hold of the rail, to have recourse to the above experiment; if not so, we should be in danger of falling over the rail in the above-mentioned part; therefore, that very place which should in reason (to cause a pleasing appearance

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in the rail) be lowest, is for the motive above-mentioned unavoidably and indispensibly confined to be the highest.

There are some necessary observations relative to the practice of these rails ; the first is, the consideration of the matching of the stuff, which must be contrived and cut out of one intire piece of timber, and the fineers all appropriated in the same places they are cut off, in regular succession ; and observe, that in the getting this timber cut, that you maturely study the size you want both ways ; and remember, that to a rail of two inches and a half, it will require a piece of timber six inches wide, to allow for the saw-carffs and planing up, especially if the opening doth not exceed two feet.

There is another observation, relative to the depth of the stuff, for the size of the rail, which requires some thought, if the plan consists of winders, and streight fliers to finish the story ; for the learner must observe, that the turn required to the rail, both to the winders and from them is subjected to a cause, which he never would think of, (till either practice or instructions convinced him,) therefore it will be highly requisite for him to leave an inch more breadth to the fineers, than the depth of the rail ; the ground of this maxim is, that no body of fineers applied one upon another in a rising state, if they are turned from their natural course, either up or down, but will vary in the laying, as much as the difference of the two twists, between the first mentioned state of rising, and that which the rail is turned to when continued to the fliers ; and may be, according to the ground of the opening, one thirty-second part of an inch ; therefore, if your rail requires to be glued in twenty-four or more inches thickness, you will be so many half-sixteenths of
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an inch out of square in the turning part, (more or less, according to the plan, and number of fineers required;) therefore this width must be given to the fineers before they are laid, to be squared off after.

In order to lay fineers upon a cilinder, observe the following example: If you have no convenience for doing this, and are obliged to make use of bed-screws or wedges, lay all your fineers upon the cilinder together, and screw them down all the way dry, and having prepared pieces of wood to lay across the rails at 9, 10, or 12 inches apart, and bored holes through them as may answer to be close to the rail; opposite to them bore holes in the cilinder, adequate to receive them. If your cilinder is of plank stuff, this will be sufficient attraction; but if thinner, I would propose the setting your cilinder upon stools, or legs, for convenience of getting underneath, and put the screws through the under-side, and make use of the nuts upon the top for confinement; and, having loosed one half, take the assistance of two men, one to hold up all the fineers, the other to lay them down successively as you glue them, then all hands to fixing the screws; which, if well done, will be the most judicious method of doing any rail of this construction; then proceed to the other half as above.

My reader must observe, if the rail be for a regular plan, either circular or oval, he will have no occasion to augment the width of his fineers more than what is just necessary for clearing off, because the rail will come off the cilinder ready squared. With regard to the number of fineers to make the adequate thickness, you must be a little particular, in order to have a few shavings to plane off the
outside;

outside; because where the screws are applied, the fineers will naturally be most close, and consequently leave hills between, which will want planing off when struck.

The learner may take notice, if he hath not leisure to wait till the rail is dry, (which, in the best weather, will require three weeks) he may proceed as before, and glue down another by the side of it.

Many people of the profession argue against rails of this sort, and give a preference to gluing them up solid; but I cannot side with such an opinion.

To an opening of three feet and a half, or four feet, where the rail may be cut out of one entire plank, it may be a feasible method. The great particular of matching the stuff to small-grounded plans (glued up solid) will ever raise objections against the rectitude of this mode of appropriation, besides the danger of so many joints, and all glued across the grain, which creates a fault in the strength, and is in no wise equal to the purpose. However, if the learner is infatuated to this method, the best way that I can propose for the execution of it, is, still to make use of a cylinder, and either cut the top off to the position and rise of the steps, and square from the perpendicular of it, which will be adequate to the ground; or else cut out your pieces, and fit them side-ways to the cylinder, by the nosings of the steps, as you would proceed with the fineers.

This work may be done without the trouble of making a cylinder, by finding or making a mould for the backing of the rail: but there is a great difficulty attends this, and it is hardly to be found correct. Every author that hath attempted the resolution of laying this down, is in point of disgrace; none having come at a proficiency, nor is
it

it to be well done without practical allusions: As I lay down no lines, and a description without, in this particular, would be no advantage to the learner, I must beg his excuse, and refer him to the true methods alluded to; which, when once he is in possession of, will furnish him with comprehensions for any other subject of this sort.

I beg to observe to the learner, that if the plan consists of fliers and winders, in the meeting or joining of those two parts he will be careful to give the rail as easy a turn as possible, and not directly follow the steps; and likewise, that he leaves wood both at the top and bottom side of his fineers, at the joining of the twist to the scroll; if it is a regular circular plan, it will require very little; and with the scroll proceed in every respect as to a straight rail.

With regard to strings to circular stairs, I would not propose the gluing them up in fineers, but solid; especially, if the plan is only circular at one end; in such a case glue them up and down in the manner of the cylinder; and cut to the section of the steps, at the upper edge; and at the bottom in a regular rising state, as in the straight part.

Strings to circular stairs are worth per foot 4s. 6d.

LECTURE XLIII.

Of the VALUE of DOG-LEGGED-STAIRS.

Common dog-legged stairs, with bearers and strings included, the masters *s. d.*
charge from 9d. per foot to 1 0

Surveyors allow upon an average about
8d. $\frac{1}{2}$, or

0 9
The

The materials to ditto of yellow deal, bearers, strings, nails, &c. upon the nearest calculation are worth

s. d.
0 3 $\frac{1}{2}$

The neat labour to ditto about 2d; therefore the universal price may be, per foot superficial,

0 7

Rails and banisters to ditto, of inch deal, planed square to represent iron, are worth per foot, if ballusters are included, newels turned, capped, &c.

0 6

The labour to ditto is worth to a master

1 3

Masters charge, when valued this way, per foot

2 6

Surveyors allow from 1s. 6d. to

2 3

Some surveyors measure the rail superficial, including newels, at per foot

1 2

and allow per balluster, with capping, &c.

0 3

which comes partly to the same money.

If newels are not turned, nor capped, the price is, or should be, per foot

1 9 $\frac{1}{2}$

Ditto turned ballusters of 2 inch stuff, per piece

0 7

Bracket-stairs of strong stuff, per foot, the masters charge

1 3

If of second-best risers and covers

1 5

Surveyors allow to ditto; from 1s. to

1 4

The materials to ditto are worth, per foot, 5d. the neat labour well done, about 4d. $\frac{1}{2}$; therefore the universal price should be, per foot, 1s. or

1 1

The strings measured at the above price; the architrave at 10d. per foot superficial.

The brackets, if plain, per piece,

0 9

If carved from 1s. 6d. to

2 6

Ditto of clean deal, per foot superficial, the masters charge, per foot, from 1s. 6d. to

2 0

The

	s.	d.
The surveyors allow from 1s. 3d. to	1	8
The materials according to the ground of the tread, if very good, are worth per foot	0	8
Labour to ditto about 6d. therefore we cannot stipulate the price at more per foot than	1	5
Architraves and brackets as before.		
Geometry-stairs, of clean deal, with a string, are worth per foot superficial from 2s. 6d. to	3	0
These sort both the masters and surveyors in common are unacquainted with, it being rare to see one done this way.		
The materials to ditto with risers of 2 inch stuff, good screws, &c. are worth per foot, if they are wedged in a plank in the wall, I say, are worth, per foot superficial, from 9d. to	—	—
Labour to ditto is worth to a master	1	10
Geometry-stairs moulded under the steps, according to the bracket, are worth per foot, from 3s. to	—	—
Materials to ditto are worth	2	0
Labour to ditto	1	0
Mahogany hand-rails, scroll and ramp, the masters charge per foot superf. from 3s. to according to the goodness of the stuff.	4	6
The mahogany to ditto is worth per foot, of Jamaica wood, 6d. $\frac{1}{2}$; of Rattan, 5d. labour to ditto is about 2s. per foot; therefore the real price should be per foot	3	6
Surveyors allow from 2s. 6d. to	4	0
All circular rails double measure, which in some respects is too little, as weith-rails or so; if the surveyors will not be persuaded		

out of their humour, and will allow no more	s.	d.
than double measure, the price should be		
per foot	—	—
Labour to ditto, single measure	7	6
And also allow 1s. per foot for the cylinder, deal rails, scroll and ramp, is worth	7	6
per foot	—	—
Masters charge for ditto	2	0
Surveyors allow from 1s. 6d. to	2	3
	2	0

LECTURE XLIV.

Of FRONTISPIECES.

THE word Frontispiece imports the fore-side or entrance of a door, usually made more rich and beautiful than the rest of the exterior work. There are many different sorts of those; but the most elegant are such as are made according to the designs of one of the five established orders, invented and delineated by the ancients. The most considerable of them for the purpose is the Doric, on account of the large projections of its cornice, which prevents the inclemency of the weather from affecting those who may have occasion to wait at the doors for admittance; a matter of very great consequence.

The manner of appropriating the orders to frontispieces, is to lay aside the pedestal, with all its appurtenances, and let the base of the column finish upon the first step with a sub-plinth.

The method of proportioning the Doric order to frontispieces, is to let the whole be guided by the proper symmetry of the door, in the following manner: Make the height of the door equal to two diameters;

diameters ; after divide the width of the door into four parts, and one will be the diameter of the column ; the height of the column, base, and capitol will be equal to 8 diameters ; the architrave, friese, and cornice is 2 diameters high ; the pedement is in height two-ninths of the width ; the Doric column diminishes one-sixth of the diameter at the bottom.

The Tuscan door may be divided into four also, and one is the diameter of the column ; the height of the column, with base and capitol, is equal to 7 diameters, the intablature 2, which makes the whole height 9 diameters ; the pedement as before.

For the Ionic front, the door's width must be divided into 9 parts, and two is the diameter of the column ; the height, with base and cap, is 9 diameters, and 2 the height of the intablature, which makes the whole 11 diameters high ; the proportion of the pedement is the same as before.

To proportion a Corinthian frontispiece, divide the width of the door into 5 parts, and one is the diameter of the column ; the height, with base and capitol, is 10 diameters ; the intablature 2 ; the height of the pedement is 2-9ths of the width.

The general proportions of the Composite order are the same as the Corinthian.

The component parts to each front may be had by consulting the orders, as a description here would not make any addition, or be more clear than what may be seen by inspection. The practice of frontispieces may be reckoned equal to any thing in the business ; therefore it may not be amiss to point out its properties, and where the difficulties lie, so that the learner may proceed with judgment and accuracy.

The design being fixed upon, and the several mouldings laid down at large, with the pitch of the pedement, diameter of the column both at the bottom and top, with the cap and base drawn from them, &c. the first thing the learner should turn his thoughts upon, is the gluing up the columns, which cannot be trifled with; for these being badly executed, will totally eclipse the beauty of the whole; notwithstanding, the whole mass of mouldings, and decorations, as the trigliffs, mutules, frets, caps, bases, as well as the circular-foffite, jamb-lining, &c. which are all very essential points, must be done well in their place, to render it an object worthy the notice of the public.

And first of the columns.

The learner must observe, that the customary method of gluing up columns, is to divide them at the base and cap into eight parts: which done will shew the thickness of the stuff required; to find this draw the lines across through the circumference, and after lay down the lines close by the outside of the circle, both at the top and bottom of the column, which will shew it in an octagon state, and point out the width of the flaves both at the top of and bottom; which will vary as much as the column diminishes on one side: when you have got the width of the flaves at the top and bottom, you must consider that the natural meaning of all columns is to be represented swelling, (either from the base or from one third of the shaft: but for fronts of doors I approve of the former method, or at least within one foot of the bottom;) and cannot be got otherwise than by diminishing the outside of the flaves equal to one side of what the column diminishes to the top; therefore the first thing, after the
stuff

stuff is sawn out, is to diminish the flaves by a board cut for the purpose intended.

As the diminishing a column is a secret to some, I shall endeavour to point out a more clear and judicious manner than was ever offered to the public before.

First, draw a circle for the size of the column below; and within it another, which will be the size of the top; and having drawn a line through the middle, for the diameter upon it, where the inner circle cuts, draw a line square into the outward circle, which gives a portion of it, that the column diminishes; then, having got a board equal to the length of the shaft, divide it into any number of parts you like, supposing eight; next with your compasses divide that portion of the outward circle (that the square line cuts off) to the diameter into eight parts also; and draw lines from each into the square line, all tending to the center of the circles, which will give the scale: then take off each part, and transfer them into the diminishing board, from the streight edge, and drive in brads at each point, about which bend a regular thin lath, which will form the diminishing-board required.

Observe, when you diminish stuff, if you are pinched for thickness, that you need not plane it all off at the top-end, for it matters not whether it is taken off the top or the bottom, so that it does but fit the templet above-mentioned; and be but at each end pricked off and planed to a regular thickness, that the pieces of cants, which must be glued on the inside for strength, fit the inside of the flaves; having gone so far, set your bevel to the edge, and make a little templet to fit the outside of two by the drawing when together, in order to try them, when you joint the edges; and glue two and two together
first;

first; and then glue them in halves, and after glue the two halves together, which will compleat the whole; for a frontispiece you may perhaps want no more than 7 slaves, in which case you must first glue 6 together by two's, and one more after, or joint them one against another in successions as other joints.

The learner must observe, that if the iron of his jointing-plane be not particularly square, when he comes to round his columns, his joints will be open, which will have a very disagreeable appearance, besides being very defective in point of strength.

The method of rounding a column is, to cut a board circular the size of the base, and another the size of the top, and nail them on to each end, having bored holes to put pins through at each end, hang them in a creel, by the side or on the top of the bench, for the advantage of turning them round; plane them to the templets at each end, and by the diminishing board for length, and your work is done.

Bases and caps are sometimes glued up as columns, and sometimes are got out as solid of different thicknesses; the latter method is much the strongest, though attended with more expence; observe in this last method, that the thickness of the stuff be always equal to the moulding, and that the joints be always in quirks and fillets.

Having done the columns, bases, and caps, the next thing of material consequence, is, the fronton or pedement, which is superior in size to the level work, in proportion to the pitch; therefore, the moulding and other decorations will require to be made adequate to the purpose.

The

The simplest way to find the size and curve of a raking-moulding, is, first, to draw the level one; from which, set out the height of the pedement, and draw lines parallel from the level fillets, by the raking-line, parallel to each other at the top end; in any part of the raking lines, draw the size of the moulding, equal to this width, with the projections of the level moulding, and draw a line through the face of each, the same as you would do to draw the curves of an o-gee or simarecta; and, having divided this face-line into any number of parts, draw them square from this last-mentioned line into the moulding, and transfer them to the raking part, which will give the points for tracing the curves; this may be done full as well by pricking off the curves in the middle of the level moulding, and transferring them to the raking one; and, after finding a center that will strike three pricks, will draw the raking curve required.

The way to cut a raking mould to mitre to the level one, is, to make a pitch-board equal to the rise of the pedement, and put it into the mitre box, and set the moulding upon it; then cut it in the same manner as another mitre.

The way to mitre a little o-gee round the block, and mutules in a pediment, is, to make a little jack for the purpose to shoot them in, and glue them on before they are put to the planceer; the learner must observe, that there must be three sorts of mouldings to cap a block upon the rake, which bears this analogy; as the level moulding is to the raking one, so is the raking ditto to the returning one of the top, and found in the same manner as the other; as the putting the different works together well, can only be acquired by practice, for
any

any further explanation, must refer my reader, as it is impossible to communicate execution.

Of a circular Soffite to a Frontispiece.

The best method of gluing up what is called the stiles of a soffit, is to do them in two widths, and break the joints; if they are to be stuck, that is, framed, you must be careful to turn the grain with the edge all one way, for the advantage of sticking the moulding, and finer the stiles the thickness of the square of the plan; the best way of confining a finer upon any concave circular-work, as the above stiles, or such as may be wider, is, to plough a couple of pieces, and nail one fast upon one end first, and thrust the finer round with the end into this plough-grove, which will give the exact length; then, when you have laid on your glue, thrust it in as before, and put on the other piece likewise, and nail it fast down upon the other end, and if your finer is long enough, the glue will all be properly squeezed out without any other force.

If the soffit is plain, I would only make a finer, and cut out ribs to bend it upon, with rails across equal to the width, and proceed as before observed; after the finer is on and dry, glue backings on the outside, which is much the readiest way, and will answer well the purpose; the jamb-linings are the same as to any other framing.

LECTURE XLV.

Of the VALUE of FRONTISPIECES.

FRONTISPIECES, if valued properly, should in every respect and part have a different price.

First, the jamb-linings, which should be s. d.
made particularly well, if of flat pannel,
are worth per foot to a master — 1 0

Of raised ditto — — — 1 3

Of bead and flush — — — 1 0

The materials are worth per foot, whole
yellow deal — — — 0 5

Surveyors allow, and masters charge, well
done, from 10d. to — 1 4

The ground to a front, the masters charge,
per foot — — — 0 8

Surveyors allow from 6d. to — 0 7 $\frac{1}{2}$

The materials are worth 2d. $\frac{3}{4}$, the labour
3d. therefore the price may be — 0 7

If the columns, base, and cap, are valued
together, which is a custom by some, the
masters charge per foot from 1s. 9d. to 2 6

Surveyors allow the same, according as
the work is executed; but the most general
price is — 2 0

The materials, to ditto, are worth per foot
superficial, including the care of timber,
which should be put through all columns,
to take the weight off the base and cap 0 9

The neat labour, with expence of turn-
ing, per foot — 0 8 $\frac{1}{2}$

If for bases, are solid; the labour alto-
gether well done — 0 11

A a

There-

Therefore the real price should be per
foot superficial ————— 1 10

All the level mouldings, the masters
charge ————— 1 2

Surveyors allow from 1s. to ————— 1 2

The raking mouldings ————— 1 3

Mouldings of all frontispieces, as they
are, or at least should be, all of good yel-
low deal, are worth per foot ————— 1 0

The architrave and cornice, with friese
taken together, is worth per foot with the
trigliffs, bells, &c. ————— 2 6

The materials to ditto, are worth per
foot ————— 0 6

The method of valuing those, is, to value
the blocks or mutules at so much per piece,
plain blocks from 9d. to ————— 0 1

Those with bells in them, from 2s. to 3 6

The friese, at per foot, from 1s. 6d. to 2 0

All the mouldings at per foot ————— 1 3

The bearers and cover-boards at per foot 0 6

The columns shaft, per foot superficial 1 6

The base and cap, per foot, at 2 6

The sub-plinth, and plinth of the base,
together at ————— 0 7

Frets, under the planceer of the raking
part, per foot ————— 2 0

Flutings, upon the facio, per foot 0 6

The above prices, which are the medium of
many surveyors prices, are near enough, and not
extravagant; the quantity of stuff for mouldings
hath already been considered, therefore need no
further explanation.

Fan-lights to frontispieces are done from
2s. per foot to ————— 4 6
Some-

Sometimes they are paid by the piece, but this is an uncertain way.

LECTURE XLVI.

Of fluting COLUMNS or PILASTERS.

THE way to set out a column for fluting, is, to divide it at its base into ninety-six parts, and give one to the fillet, and three to the flute, which will just make in number twenty-four flutes, and twenty-four fillets.

The way to gauge a column for fluting, is, to fix a parallel piece to the middle of the column, and turn it round to every prick, or part, as you have set it out, and run the gauge streight along as in other work.

The method of gauging a pilaster, having divided it into twenty-nine parts, and given one to the fillet, and three to each flute, is, to make a gauge that will run half of them at one time, and after turn it to the other side for the other half: if the pilasters diminish, you must make a gauge with pricks equal to the whole, cut out to fit the width of the pilaster at the bottom, and, where it begins to diminish, turn the gauge a little a-skew, and continue so to the top, observing to keep the points of the notchings of the gauge close to the outside of the pilaster on both edges, so will your flutes be regular, and diminish properly. With regard to cabling columns and pilasters; some people have a method of working cables in the solid, with a plane made for the purpose; but, for my own part, I do not approve of it, because it doth not work clean. Columns fluted and cabled require the addition

of nine-pence per foot, or three-pence pence per foot run, of every flute and cable.

LECTURE XLVII.

Of Gluing up Corinthian or Ionic Capitols.

THERE is nothing very difficult in this work, save a judgment in appropriating the pieces to their proper places, and applying the grain of the wood the same way of the staves glued up; the best way to find which, is to draw the size of the capitol, with the leaves, abacus, &c. and their proper projections, which will point out the length and thickness of each piece. The same of the Composite capitol, &c.

Of Chimney-pieces.

Chimney-pieces are a great addition to rooms, and require clean execution; the mode of proportions assigned to them, is the dextrous result of fancy, which at present is in large estimation. There are many elegant and judicious designs published, which might serve as a standard of this sort of work; but custom having long ago bid defiance to propriety, and is now stalking abroad without let or molestation, what I have before said of mouldings should serve as an index to chimney-pieces as well as the rest of the works of this kind.

Chimney-pieces the masters charge per	s.	d.
foot from 1s. to	1	8

Surveyors allow from 9d. to	1	6
-----------------------------	---	---

All plain chimney-pieces worked by hand are worth per foot	1	0
--	---	---

Ditto with breaks	1	3
	With	

	s.	d.
With dentils	1	6
Fret dentils are charged per foot run	0	6
Common fillet dentils per foot run	0	4
Frets to frieses to ditto per foot run	2	0
Fluting in frieses, 6 inches wide, per foot	2	6
Fluting upon facios per foot run	0	8
Flutings and beads in frieses are per foot		
run — — —	0	2

As chimney-pieces are a particular work, the above prices, are in general such as take the medium, both with respect to the masters charging, and what surveyors allow; therefore shall not enquire too strictly into the merits of them, because they are so very tedious, and take much time to execute.

LECTURE XLVIII.

Of a Circular Splayed Soffite in a Streight Wall.

A Circular splayed soffite in a streight wall hath no great difficulty, after a proper curve is found for the stile; the following method is without exception.

First, draw the lines by the splay of the wall till they meet at a point; after transfer the length of these lines to another place; and having divided the circle of the arch into equal parts, and transferred them on to a sweep struck by the above radius, your stile is found; when bent round, will be the exact curb for the outside of the wall; then set off the stile, and proceed as in other circular work.

LECTURE

LECTURE XLIX.

A Circular Splayed Soffite in a Circular Wall.

A Circular splayed soffit in a circular wall is upon the same principle as the above, though it requires more judgment in the execution.

EXAMPLE.

First lay down the curve of the wall, with the splay of the jambs, and transfer them as before; then divide the circle into any number of equal parts, and transfer them to the curve struck by the center, from the splay of the jambs; after draw the lines all to the center; then draw a square line close to the front of the outward curve of the wall; and, having drawn the arch a little below the windows opening, continue lines perpendicular from the parts, the arch was divided into, to the square-line laid close to the curve of the wall, and the sweep struck by the center and splay of the jambs, which will give the points for tracing the curve; which when held upon the splay, and bent round, will exactly answer the purpose: the outside being once got, proceed with the best advantage.

Things of this kind very rarely happen; when they do, they should be put into the hands of men of great experience, and good judgment. There is no value in reason can be fixed to this work: the method is to measure them four times; but this is too little at the common prices. This method will do in point of stuff; but if this work is framed, the prices should be per foot 1s. and subject to the above measurement. But jobbs of this kind, the surveyors

surveyors are obliged to learn the quantity of materials and labour of the masters, and stipulate a price accordingly.

LECTURE L.

Of Dressers.

DRESSERS should be always made of white deal very clean: there is nothing required in these but their value.

The masters charge for 2 inch dressers	s.	d.
per foot — —	1	2
Surveyors allow from 1s. to	1	2
The materials are worth per foot	0	6
Labour to ditto 4d. therefore 1s. per foot is very reasonable	1	0
Columns to ditto are worth per foot, 3 by 3, per piece —	1	6
Masters charge for ditto from 1s. 6d. to	2	0
Drawers are worth per foot of deal	0	7
Runners to ditto per foot lineal	0	2 ¹ / ₂
Shelves to dressers are worth per foot, of whole deal, —	1	7
Common horse-plane cornice to ditto per foot run —	0	3

Of Slit-deal Linings.

All slit-deal linings are worth per yard, of white deal, ploughed, tongued, and beaded, —

Ditto of whole yellow deal 3s. 10d. or	2	2
Bracketing to plaister cornices per foot run 5d. if 6 inches square; if but 4 inches ditto	4	0
	0	4

LECTURE LI.

Of TORUS-SKIRTING.

Torus-skirting is worth per foot
Ditto to stairs double measure.

d.
o 7

As there is a difficulty in putting this up to stairs, I shall give my learner a method, which, if he pursues with accuracy, he shall in this point never err.

EXAMPLE.

First make two templets, one with the nosing cut out, so that it may go close to the riser; the other the width of one of the highest steps made parallel; lay the skirting-board close to the nosings of the steps: then with the templet against the riser mark all the lines for the risers, and with the parallel board strike out the lines to fit upon the treads; observe also, if the covers are a litte cast, set your compasses to the part, and from the top-edge of the board prick off the deficiency downwards; and having procured a piece off one of the nosings, mark on the board as is required for every step, those exactly cut will fit at the very first time; if not, it is of little use; because a second scribing either up or down alters the nosings and the general tenor of the whole, which cannot be any-wise so well executed as at the first time.

Of Trunks.

Trunks of good yellow deal, well pitched, s. d.
are worth per foot from 10d. to 1 0
Labour to ditto. o 3¹

LECTURE

LECTURE LII.

Of CARPENTERS WORK.

THough Carpenters work must be allowed and considered as the principal source of strength in every building, yet the practice of it is less irksome and difficult than many other of the interior parts of a structure, especially in London, where it is a rarity to see what may be called a piece of good carpenters work: not but there are many capital jobs in this branch, though they seldom occur, except it is in the country, at the mansion-house of some nobleman, or gentleman, whose chief pleasure it is, and was, to erect something noble, to shew their regard for their paternal estates.

There is nothing very material in the practice of carpentry, more than what demonstrates itself by a drawing; therefore I shall not take up my reader's time with what he may esteem as trivial observations; and only give some few hints of the particular methods and properties, and proceed with the value and consequence of materials.

First of foundations, as it is the carpenters business to settle the particular under-filings, and subtraction, touching the solidity of the ground.

With respect to piles, or planking, I must advise him to have a particular care both for the benefit of others, as well his own work; and weigh well the consequence of the superstructure by the intended size and height, in order, if possible, to prevent premature settlements, as well as the under conducts or conveyances of suilage, cess-pools for the soil, &c. that they likewise be in no-wise detrimental to the natural grounding of the foundation.

When his mind is at rest with respect to the basis of his building, he must then turn his thoughts to the centring for the vaults. There are various forms of those ; but the strongest, in my opinion, is the circular ; for if bricks or stones to those were cut wedge-wise, and disposed in the form of an arch all from one center, the bricks or stones can in no-wise sink downwards, for want of room to descend perpendicular ; because all solid materials must descend directly downwards, for ponderosity hath a natural tendency to the center of the world, and nature will perform her works by the shortest lines ; neither can the butments of a semicircular arch suffer so much as one made flatter, because the roundness of it will rather incline the weight to rest upon, than shove them out.

There is no difficulty in either making or setting of centers, but what every man that hath served a time to the business must naturally know ; notwithstanding, I shall not omit to acquaint my reader, that the most familiar method of setting centers, is, to cut pieces of quarter equal to the length at the top and bottom, and set your bearers upon wedges, for the convenience of easily striking them ; also if the vault is groined, to keep them up considerably in the middle, to prevent a defect in appearance by the setting of the arch ; a thing very common in arches or vaults of a great span.

As some young men may be unacquainted with the nature of striking out centers, the following is a certain method, for every part or a portion of a circle whatsoever.

EXAMPLE.

E X A M P L E.

First draw a base line equal to the width of the arch you intend; from the middle raise a perpendicular equal to the height, and likewise continue it below the base line; then from the height to the point of half the width, draw an hypotenuse line, in the middle of which set to your square, and draw a line into the perpendicular, which will be the center required: and so of every other circle.

An eleptic may be struck with a trammel for a rough arch; but the most exact and best method is to divide half the width and the height into any number of equal parts, and draw intersection of lines, which will form the arch desired.

The centers being done, the next thing that requires the carpenters thoughts, is, the plates for the floors to rest upon in the walls, which are of the greatest service imaginable, both with respect to strength, and form in practice; also, if the building is of no consequence, and requires binding-joists, consider well the nature of them, both with respect to scantling and disposition, and that they by no means exceed 3 feet 6 inches apart, or 4 feet at the farthest, to prevent too great a scantling for the bridgings.

The practice of this work is familiar; the binding-joists are mortised into the girder flush with the under-side, and so much below the top as will allow the thickness of the bridgings to be equal with the top of the girder; the binding-joist mortised near the under-edge, for the ceiling-joists at one end, and slip into a chase-mortise at the other.

Partitions come next under our examination, but require no difficulty: the principal thing in

partitions lies in the judgment of properly placing the braces, so as they may in some measure serve as a kind of bument or stay one to another ; where those are used, they are both of strength in supporting the upper floors, besides are a tye to the building by the top-rail being dove-tailed upon the plates, though should not be too frequently used, being less serviceable than partition-walls ; having mentioned those things, we will not doubt but the ingenious carpenter, will, from the hints before given, remember the adjuncts of strength and convenience, such as bond-timbers, lintels, discharging-pieces, tassels, and have them put in their proper places, for the advantage of putting up his own work, and turn our thoughts to the great consideration of every building, which is the roof, and hath a two-fold meaning, both of equal consequence. The first, is, the natural notion of the benefits intended, which is a shelter or covering from the inclemency of the weather ; the second, is, the extremity of the properties of this covering, which requires some thought, that they may not be inconsiderately applied as too heavy or too light ; (both of which I have in my lecture of strength hinted at) the former hath the common objection of pressing too much the under-work ; the latter (though of less danger) is always subject to the power of a storm.

With regard to the height of the pitch of roofs, the natural effect of the climate should be the only guide ; for if the situation where we build is cold, and subject to heavy falls of snow, the pitch should be particularly higher, to give a fall to the gathering-weight ; though, I think, the common pitch, understood by every workman, will be high enough for any part of this kingdom ; and something

thing under this, will do for all the cities and large towns, especially for pan-tiles.

The principal thing, in the practice of roofing, is the scarfing, or the raising of wall-plates, to find the length and backing of the hip-raftors, to contrive the trusses, that they may take part of the weight from the beams of the principals, and also be a shore to the length of the raftors; also, to lay out the different skirts of the roof in ledgement, to find out the real length of every piece, as well as the quantity of stuff required.

LECTURE LIII.

To find the Length of a Hip-raftor to any Angle.

FIRST, upon your drawing, lay down the principal you hip the roof to, and make a line through the middle of the plan, which is the base of the ridge; then draw the base-line of your hip; from this base-line, in the point of the base of the ridge, raise a perpendicular, and prick off the height of the pitch of the roof, from which prick, to the outward point of the base line at the angle, draw the hypotenuse, which will be the length of the raftor required; after, set off the thickness at the top and bottom, and you have the form of the hip-raftor with the bevels at each end.

LECTURE LIV.

How to BACK a HIP for any ANGLE.

DRAW a line across the angle of the roof, parallel from each corner, at any distance; in the middle of this line (which will be upon the base of the hip) set the point of your dividers, and extend the other to the nearest place against the inside of the hip just laid down, then turn your dividers to the base-line towards the ridge, and make a mark, which drawn to the outward points of the parallel line, will give the backing of the hip required.

I think it needless to say any thing concerning the method of mortising and tenanting roofs together, or of trussing of girders, or scarfing of plates, since Langley and others have so largely defined these things; an immediate recourse to them will shew, and, moreover, are much plainer by inspection than description.

It may not be amiss to mention that tie-beams should not be more than ten feet apart, and well pinned down upon the plates; the strength of a dove-tail being insufficient for the strength required, that the pieces you appropriate to tie the angles, be of sufficient scantling, well pinned down also, to keep every part in due form, and adequate to the purpose.

LECTURE LV.

Of the PROPER SCANTLING of TIMBERS.

Scantling of Girders.

IF the length of a girder of fir be	Ft.	In.		In.
	12	9 $\frac{1}{2}$	by	8 $\frac{1}{2}$
	14	11	by	9
	16	12	by	10 $\frac{1}{2}$
	18	13	by	12
	20			
	22	14	by	12 $\frac{1}{2}$
	24	15	by	13
	26	16	by	13 $\frac{1}{2}$

Of Binding-Joists.

If their length be	Ft.	In.		In.
	8	6	by	5
	10	7	by	5
	12	8	by	5

Observe, that no joist should exceed 12 feet in length, and lay 6 inches into the wall.

Of Bridging-Joists.

	Ft.	In.		In.
Length	3	3	by	3
	4	4	by	4

Common

Common Floorings where neither Binding or Bridging-Joists are used.

Length	Ft.		in.		in.
	10	Their scantling should be	7	by	3
	11		8	by	3
	26		9	by	3

Of Fir-Beams.

Length.	Scantling.		But if of oak.	
Ft.	In.	In.	In.	In.
30	6	by 7	7	by 8
45	9	by $8\frac{1}{2}$	10	by $11\frac{1}{2}$
60	12	by 11	13	by 15

Principal Raftors.

Length.							
If the raftors be of fir	Ft.	its scantling	in.	in.	at the top	in.	in.
	24	at the bot-	6	by 7		5	6
	36	tom must	8	by 10		6	8
	46	be	10	by 12		8	$9\frac{1}{2}$

If of oak at bottom.

If at the top.

In.		In.	In.		In.
8	by	9	7	by	8
9	by	$10\frac{1}{2}$	8	by	9
10	by	$12\frac{1}{2}$	9	by	10

Small

Small Raftors.

Length.	Scantling.		
	Ft.	In.	In.
	8	3 $\frac{1}{2}$	by 2 $\frac{1}{2}$
	10	4 $\frac{1}{2}$	by 2 $\frac{1}{2}$
	12	5 $\frac{1}{2}$	by 2 $\frac{1}{2}$

Purlines must be in large buildings, (where they are framed into principal raftors,) 9 inches by 8; in small buildings, when laid into the collar-beams, 4 by 5 $\frac{1}{2}$; raising-plates, and all wall-plates should be 9 by 5; lentils and discharging-pieces, 9 by 6; bond-timber, 6 by 2 $\frac{1}{2}$; tassels ditto.

LECTURE LVI.

Of the VALUE of CARPENTERS WORK.

FRaming of floors, with binding-joints, £. s.
and all materials of oak, from 2l. 15s. to 3 10
when the timber is valued in scantlings at
3s. per foot.

Surveyors allow, when both girder, binding-posts, bridgings, and cielings ditto, are, of oak, from 2l. 10s. to 3 5

Note, the materials to a square of the above floor are worth, when the oak is cut to scantling, at 2s. 8d. per foot 2 8

Labour to ditto 10s. therefore 3l. 5s. per square is as little as can be allowed.

As materials of every kind vary in every county, I must beg my reader to abide by

the labour in this particular for the country,
and value his stuff at a fair appraisement. £. s.

Floors of fir, with binding-joists, the masters charge per square from 1l. 10s. to 2 2

Surveyors allow about 1 16

The materials at 1s. 6d. per foot in scantlings are worth — 1 4

Labour to ditto 8s. 6d. therefore the price should be about — — 1 18

Common naked floors, the masters charge per square, of fir, from 1l. 8s. to 1 18

Surveyors allow about the same for those as the bridging floors; because the quantity of materials run near the same; the latter rather more.

The price of these floors is not extravagant, of fir, at per square, 1 18

The neat labour to those is about 6s. the masters charge 0 9

Surveyors allow 8s. 6d. which should be the universal price for labour.

Framed partitions scantlings 4 by 3, the masters charge per square, from 1l. to 1 5

Surveyors allow per ditto 1 0

The materials are worth, of fir, 12s. the labour to a master 8s. therefore we will call it — — 1 2

Ditto trussed partitions, labour is worth per square — — 0 10

All bond-timbers, lintels, discharging-pieces, &c. are charged at 1s. 6d. per foot cube.

Framing of king-post roofs, with purlines, &c. per square of fir, the masters charge 3 10

Surveyors allow from 2l. 15s. to 3 0

The

The materials per square of this sort of £. s.
framing are worth about 2l. 3s. the neat la-
bour 10s. therefore the price should be 2 18

Labour only of this work to a master is
worth per square — 0 14

Common roofs with a ridge-tree the mas-
ters charge per square, with all materials,
from 1l. 15s. to 2 0

Surveyors allow according to pitch from
1l. 10s. to — — 1 16

The materials to a square of this sort of
roofing, with raising-plates, tie-beams, ridge,
&c. are worth — — 1 6

Labour to ditto to a master is worth 9s.
therefore the price is low enough at 1 15

Extra-work to trussing of girders, beams, s. d.
&c. at per foot run, of oak, 0 6 $\frac{1}{2}$

Ditto of fir, per ditto 0 5

Bridged guttering, of whole deal, is
worth per foot superficial 0 6 $\frac{1}{2}$

Ditto with oak-bearers 0 7 $\frac{1}{2}$

Rafters feet and eaves-boards for slate,
per foot superficial 0 4 $\frac{1}{2}$

Door cases, framed of fir, rabbited and
beaded, at per foot cube, masters charge 2 8

Surveyors allow from 2s. 6d. to 2 8

The labour to one is worth per cube 1d.
and the materials 4 by 4 $\frac{1}{2}$, to a door of 6
feet 6 inches by 3 feet 3 inches, are worth
1s. 8d. therefore the price of 2s. 8d. is
little enough; the best way of valuing those
is to measure them superficial at 4d. per foot.

Centring for groins, per square, masters charge	s. d.
	12 0
The surveyors allow from 9s. to	11 0
The materials wasted, &c. may be valued at	6 0
The labour to making, striking, &c. to a master in worth very well 6s. therefore the standard is	12 0
Framed quarter-paces to stairs per foot, with materials, from 8d. to	1 0
Leading pieces of fir, per foot cube,	2 0

LECTURE LVII.

Of PLUMBERS WORK.

PLumbers work is all valued by the long hundred or 112lb. and bears a price according as it weighs per foot, from 4lb. to 12lb ditto, and is of different sorts, as sheet lead, and milled ditto; the former is used for all gutters, platforms, and covering of roofs; the latter for ridges of houses, hips, tops of cornices, &c.

I think it but of little use to enter into the quality of lead, (which is of various sorts) since the plumbers have an opportunity of giving you what sort they please.

The plumbers method of doing their business is to value their work at so much per hundred; and after charge you the time for laying, and finishing, which I think is a very weak as well as indolent method, and fit only to encourage their men in idleness.

The price that plumbers charge for 7lb. £. s.
to the foot, is, from 1l. 2s. to 1 3

Surveyors allow 1 2
The

The value of lead, considering the waste in the melting, is worth per hundred about 19s. therefore 1l. 2s. is sufficient. I think it a folly in surveyors to allow more per hundred for lead of 10lb. or 11lb. per foot, than 7lb. which is the general rule, let the plumbers custom be what it will.

The true and genuine method of valuing plumbers work, is, to state the price for sheet-lead of any weight above 7lb. to the foot at 1l. 3s. per hundred, which will allow 1s. per hundred laying, which is quite sufficient.

Milled lead is of a thinner and finer quality, and should be per foot laid and foldered, at per hundred

£.	s.	d.
1	5	0

The price of casting and laying lead is from 3s. to —

0	3	6
---	---	---

Casting old lead, and the plumbers make up the deficiency

0	4	9
---	---	---

Water-pipes, from 1 inch to 8 inches bore, folder and labour included

1	7	0
---	---	---

Rain-water-pipes, and pumps, per hundred —

1	8	0
---	---	---

Water-pipes of large bore per yard or hundred weight.

The customary allowance by plumbers for old lead is 14s.

Sash-weights at per hundred

1	1	0
---	---	---

Solder per pound 8d. $\frac{1}{2}$, or

0	0	9
---	---	---

The price of foldering water-pipes is 2s. 6d. per joint to —

1	2	0
---	---	---

One of $\frac{3}{4}$ inch bore is —

0	2	6
---	---	---

1 inch ditto —

0	3	0
---	---	---

1 $\frac{1}{2}$ inch —

0	3	6
---	---	---

2 inches —

0	4	0
---	---	---

3 inches —

0	6	6
---	---	---

4 inches —

0	9	0
---	---	---

One

		£.	s.	d.
One of 5 inches	—	0	12	0
6 inches	—	0	15	0
7 inches	—	1	0	0
7 $\frac{1}{2}$ inches	—	1	1	0

All dimensions between those bear an exact proportion.

The price of stop-cocks are per pound	0	1	3
Ditto, setting on folder and labour, at per cock, of an inch and half diameter	0	8	0
Ditto, $\frac{1}{2}$ inch, at per cock	0	3	0
One inch ditto	0	5	0
Brass-cocks, of an inch and half diameter, with bosses, folder, and setting on, per cock	0	7	0
Ditto, of inch, per cock	0	4	0
Ditto, $\frac{1}{2}$ inch, per cock	0	3	0

LECTURE LVIII.

Of MASONS WORK.

HAVING already said so much of the principles and properties of building, I hope my reader will excuse a dissertation on Masonry, as the volume is already stretched beyond the intended size. Notwithstanding, it is a noble art, and bears its date ever since the first intent of Jabel, the son of Lamech, who invented the first house of stones and trees.

Masonry hath in its practice every definitive principle of geometry, and is not surpassed by any of the liberal arts.

The way that masons value their work solid, is, first to consider the cubical measurement of the stone,

stone, and the work as superficial, reckoning nothing for what is not seen, accounting all stone under two inches as superficial; what is above this, or 3 inches, as solid measure.

Key and ashler fronts, of Portland stone, s. d.
the masters charge per foot superficial 1 6

Surveyors allow from 1 s. 3 d. to 1 6

Besides, measuring the solidity of the key-stones, or bonds, which go through the wall, and charged per foot cube 3 9

The value of materials to a foot of key and ashler work, considering the sawing and the veins that often are detrimental in the opening of a block of stone, which cannot before be seen, is worth, with materials to setting, per foot superficial 9 d. labour to squaring, rubbing, fitting, &c. is worth 6 d. therefore the price allowed by surveyors is not in the least exorbitant at 1 6

Plain-work, as curbs to iron-rails, &c.
at per foot superficial — 1 2

The stone at per foot cube 3 0

Holes for iron-bars, cut in ditto, at per pce. 0 2

Portland astragal steps are worth per foot superficial — 1 0

the solidity of the stone as before.

Ditto, plain steps, per foot superficial 0 6

Portland coping, a foot wide, per foot run 1 10

Mouldings of Portland stone, of all sorts,
at per foot superficial 1 7

Circular ditto — 1 9

the stone measured as solid.

Slips and mantles to chimnies, of Portland stone, are worth at per foot superficial 1 0

Ditto, superficial moulding to chimnies
with stone, per foot — 1 8

Portland

	£.	s.	d.
Portland slabs at per foot	0	1	0
Portland paving at per foot superficial	0	1	6
The shafts of columns, of Portland stone, per foot superficial —	0	1	2
Bases and caps to ditto —	0	3	0
Ditto columns-fluted, and cabled of stone, labour only, —	0	1	9
the Stone valued as before.			
Doric intablatures of stone at per foot superficial —	0	5	6
Carving the capitols of Corinthian and Compositive orders at per foot superf.	0	11	0
Italian marble at per foot cube	1	1	0
Plain work on ditto, as slips and mantles, at per foot —	0	4	0
Slabs of ditto at — —	0	4	6
Dove marble in slabs at per foot	0	5	0
Mouldings of chimney-pieces, &c. of any sort of marble at per foot superfici- al, from 3s. 6d. to — —	0	5	0
the marble valued extra.			
Marble, of different sorts, must be valued according to its quality, and is from 1l. 1s. per foot cube to	3	0	0
Small mouldings of marble at per foot run from 6d. to	0	1	0
Portland geometry-steps are worth per foot superficial	0	1	0
The stone for those must be valued at per foot —	0	3	6
on account of the variety of blocks that must be opened before those can be all got found.			
Fire-stone covings with materials at per foot superficial	0	1	2
			Ditto

	£.	s.	d.
Ditto in hearths per ditto	0	1	1
Purbeck steps, at per foot run with stone,	0	2	6
Purbeck paving in random-courses, at per foot	0	0	7 ¹ / ₂
Old purbeck paving at per foot squar- ed and new laid	0	0	2

My reader may perhaps wonder why I have not in masons work proceeded with the value and labour as in other work. I own it was my intent, but hearing of the laudable design now on foot of the masters raising the mens wages three shillings per week, I therefore made the digression, knowing well that their prices will not be in the least extravagant when that is put in execution; therefore, I hope, as my whole motive is designed for the benefit of mankind, I shall be freed from all aspersions in the above particular, in deviating from my general plan.

LECTURE LIX.

Of ESTIMATING in General.

I Almost think it unnecessary to mention estimating in general, since I have been so particular in all the component parts of a building, which might be by the learner easily put or compiled together; however, to prevent every argument that might be offered, touching my neglect, I shall propose the simplest and most concise method in my power, in order that the learner may have no doubt of my fully acquiescing with every particular

of my propofals, as well as my ardency to ferve him in every article that occurs to my memory.

Many furveyors have, or propofe methods for eftimating, by knowing the exterior dimenfions of a building, that is, gueffing at the expence by the number of fquares the houfe contains; but this is a very uncertain rule, and can never be followed with any degree of certainty, unlefs all buildings were finifhed in one manner, and confifted of no other variations than the fize of the ftructure; in fuch a cafe a proper criterion might be formed; but, as this never can happen, it is obvious that any examples laid down of this nature could only (like the artift, who pretends to the world, he hath a power adequate to the uncertain changes of fortune in the calculation of the lotteries) amufe, without the leaft benefit or advantage.

The only and general thought required in eftimating a building, is, to be well apprifed of the intent, both refpecting the fize of every part and particular, as well as the manner and mode of execution; without a conclufion of thefe principles, the greateft judge in nature, can only guefs at the expence; thefe things being fixed, the drawings will point out the fize of every part, and the prices before mentioned, applied to every particular, according to the different dimenfions, will form a near certainty for the whole.

If the learner hath no drawings given, and has only an idea propounded by the gentleman, what fort of a ftructure he would chufe, and what expence he had fettled within himfelf, to be finifhed after fuch and fuch a manner; let him make firft, a drawing of the plan and elevation, (having firft examined the ground for the confequence of the under-filings) by which he
will

will be able to come at the expence of the piling, planking, &c. if any required; proceed then to take the value of the foundation, as digging and taking away the earth, next the brick-work, stone, &c. in the foundation, which is easily calculated as I have before observed, according to the height of the building; then the expence of the brick work only, in the basement-story, both outward and inward walls, vaults and cefs-pools, &c. then the brick-work in the first story, or ground-floor; and so from story to story, to the top of the edifice, topping of chimneys, &c. with all the arches, tiling, and every other incident in brick-layers work.

Secondly, according to the size of the house, let him calculate the scantlings of the different timbers in every story for the floors, as well as the lintels, wood-bricks, discharging-pieces, bond-timbers, &c. what is measured cubical, and what by the square, as well as door-cases, centers, both for vaults, openings, and apertures, not omitting the trimmers, whether arched or coach-headed, roofing, plates, tie-beams, guttering, boarding, rafters-feet, nor any vacuum, where a piece of timber may be required.

Thirdly, the sash-frames and sashes, throughout the whole house.

Fourthly, the covering, whether lead, slate, or tile, &c.

Fifthly, the joiners-work in every room, on every floor, the quality as well as quantity of materials, not forgetting the furring of walls, floors, &c. bracketing to cornices, glue, nails, and every other incident; likewise, the stairs in every respect and part, according to their bearings, whether with or without carriages; nails, screws, glue, templets, cylinders, &c. the casualty of removing lumber and

other incidents, that may retard the progress of your practice.

Sixthly, the plaisterers-work after the same manner in every room, with the gentleman's proposals of ornaments, decorations, &c. making allowances for the inconveniences that generally attend the progress of their work, by scaffolding, &c.

Seventhly, the masons-work both without and within, as steps, ashlers, facios, coping, quoins, rusticks, pavings, floors, hearths, jambs, mantles, coverings, caps, carvings, &c. all according to their different size and value; omitting nothing in this business more than the rest.

Eighthly, the painters-work all through the house; every floor separate, and let every part and portion that hath variations be strictly nominated: the number of times required to be done over, with observations of fronts, and other work that is paid by the foot, whether run or superficial.

Ninthly, the glaziers-work in every respect and part the same as in other branches.

Tenthly, the carvers-work also in every article, which must be most strictly considered in every point, because of the great expence attending this beautiful branch.

Eleventhly, the plumbers-work, both touching the capping of cornices, fronts, facios, gutters, hips, vallies, fixtures, pipes for fuillage, pumps, drains, water-closets, &c. soldering, and every other incident required.

The same of smiths-work, paviours, &c. that will cause any expence.

After those matters are all noticed, sum up the whole, to answer the sketch given; if you run above the stipulated price, such contractions in the mode of finishing must be made as will reduce your plan

plan to the gentleman's propofals, if he will not be reconciled otherwife to what the purport of his intention amounts to.

The beft and moft fure way to be perfect, and to a ftrict nicety in every particular, is to make drawings of every room and part with the ornaments prefixt, as well as the fection, plan, and elevation of the whole: alfo, mark every room, and every branch to each apartment or floor; and in fumming up the whole, take care to allow a fufficiency for cafualties, that in the execution you may not much exceed your ftipulated fum, and incur the gentleman's difpleafure.

LECTURE LX.

SCHEDULE of PRICES to TASK-MASTERS.

Of Carpenters Task-Work.

	s.	d.
K ING-post roofs with purlines, &c. and fixing on the irons at per sq.	10	0
Ditto common roofs per fquare	6	6
Bridged floors, with binding joifts included, at per fquare	8	6
Common naked floors per fquare	6	0
Ceiling ditto per fquare	7	6
Truffed partitions	5	6
Common partitions per fquare	5	0
Plates, bond-timbers, difcharging-pieces, lintels, &c. at per hundred feet run	3	0
Centring to vaults rough	4	6
If groined	5	6
Centers to apertures at per foot	0	1 $\frac{3}{4}$
Bridged-gutters at per foot fuperf.	0	3
Ditto vally-boards per foot	0	1 $\frac{1}{2}$
Raftors-		

	<i>s.</i>	<i>d.</i>
Rafters-feet and eaves-board per foot run	0	1 $\frac{3}{4}$
Framing the carcases of houses per sq.	6	6
Door-cases per foot — —	0	1 $\frac{1}{2}$
If rabbited and beaded — — —	0	2
Bracketing to plaister cornices run	0	1 $\frac{1}{2}$
Clean-dowelled-floors per square	17	0
Second best ditto — — —	15	0
Streight joint ditto of board — —	8	0
Ditto with battins — — —	10	0
Folding-floors per square — —	6	0
Furring-joists per square — —	1	2
Lifting-boards per list — —	0	0 $\frac{1}{2}$
Doors ovolo and flat on both sides per foot — — —	0	6
Ditto stuck on one side square back	0	3 $\frac{1}{2}$
Doors with fancy-mouldings quirked per foot — —	0	7
Astragal-mouldings on the pannels to ditto at per foot run — — —	0	2
All window-shutters per foot ovolo, and flat, square behind, hung single	0	6
Ditto hung double — —	0	7
if stuck with a quirk moulding.		
Bead and flush behind, and hung double, are worth per foot — —	0	10
Astragal-mouldings on the pannels to ditto — — —	0	2
Back-shutters framed square — —	0	3 $\frac{1}{2}$
If bead and but hung double — —	0	4 $\frac{1}{2}$
Plain clamped back-shutters per foot	0	2 $\frac{1}{2}$
Framing linings — — —	0	3
Doors bead and flush, &c. both sides, per foot — — —	0	8
Ditto beaded on one side — — —	0	5
		Bead

	s.	d.
Bead and flush shutters to outside work	0	5 $\frac{1}{2}$
Sashes and frames with oak-casings, soils, beads, &c. together —	0	7
Ditto with mahogany sashes	0	8 $\frac{1}{2}$
Fir sashes and frames together per foot	0	5
Venetian and Palladian window-frames and sashes at per foot	2	0
Mouldings of all sorts at per foot	0	6
Columns at per foot	0	10
Pilasters ditto —	0	6
Fluting columns, or pilasters, the flutes at per foot run —	0	1 $\frac{1}{2}$
If cabled as far as the length of ditto	0	2 $\frac{1}{2}$
Doric frieses at per foot superficial	0	10
Doric blocks plain per foot	0	6
Raking ditto —	0	8
Ditto with enrichments —	2	6
Frets 6 inches broad, per foot	2	0
Small frets per foot run	0	6
Fluting of fascias per foot run	0	5
Friezes fluted and bead per foot run; the plane of the frieze at per foot superficial	0	2 $\frac{1}{2}$
The beads and flutes run at	0	1 $\frac{1}{2}$
The method of measuring ditto, is, to take the length of one flute, and multiply the number of flutes in the frieze.		
Terms to chimney-pieces per foot superf.	0	9
Gluing up Ionic caps for carvers at per piece —	2	0
Corinthian ditto per foot superficial	0	6
Dado per yard —	1	6
Torus skirting per foot	0	2 $\frac{1}{3}$
Up stair-cases double measure.		
Horse-plane courses per foot run	0	1 $\frac{1}{2}$
O-gees per foot run	0	0 $\frac{3}{4}$
		Dog-

	£.	s.	d.
Dog-legged stairs at per story	1	8	0
Bracket ditto per foot superficial	0	0	4½
Ditto with clean steps	0	0	5
Newels at per foot run	0	0	4
Strings at per foot superficial	0	0	6
Ballusters per piece	0	0	3
If dove-tailed —	0	0	4
Geometry-stairs moulded underneath			
as the bracket, per foot	0	0	9
Or per step —	0	10	6
Steps hung in the wall at per foot	0	0	8
The string at per foot, if upon a circular or oval plan —	0	1	6

There is a method of doing geometry-stairs without a string, although they be not moulded underneath the steps. This is done by mitring the bracket, and fixing it to the end of every step, before they are put up, and leaving them long enough to exceed the width of the under-side of the step, so as the succeeding one shall take and lay upon this, in regular form all the way to the top; after they are up, you may shoot streight the under edge of the brackets, which will appear like the under edge of a string; also, when they are up, you may put up a fillet on the inside, which will bear the ends of the laths, and be a kind of stiffening to the brackets, or artificial string.

These are much the cheapest of all stairs, and may be done to any plan, with a good appearance, by putting a neat astragal moulding to the lower edge, just under the nosings.

The learner may observe, that those brackets need not be longer than what will be adequate to receive the furrings, and the laths and plaister.

My

My reader will excuse my making this digression. These sort of stairs I had omitted mentioning in their proper place; however, I will cloak my neglect under the old proverb, that it is better late than never.

These sorts of stairs are worth per foot,	s.	d.
labour only, when hung in the wall	0	7 $\frac{1}{2}$
Plain brackets to stairs per piece	0	6
Circular ditto	1	0
Mahogany hand-rails to stairs to circular plans, glued in thickneses, at per foot superficial	7	0
The cilinder, either done by day, or allowed per foot, the run of the circular part of the rail	0	4
All twists to scrolls	5	0
Streight rail of mahogany	1	3
Ramps double measure, or	2	6
Deal streight rail	1	0
Twist to ditto	4	0
Shelves per foot	0	3 $\frac{1}{2}$
Linings of all sorts	0	2 $\frac{1}{2}$
All plain linings to door-cases	0	3

L E C T U R E LXI.

Of BRICKLAYERS TASK-WORK.

THE master to find all materials and scaffolding,	£.	s.	d.
Common brick-work, per rod	1	3	0
Camber arches, rumbed gauged and set, per foot	0	6	0
Circular ditto	0	7	0
E e			Ditto

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Ditto to a nitch per foot	0	3	6
A circular arch upon a circular plan double measure	0	1	0
Brick cornices per foot superficial	0	2	6
Plain tiling per square	0	5	0
Ditto pan-tiling pointed	0	5	0

LECTURE LXII.

Of PLAISTERERS TASK-WORK.

	<i>s.</i>	<i>d.</i>
A LL ceilings per yard	0	5
Ditto walls with three coats on laths	0	5
Ditto two coats floated	0	4
Walls floated per yard	0	3½
Stucco per yard	0	8
All plain cornices per foot	0	4½
Ditto fully enriched	1	0
Common block cornices per foot	0	8
Dentil ditto	0	7

LECTURE LXIII.

Of MASONS TASK-WORK.

Sometimes masons let their men to task-work, though it is but seldom; I shall therefore mention two or three prices in particular cases, and which may be a better method of calculation than what they generally go by in task-work.

The masons method of taking work is by the piece in many jobbs, as frontispieces, &c. but I think it rather an irregular mode of proceeding, without one advantage to recommend it.

Fron-

Frontispieces of the Doric order, when done by the piece, may be charged from 10l. to 12 guineas, according to the enrichments that are upon them; but the best way is to measure them by the foot superficial, and value the different works after the following prices.

	s.	d.
The columns at per foot superficial	0	8
Bases and capitols per ditto	2	9
Fluting and cabling columns in Portland stone, the run of the flutes at per foot	0	5
All mouldings at per foot	0	7 $\frac{1}{2}$
Frieses to Doric cornices per foot	5	0
Mutules level at per piece	4	0
Raking ditto —	4	6
All the plain work per foot	0	5
Portland steps per foot run	0	7
Geometry ditto, and set off, per foot run	0	8
Paving with Portland stone, per 100 feet, from 5s. to —	8	0
Purbeck in random-courses per 100	4	6
Old Purbeck taken up, new squared, and re-laid, at per 100 feet	3	9
Key and ashler fronts per foot	0	4
Holes cut for iron palisades per piece	0	1 $\frac{1}{2}$

As there is seldom any other branches done task-work, I beg my reader, when he hath other sorts of work, and not above mentioned, he will have recourse to the other parts of the book, where the labour required is proved, and get as much as he can.

Proportions of the Doric order, when done by the piece, may be charged from 10l. to 12 guineas, according to the enrichments that are upon them; but the best way is to measure them by the foot in particular, and value the different works at the following prices.

0 4	The columns at per foot superficial
0 8	Bases and capitals per ditto
0 9	Triglyphs and caryatid columns in Portland
0 3	Triglyphs, the run of the flutes at per foot
0 7	All mouldings at per foot
0 0	Triglyphs to Doric cornices per foot
0 0	Mouldings level at per piece
0 0	Running ditto
0 0	All the plain work per foot
0 2	Portland steps per foot run
0 7	Geometrical ditto, and set off, per foot run
0 8	Facing with Portland stone, per 100 feet
0 8	Do as to
0 0	Parbeck in random courses per 100
0 0	Parbeck taken up, new squared, and
0 2	Parbeck at per 100 feet
0 4	Kew and alder trunks per foot
0 1	Holes cut for iron palisades per piece

As there is seldom any other business done with it, I beg my reader, when he hath other things to write, and not above mentioned, he will have recourse to the other part of the book, where the same is proved, and not as much as he