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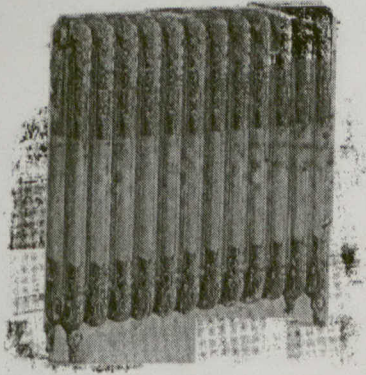
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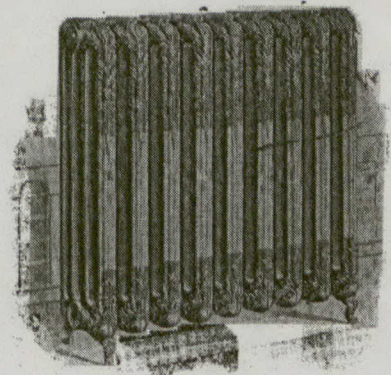
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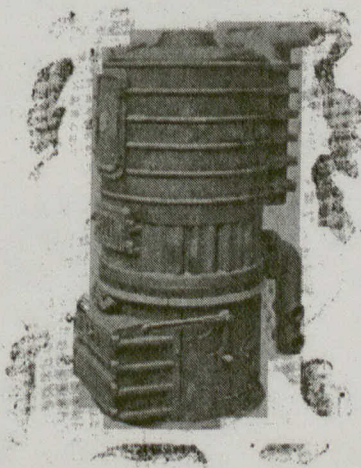
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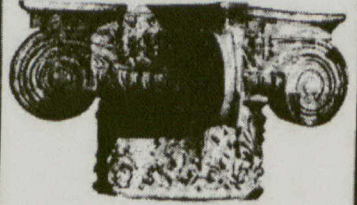
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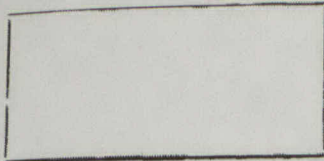
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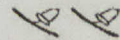
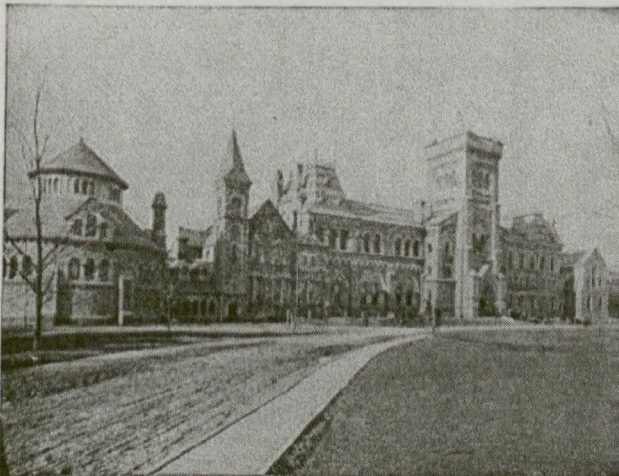
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The Canadian Architect and Builder

VOL. XVI.—No. 190.

OCTOBER, 1903.

ILLUSTRATIONS ON SHEETS.

Business Premises, Yonge Street, Toronto.—Henry Simpson, Architect.
House at Fredericton, New Brunswick.
Font in English Cathedral, Fredericton, N. B.
House in Park Road, Toronto.—Burke & Horwood, Architects.
House in St. George Street, Toronto.—F. H. Herbert, Architect.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Lightbourne Court, London, from Road—Lutyens, Architect.
Electra House, London, Eng.—John Belcher, Architect.

ILLUSTRATIONS IN TEXT.

Drawings Accompanying Notes of Travel.
Brick Laying Machine.
New Canadian Emigration Offices, London, Eng.

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SPECIAL CONTRIBUTORS.

MR. W. A. LANGTON, Architect, Toronto.
" EDMUND BURKE, " "
" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal
" W. H. ELLIOTT, Toronto.
" J. C. B. HORWOOD, Architect, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.
" FRED. T. HODGSON, Architect, Collingwood, Ont.

A Commendable Work is performing a valuable public service by marking historic spots in the city and vicinity. During the last five years the Club has placed bronze tablets bearing suitable inscriptions on a number of ancient buildings and on new buildings erected on the site of ancient structures which were the scene of no able occurrences in the early history of the city and province.

Wages and Working Hours in the Building Trades. An interesting table is published in the September number of the Canadian Labour Gazette, showing the changes that have taken place in working hours and wages of mechanics in the building trades in Canada during the present year. In ten towns and cities the wages of bricklayers and masons were increased by \$1.00 to \$3.00 per week; in fifteen towns and cities the wages of carpenters were increased from 25 cents to \$3.00 per week. In Montreal, plasterers obtained an increase of \$1.36 per week, and in Toronto \$2.20. Wages of plasterers' laborers also advanced by \$2.20 per week. Painters, decorators and paperhangers in eight cities got increases ranging from 65 cents per week in Montreal to \$2.78 in St. Catharines. The wages of plumbers and gas fitters in six cities show advances ranging from 50 cents

per week in St. Catharines to \$5.33 in New Westminster, B. C. Stonecutters were given increases ranging from \$1.50 to \$4.00 per week, and builders' laborers of 28 cents to \$2.10 per week. Coupled with this general rise in wages there were in many instances reductions in the number of working hours.

The Eiffel Tower The municipal authorities of Paris have in view the purpose of transforming the Champ de Mars into a park. This means that the portion of the site of the Exhibition of 1900 lying south of the Seine, must be cleared, and that seven years hence, when the concession for the Eiffel tower will expire, that great and novel structure will disappear, and with it the most conspicuous modern landmark of Paris. For boldness of conception, and as an example of original and artistic design, the Eiffel Tower deserves to rank, as it has done since its erection, among the wonders of the world, and the necessity for its removal will be generally regretted.

Wall Papers Attention is being called by the technical press of Great Britain to the fact that the export trade in wall papers to Germany from Great Britain is diminishing. A few years ago British manufactured wall papers were in large demand in Germany and a

profitable trade was built up. While it is claimed that the British manufacturers have neglected to put on the market new and attractive patterns, the Germans have greatly improved their manufacturing facilities, and are not only supplying to a considerable extent the home market, but are exporting largely to other countries. Their exports have, it is said, increased by 83 per cent. during the last five years.

Dismissal of an Architect.

Under the provisions of the Tarnsey Act leading architects in private practice have for several years received commissions from the United States government to design and superintend the erection of important public buildings. Such commissions must be won in a limited competition. In this manner Mr. Henry Ives Cobb was appointed architect of the new government building in Chicago. He was recently dismissed from the position with the concurrence of the supervising architect of the Treasury. The reason given for his removal is that he proved himself seriously lacking in business qualifications. The contracts in connection with the Chicago building are said to be in a muddle. This incident proves conclusively that the architect of to-day who aspires to supervise the construction of important buildings must himself possess a thorough knowledge of business methods, or must have business men as associates. It is to be hoped that the dissatisfaction and trouble experienced by the United States government in this case, may not result in the repeal of the excellent law under which a stimulus is given to architecture profitable alike to architects and the nation.

For many years in London, New York and other large cities the question of the best means of providing accommodation suited to the requirements and within the means of laborers, artisans and persons with small incomes has received much attention. The time has now arrived when this problem also demands consideration in the larger Canadian cities. In Toronto, where at present all classes of houses for rental are at a premium, families who are only able to pay a rental of from \$10 to \$18 per month, find it impossible to secure accommodation within this price limit. It is claimed that land values within the city coupled with the advanced cost of building and building restrictions will not permit of a fair return to owners of moderate cost houses, consequently few are being built. So long as present conditions obtain there would seem to be but two feasible methods of meeting the demand for accommodation of this class. One is to erect flats in central locations within the city, which is the plan adopted in New York. The other is to build suitable detached or semi-detached houses beyond the city limits and provide means of rapid transit to and from. From the standpoint of comfort, health and morals, the last mentioned plan seems to possess great advantages.

It can scarcely be hoped that the problem will be met either in one way or the other on strictly business lines. It must be undertaken in a large way and to some extent in a philanthropic spirit. In other words,

those who put their money into the enterprise must be satisfied with a moderate return on their investment and find the balance of their reward in the assurance that they have helped to smooth the pathway and elevate the standard of living of their less favored fellow citizens. It is to be hoped that men of wealth may be found actuated by these motives, to give money, time and thought to the solution of this important problem of the present and future.

The failure of the Consolidated Lake Superior Company's enterprises at Sault Ste. Marie last month resulted from the want of exercise of sound judgment by the promoters and managers. This failure is not only a serious blow to the shareholders, many of whom are Canadians, to the thousands of employes, and the business interests of the Sault, but also to the advancement of the whole province. It should teach the necessity for caution to the promoters of other industrial enterprises, including cement manufacturing concerns, of which we are in danger of having a surplus. The days of large profits in cement manufacturing seem to have gone by, and investors will do well to acquaint themselves with the conditions and discount the statements of glib-tongued promoters and stock peddlers, before parting with their money.

It is rumored that some recent enterprises in this line have been to a large extent stock jobbing schemes. The promoters are said to have received for their services large blocks of stock which they converted into cash as speedily as possible, leaving to the legitimate shareholders the responsibility of making the enterprises pay, which, in the case of over capitalized concerns is proving a by no means easy task.

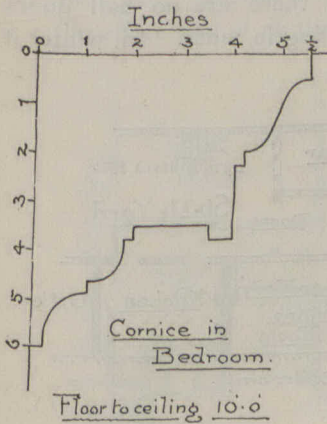
Some of the better class of technical journals in the United States are pointing to the experience of Germany as a warning against the investment of money in new cement manufacturing companies. Under the stimulus of a demand for cement for large public works manufacturing in that country rapidly increased until there were 261 of them, with a capacity of 29,000,000 barrels. Then the home demand dropped and the mills found themselves with a surplus stock of about 12,000,000 barrels.

The annual report of the Ontario Bureau of Mines lately to hand estimates the quantity of cement representing a year's consumption in the whole of Canada, at 1,100,000 barrels, and the possible consumption of 1903-4, taking into account the development of the country and the multiplying uses to which the material may be put, at 1,200,000 or 1,300,000 barrels. The yearly output of the factories as at present equipped, if all were working full time, is placed at 1,150,000 or 1,200,000 barrels, and when the improvements now in progress are made, it will rise to 1,700,000 barrels. The latter quantity is in excess of the present annual consumption, so that it appears to be within the capacity of the cement factories now in existence to supply the requirements of the home market. On the basis of these figures the report states that there are grounds for misgivings as to the future of the industry if all the cement works now being projected are built.

NOTES OF TRAVEL.—V.

A flying journey on bicycles is not productive of careful drawing; but it was impossible not to make some notes, and they may be worth publishing.

Contemplating in a peaceful mood, on waking up in the morning, the bedroom cornice in my bedroom, in our inn, a Jacobean building, it seemed so thoroughly satisfactory that I thought a measured drawing of it would be worth something to readers of the Canadian Architect and Builder.

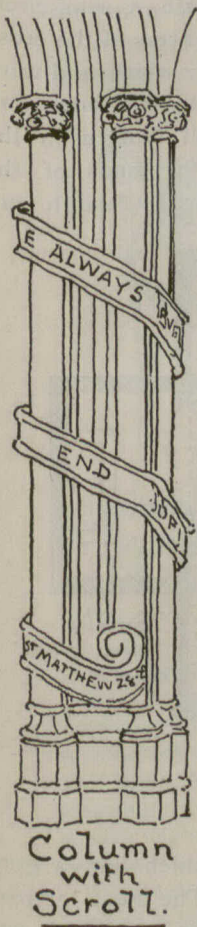


The room had two windows on a long side. Over the windows, all vertical surfaces were dark, all horizontal surfaces white. Opposite to the windows this effect was reversed.

On the short sides, which got a raking light, the whole cornice was blanched except the weathered soffit, which was a dark band. This variety was delightful. The breaking of the cornice around the chimney breast, at one end, was just right.

We visited a perfect Saxon church; but, in Canada, we have got ahead of the Saxons. The parish church, on the other hand, if one could bring it over, would be the finest church in most towns and the most interesting in the country.

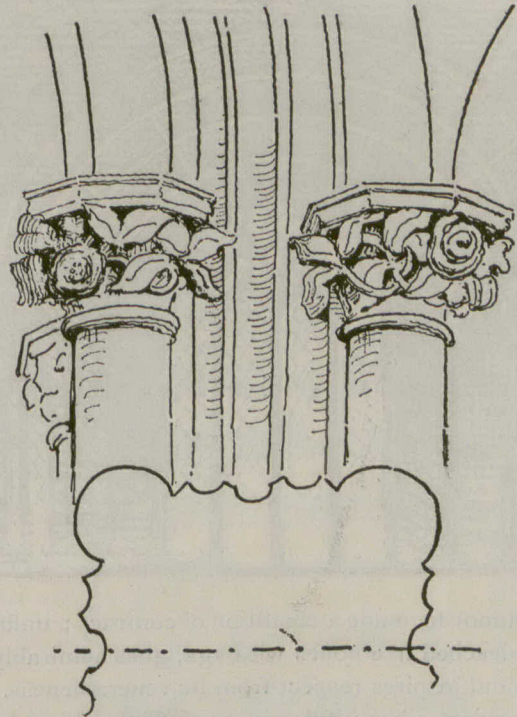
What, however, seemed best worth noting, because differing from other work of the kind, was a restored portion, in which the architect had, with success I thought, ventured to be original. Two columns had scrolls as shown above; said to have been a whim of the lady who paid for the restoration. The ribbon ends require judicious abstraction. (They were, in this case, given the comparative obscurity of the aisles). The bands were not in the least simulative of ribbons but good solid masses, 8 inches deep, with a minimum projection of 2 inches beyond the surface of the angle shafts, which meant at least 4 inches out from the deepest hollow of the mouldings. The surface of the bands waved slightly, not to follow the line of the mouldings, but arbitrarily, for the sake of a varied surface. The jointing was a difficulty; it had to be jogged to avoid a feather edge, and was made as inconspicuous as possible.



inconspicuous as possible.

The capitals of the restored part were also interesting; as being original, yet in perfect keeping with the style, carefully modelled roses, yet abstract enough for stone. The 14th century could do this sort of thing as well, or better, when it chose. A couple of days afterwards,

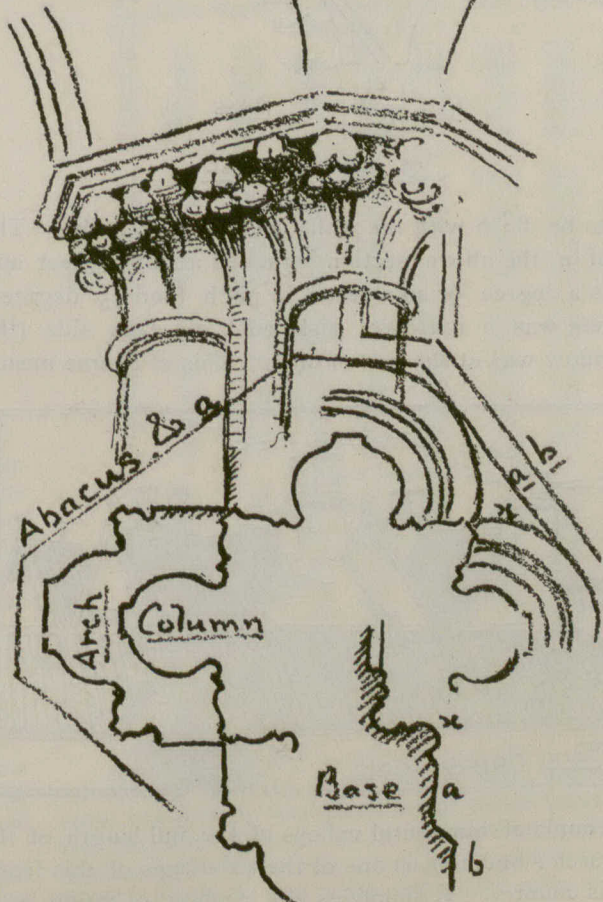
among some beautiful "stiff leaf foliage" capitals (which were, however, not so stiff as they appear in the books but, on this occasion at any rate, full of life and gracefulness) the above flower forms appeared. The sort of clinging springiness with which they grow under the projection of the cap was well expressed.



Rose Capitals

It is impossible not to become deeply interested in these beautiful white stone churches, but interest is qualified by doubt as to its immediate utility. The

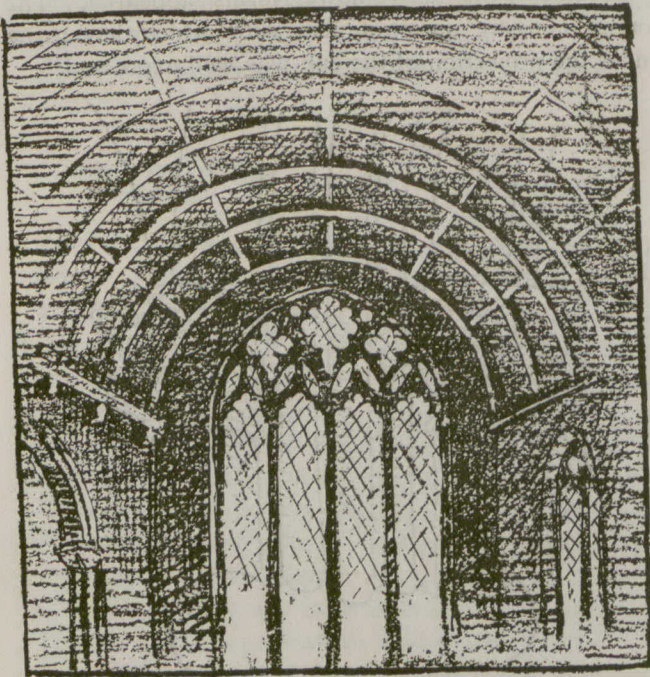
14th Century Flower Capital



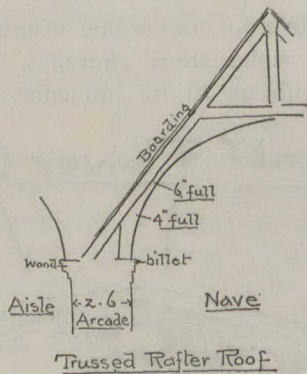
roof, however, which is commonly met with in village churches suggests application. It is a form which goes very well with a medium pointed window, and has a

NOTE.—We regret that the illustrations to the Notes of Travel in the September number were published without acknowledgment that they were the work of Mr. E. H. New, reproduced from a pamphlet printed by the Guild of Handicraft in connection with an exhibition of their work.

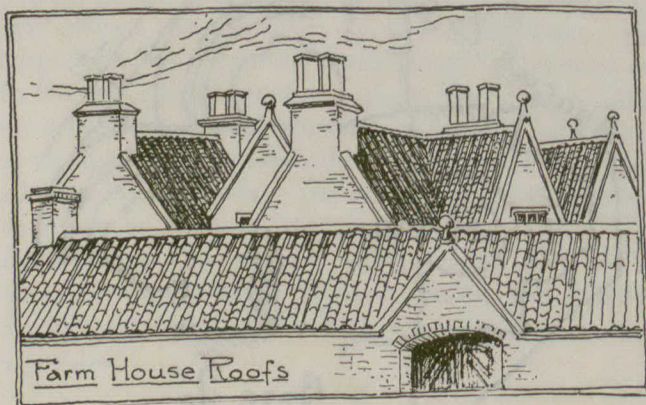
continuity of form that is as dignified as vaulting and, if anything, richer; quite apart from the barn-like effect of principals and purlins. It is unfortunate that



age cannot be made a condition of contract; unfinished oak, bleached like bones with age, goes admirably with stone and inspires respect from its venerableness. But I have seen a beautiful new roof of the kind by Mr. Bodley. It takes a thickish wall, if the curved member



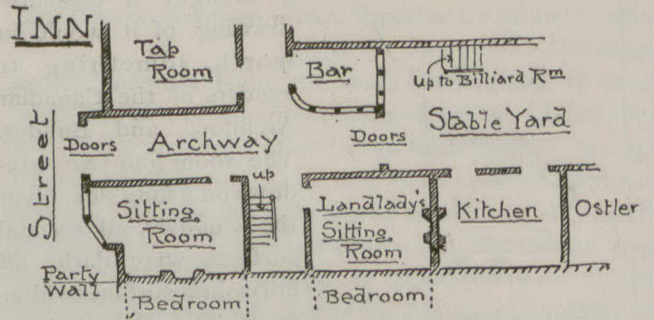
is to be flush with the wall, as it ought to be. The roof in the above section spanned about 25 feet and was a degree or so steeper in pitch than 45 degrees. There was a narrower aisle roof on each side (the window was at the end of one). This of course means



a couple of horizontal valleys of the full length of the church; but that is one of the privileges of this frostless country. It simplifies the roofing question and, as a consequence, complicates the roofs. There is no use in our imitating this kind of thing in Canada;

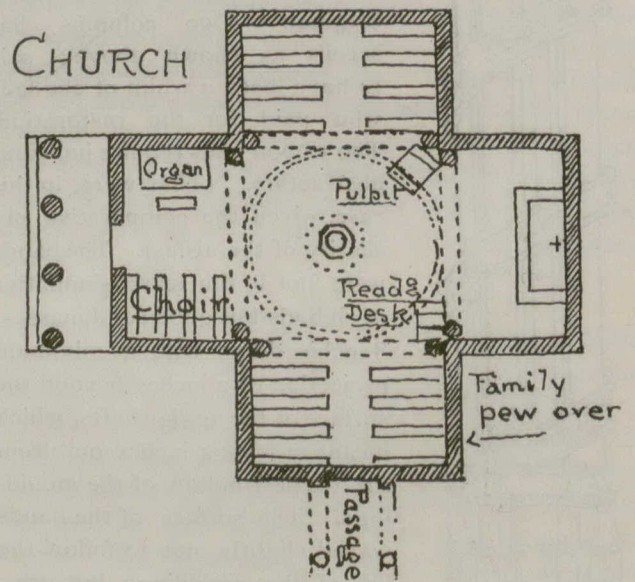
though we cannot pass it in England without stopping to admire.

The mildness of the climate is still further exemplified by the plan of our inn, every room is practically out of doors; for the doors of the archway are never closed except at night; and, while they are open, even the upstairs rooms may be said to be out of doors; for the staircase opens off the archway, and there are no hall doors above. It is a case of dwelling in tents. In winter it



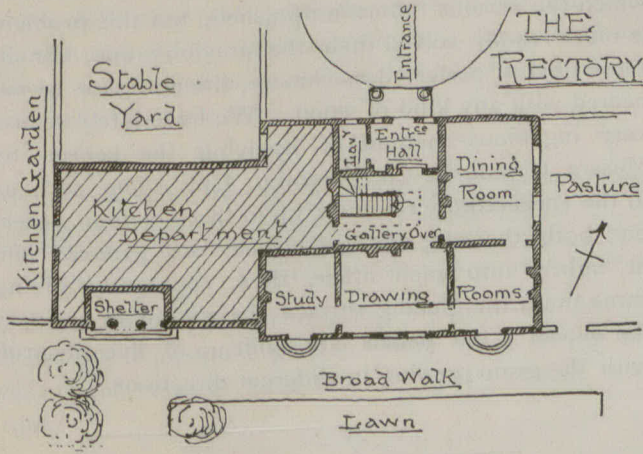
must be like a series of warm air baths, with cold plunges between: that is, if the rooms are warm.

On Sunday we went to a little Doric church connected by a passage with the hall. The church was a solemn little composition, but not big enough or comfortable enough to be really dignified. The crossing, under a dome, was about 25 feet square; handsomely paved in marble, and vacant; except for a little, lonely font in the centre. The crossing was probably a cube, and was domed with a semi-circle on top of semi-circular arches. The arms of the cross extended a little more than half their width and were barrel roofed. It was interesting to see how well this building was lighted by a small lantern in the dome and semilune windows at the ends of the arms. The glass was also coloured, though not



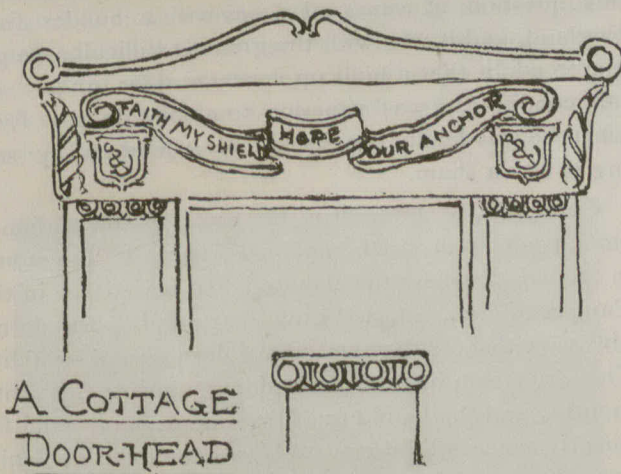
deeply. We dined at the Rectory, which had a good set of rooms looking southwards. The most interesting feature of the plan was a galleried hall which was roofed above the rest of the (two storied) house and lighted by circular windows in a clear story. There was a fine and well lighted wall space, above the gallery, for hanging large pictures. The land to the south of the house was the rectory glebe and let out for hay and pasture, excepting a lawn and gardens attached to the house. The gardens were enclosed by a stone wall, sinuous in plan for the sake of greater stability. It

was open to the suspicion of looking more knowing than it was. It looked as if buttresses would be better in every way. It was interesting to meet here a ha ha fence. The pasture, on the east, was enclosed by a stone wall; but, instead of running past the south front of the house, to enclose the lawn, this wall, when it came to the east line of the house, dipped underground and became the retaining wall of a wide ditch. As the ditch was invisible from the drawing room windows, the effect was of an unbroken slope of grass, stretching



away in boundless continuity to the rising and wooded ground of the park.

The hall, which we saw in the afternoon, is of the Italian period and dull; but size and stone are always something, and a stone flagged terrace, about 30 feet wide and 90 feet long, handsomely balustraded, with the valley of the park seen beyond, stretching away in a perspective of heavily wooded slopes, is a vision to remember as long as possible.



W. A. LANGTON.

A BUILDING COMBINE.

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—I have learned from a reliable source that some fifteen Toronto contractors who were asked to submit tenders for the construction of a new grand stand at the Woodbine race course, after laying their heads together, agreed on a uniform basis for tendering. It was further agreed that whichever one of their number might receive the contract must give the sum of one hundred dollars to each of the unsuccessful tenderers.

It is a well-known fact that there has existed for some time in Toronto a combination among heating contractors, the fact being clearly enough apparent from the character of the tenders.

Some architects have already brought in outside contractors to do their work, and express their purpose of following the practice to a much larger extent if such illegitimate methods of getting fancy prices are persisted in by local contractors.

I think it only right that this sort of thing should be exposed even at the risk of frightening persons out of the idea of building.

FAIR PLAY.

EFFECT OF VARIATIONS IN WATER AND SAND ON CEMENT.

TENSILE STRENGTH OF CEMENT MORTAR WITH SAND GRAINS OF DIFFERENT DIAMETERS. ARE THE AVERAGE OF 6 BRIQUETTES.									
Natural cement mortar, 1 to 1.					Portland mortar, 2 to 1.				
Per cent. used.		Water, per cent.		Days		Water, per cent.		Days	
No.	30	20	100	7	28	7	28	7	28
10	10	10	100	156	193	115	163	286	288
15	15	15	100	151	194	118	168	294	294
20	20	20	100	153	187	91	110	201	226
25	25	25	100	100	123	71	76	129	159
30	30	30	100	154	210	94	186	301	361
35	35	35	100	142	190	86	107	285	303
40	40	40	100	143	192	83	107	307	311
45	45	45	100	140	208	80	89	391	400
50	50	50	100	133	197	82	107	350	355
55	55	55	100	128	191	78	77	296	359
60	60	60	100	122	199	66	73	285	374
65	65	65	100	108	201	68	72	291	354
70	70	70	100	193	222	107	136	440	488
75	75	75	100	232	323	155	210	309	351
80	80	80	100	210	344	178	250	408	448
85	85	85	100	183	302	155	174	337	387
90	90	90	100	179	256	142	142	257	331
95	95	95	100	144	355	93	100	257	331

MEMO.—All proportions and percentages determined by weight. Natural sand used; first passed through No. 8 screen and residue excluded; No. 30 sand passed No. 20 screen and caught on No. 30 screen; No. 20 sand passed No. 8 screen and caught on No. 20 screen; No. 100 sand passed No. 30 screen and caught on No. 100 screen. "Fine" is clean white sand sifted through the No. 100 screen.

Tensile Strength of Cements Mixed Neat With Different Proportions of Water.

Water, Per cent.	Wire minutes.	Tensile Strength.						
		Light.	Heavy.	Hour.	Days.	Mos.	Mos.	
15	12	207	371	655	875	941	720	787
16	29	297	303	750	973	1,008	735	816
16	30	355	260	649	773	831	645	748
20	142	402	233	500	693	716	621	676
22	268	473	184	546	635	658	601	589
24	327	912	167	539	649	644	629	755
13	13	270	366	775	859	1,067	892	832
14	18	303	404	780	891	972	852	781
16	22	327	363	602	723	844	806	723
16	15	383	308	570	723	785	728	724
20	56	703	225	590	718	760	674	636
22	52	833	166	554	649	731	643	604
24	188	918	42	510	691	695	632	574
23	13	32	212	251	252	311	275	356
25	18	39	185	218	215	289	300	341
27	21	42	150	188	220	257	272	314
29	20	52	128	178	202	246	248	256
31	21	57	112	173	199	224	259	309
33	27	85	104	172	182	267	246	290
35	38	137	93	121	178	260	286	319
37	34	160	85	108	168	262	306	326
39	67	233	85	119	202	252	371	400
23	22	59	138	177	271	332	284	264
24	..	78	125	141	264	342	309	310
25	35	120	150	164	216	308	318	321
27	49	143	117	116	194	305	345	272
29	76	166	96	105	164	272	320	267
31	117	212	72	72	159	270	371	225
33	115	235	62	71	147	277	379	244
35	127	400	50	64	112	245	318	315
37	198	828	59	62	96	..	284	351
39	260	1,057	54	56	85	..	355	364

NOTE.—Results tabulated are the averages of six briquettes. The residue left on sieves of 50, 100 and 180 mesh were: Giant, 0.15, 5.4 and 21.2 per cent. respectively; Atlas, 0.1, 7.0 and 18.0; Union, 0.1, 4.6 and 10.2; Hoffman, 2.3, 12.4 and 21.9.

A heating boiler for steam and hot water, designed to burn coke, has recently been placed on the United States market by the American Radiator Co. The McEachren Heating and Ventilating Co. of Galt, Ont., have been manufacturing a boiler in which during the coal famine last winter, coke was successfully burned.

DOORS.

For the last few weeks we have directed our attention to the study of doors, pursuing a line of thought that we believed to be original. Imagine our chagrin when on reading one of the "Sketches by Boz," we found this pet idea or theory of ours had been made public years ago; but the disappointment we experienced was considerably lessened when we reflected that Dickens himself had viewed in the same light the desirability of the design of the door portraying the character of the occupant. He states: "We are very fond of speculating, as we walk through a street, on the character and pursuits of the people who inhabit it; and nothing so materially assists us in these speculations, as the appearance of house doors. The various expressions of the human countenance afford a beautiful and interesting study; but there is something in the physiognomy of street doors almost as characteristic, and nearly as infallible. Whenever we visit a man for the first time we contemplate the features of his door with the greatest curiosity, for we well know that between the man and his door there will inevitably be a greater or less degree of resemblance and sympathy."

In designing the street door, did we ever for a moment study the individuality of the occupant? For instance, a five panelled, flush planted moulding, two feet ten by six feet ten door, would be most suitable for little spare priggish men, who are perfectly satisfied with their own opinions, and what can better bespeak the man of substance and genial hospitality, than a door three feet six wide, with raised panels and bolection moulded. Then there is the door solid below, with glass in the upper half. This is suitable to an innumerable class of people; the pretentious and vulgar divide the light into elaborate geometrical patterns, and glaze it with bevelled plate. Sometimes it is glazed with one clear light of glass—a standing invitation to all passers by to look with envy at the gorgeously furnished interior, and very occasionally we find it daintily screened with lace curtains, by the modest and retiring housewife, who timorously shrinks from the vulgar public gaze.

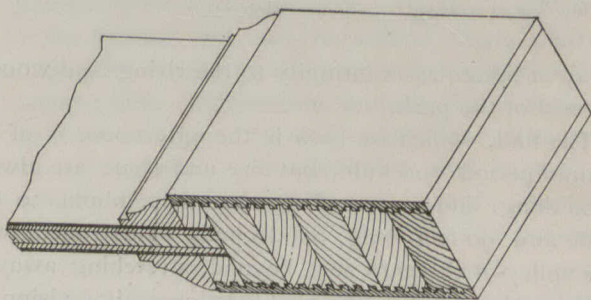
The types of street doors are innumerable and have a far reaching influence. If you ever find your client dissatisfied, or a man changing his habitation without any reasonable pretext, depend upon it, that although he may not be aware of the fact himself, it is because he and his street door are at variance; he is induced to move and seek a house with a street door more congenial to his foibles.

In studying this question of doors, we have come to the conclusion, that both the size and design of the door is more fixed than any other feature in an ordinary sized house. Let us take a so-called modern house; the drawing-room is designed in a style we will call Louis Quatorze, the library is Elizabethan, and the dining-room has a Dutch feeling throughout, and the hall, well we will make this Colonial, for it is necessary, if we wish our house to have all the modern improvements, that we treat each room in a different style. It is not a question of size or shape, or adaptability of the room, we must cram into it any style that is fashionable, if we wish to have a modern house with the latest improvements. Rosengarten has much to

answer for in this particular, with his six hundred and thirty nine illustrations of various styles.

Let us now consider the doors opening off the hall into the various rooms. The framing of the door must necessarily show the same on both sides, and therefore, the design is more or less fixed. We must depend largely upon the treatment of the architrave around the doors, to give it the character peculiar to the style.

Another point to consider is the kind of wood in which the various rooms are finished, but this problem is more readily solved than the previous one, for in these days of perfected machinery, the door can be veneered with any kind of wood. We have lately seen a very ingenious method of applying the veneer by Messrs. Gilmour & Co., Trenton, Ont. The core as in the veneered door is built up in three or four pieces, but both the core and the veneer are grooved and fit tightly into each other, thus, apparently giving three times the glueing surface there is in an ordinary flat veneer; the panels are built up of five ply stuff with the grain running in different directions.



Some two or three years ago we were discussing this question of veneered doors with a builder from England, and it was with the greatest difficulty we got him to admit that a built up veneered door under certain conditions, was superior to a solid door. Even when he was finally convinced, he wound up by saying it was a sham.

Obviously, however, it is no more a sham than a stone front with brick backing. There is no country in the world, where the climate is so varied as in this Canada of ours, and we know that solid doors do not always withstand the extremes of dryness and humidity. The dry steam heat in our buildings during the winter months, and the humidity of the summer and fall, frequently cause solid doors to shrink and check, whilst the advantage claimed for a veneered door is that these varied climatic changes have little or no effect upon it. As to its being a sham, we would remind our English friend of Emerson's statement: "It is a rule of largest application, that in the construction of any fabric or organism, any real increase in fitness to its end is an increase of beauty."

It is reported to be the intention of American Plate Glass manufacturers to make a heavy reduction in prices with the object of crippling their foreign competitors. The announcement is said to have caused consternation among the Belgian glass manufacturers who have hitherto done a large export trade with the United States.

In Dawson City water for domestic purposes is said to be supplied through machines operated by dropping a coin-shaped slug into a slot, in order to avoid the difficulty arising from freezing of house service pipes in that cold region. Five gallons are delivered at a time. There are few if any house service pipes.—Engineering Record.

PRODUCTION OF BUILDING MATERIAL.

From the annual report of the Ontario Bureau of Mines for 1901, it is learned that the output of building and construction materials has for some years been steadily increasing, and the aggregate for 1902 was in excess of that of 1901, though in one item, that of common brick, there appears to have been a falling off, presumed to be due to the average price having advanced from \$5.90 to \$6.41 per thousand.

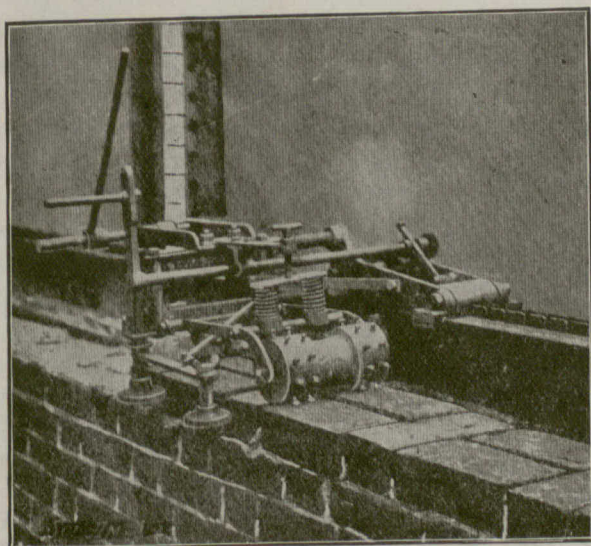
The following table gives the statistics of the production of building stone, rubble, etc., lime, common brick, and pressed brick and terra cotta for the five years 1898 to 1902 :

Material.	1898.	1899.	1900.	1901.	1902.
	\$	\$	\$	\$	\$
Building stone, rubble, etc	750,000	667,522	650,342	850,000	1,020,000
Lime	308,000	535,000	544,000	550,000	617,000
Common brick	914,000	1,313,750	1,379,590	1,530,460	1,411,000
Pressed brick and terra cotta	100,344	105,000	114,419	104,394	144,371
Totals	2,072,344	2,621,282	2,688,351	3,034,854	3,192,371

Other clay products consisting of drain tile, paving brick, sewer pipe and pottery, were made during the year to the value of \$604,280, a slight decrease from 1901.

A MACHINE FOR LAYING BRICKS.

An Englishman, John H. Knight, has designed a machine for plain brick laying, shown in the illustration. Vertical posts are set in the ground about 15 ft. apart. Adjacent to the wall to be built to these posts is secured a wooden girder upon which is screwed a 6 in. x 1/4 in. steel plate. This steel plate forms a bed on which the machine runs. The driving mechanism consists of a toothed pinion meshing with a pitched chain along the girder, motion being given to the pinion by gears and handle. A guide bar secured to the girder forms the straight-edge for the face of the bricks which are fed to the machine by hand. A pawl operated by a separate handle serves to press one brick back against the



BRICK LAYING MACHINE.

previous brick. Each brick as it moves back pushes a ridge of mortar in front of it, so that the vertical joint between the two bricks is filled. The mechanical bricklayer pats the top of each brick, this being done by a spiked roller which derives its downward pressure from a stout spiral spring regulated by the adjusting screws. The mortar is run out by hand in front of the machine. As each course of bricks has been laid the girder is lifted by hand 3 in. Holes are bored in the

upright posts to form catches for a lifting lever. Two men and a boy can operate the machine. One man spreads the mortar, the second feeds the machine and the third operates it. Mr. Knight claims that the machine will lay down from 500 to 600 brick an hour.

MR. PERCY E. NOBBS.

We are privileged to present to our readers the accompanying portrait of Mr. Percy E. Nobbs, who recently entered upon his duties as Professor of Archi-



MR. PERCY E. NOBBS.

tecture at McGill University, Montreal, in succession to Prof. S. H. Capper.

Mr. Nobbs is a native of Haddington, N.B. His earlier years were spent in Russia, where he received his first artistic instruction at the School of Design, St. Petersburg. In 1887, he entered the Edinburgh Collegiate School, leaving in 1893 to take the Arts Course (new regulations) at Edinburgh University. During his school and college years he took various art and technical classes at the Heriot Watt College, the school of art and the new school of applied art, all bearing on his profession.

In the spring of 1896, Mr. Nobbs graduated as M. A., and travelled abroad before becoming an articled pupil with Mr. R. S. Lorimer, A.R.S.A., of Edinburgh, with whom he remained four years. In 1900, he won the Tite C. Prize at the R.I.B.A., and passed his examination for A.R.I.B.A., afterwards spending a further period in foreign travel and study.

In 1901 he entered the service of the London County Council, where he gained much practical experience of building operations. Subsequently he became chief assistant to Mr. A. Hensell Tiltman, F.R.I.B.A.

In January of the present year Mr. Nobbs was awarded the Owen Jones Travelling Studentship (£100) for a scheme for the decoration of a church in mosaic.

He is a member of the standing Committee on Art of the R.I.B.A., and the author of a number of valuable papers on professional subjects presented before the Edinburgh Architectural Society.

In assuming the chair of architecture at McGill, Mr. Nobbs will endeavor to give practical form to ideas already clearly defined, and which it is hoped may improve the status of architecture and of architectural workers in Canada.

BY THE WAY.

The memory of prominent events and persons who have figured conspicuously in national affairs, is being perpetuated by the designations given to streets in London. Some of the newer thoroughfare bear such names as Pretoria, Joubert, Hawarden grove, etc.

+ + +

I observe that Lieut. Peary, of the United States Navy has been granted three years leave of absence to enable him to make another attempt to reach the North Pole. If Mr. Peary does not achieve greater things on this than on his last two or three expeditions, our own Captain Bernier stands a good chance of getting to the pole first.

x x x

We find a good many faddists among architects, but if reports be true they are eclipsed by a certain Swiss silk manufacturer, who has had built for himself a counterpart of the Swiss lake dwellings exhibited in the Zurich Museum. This architectural freak is built on piles in Lake Constance a distance of 200 feet from the shore. Around the house is a gallery 5 or 6 feet wide. The exterior of the walls is covered with osiers and lime. The floor is of plaster and the roof is thatched. Instead of glass, bladder is used. Wood of the yew has been employed as far as possible.

x x x

I learn from "Indian Engineering" that the director of railway construction of the Public Works Department of India has issued a circular to engineers employed on large works asking them to experiment with the process which is said to have been recently discovered in the United States for increasing the tenacity of clay by mixing it with a liquid obtained from boiled straw. Mention of this discovery was made in a recent number of this paper. It is said that this process was employed by the ancient Egyptians in the manufacture of bricks, and that by this means the strength of bricks can be materially increased.

x x x

They have a quaint way of telling the time of day in the Roothings, according to an Essex contemporary. A working man who was walking from Ongar towards Dunmow passed through a village about mid-day, and, wishing to know the hour, asked an old dame who stood at her cottage door if she could tell him the time. "Yes, that I can, boy, if you wait a minute," she exclaimed. She at once hobbled to the end of the row of tenements, and glancing up at a tall cottage chimney, athwart which the rays of the sun fell, said, "It wants just a brick and a-half to one." The surprised traveller, though a bricklayer by trade, had no knowledge of brick chronology, and enquired how many bricks went to the hour. The old lady explained that there were three bricks to the hour; and thus the time would be 12.30 p.m. The mystified man made off to the nearest wayside tavern for his mid-day meal, and he found that the cottage's sun-dial was true, for the hands of the inn clock pointed to half-past twelve.—British Clayworker.

x x x

Up among the arches of the great new cathedral at Westminster a "twittering" may be heard which, on investigation says the Builders' Record, is found to proceed from a score of young ladies enveloped in overalls. These are the workers on Mr. George Bridge's mosaics

—in the chapels of All Souls and of St. Gregory and St. Augustine on either side of the vast nave. Mr. Bridge finds that the young ladies suit his needs admirably, but it must not be supposed that they are there without training. "I have ladies come to me sometimes," say Mr. Bridge, "who think they can set to work at once and earn two or three pounds a week. But that is, of course, absurd. There is a great deal of technique to be mastered, and I estimate that a fairly clever worker needs two years' experience before being put on figure work"—these young ladies have been through the schools and drawn from the "life," so that they are able to handle the mosaic in an intelligent manner. Mr. Bridge's first pupil was his wife, who succeeded so well that he decided to engage other female workers; until we find him here in the cathedral directing quite a school of them. The practice of architecture as a profession for women receives periodical attention but, with a few exceptions, never becomes a reality. For ourselves we do not think it ever will while contractors are men, not always gifted with the tongues of angels; but there is surely a field for women in some of the applied arts connected with architecture where, indeed, the subtler touch of the female hand and the more delicate gauge of the female eye may prove a boon—a possibility to which Mr. Bridge's practical experience gives much hope.

NEW METHOD OF CHIMNEY CONSTRUCTION.

As a substitute for the special device called "wagons" usually employed in the construction of chimney flues in Paris, M. Morel suggests the use of a special form of brick which while strictly conforming to the Police Regulations admits of easy and quick construction and close union of the various parts of the flue. The British Clayworker describes the method thus: The sides are perpendicular to the horizontal surfaces, except one side, which is at an angle of 30 deg. to make a joint between two flues. To enable crossing of the other straight joints one part of the brick is longer than the other part. The bricks are laid as follows: A brick being in place, a second is turned in such a way that the two surfaces are applied one against the other, forming a joint with mortar. Thus a first course is laid, and, as the joints have to be crossed, the bricks in the second course are laid on the two bricks mentioned, and turned so that the large sides of the bricks in the second course are applied against the small sides of the bricks in the first. The inclined joints of the second course are thus in an opposite direction to those of the first. When the flues bend, the bricks are usually laid on different surfaces in steps, forming places where the soot can accumulate to be removed when the chimney is swept. To avoid this inconvenience the flues must be made of plaster or cement. M. Morel employs a special brick with inclined surfaces, which can be utilised with ordinary bricks. A course of bricks is laid and between two courses of these bricks the new bricks are laid, which have two oblique sides. Thus a flue is obtained not having an arrangement in steps, but a sinuous surface, requiring no facing, from which soot can be easily removed.

A new building by-law recently adopted by the city of Minneapolis compels fireproof construction of all public and quasi-public buildings of over three-storey dimension, and prohibits the use of cinder concrete.

METHODS OF REMEDYING DAMPNESS AND EFFLORESCENCE IN WALLS OF BUILDINGS.

The following on the above subject is extracted from a work by Adolph Wilhelm Keim, German Chemist:—

Most of the methods which have been proposed for curing damp walls have been based on the use of waterproof plastering or paint, or depend on the principle of employing hollow walls, with or without ventilating apertures. The former device may in certain cases fulfil the desired end, although as a rule it merely hides the mischief for a time and actually aggravates it. The plan of using hollow walls with ventilating channels, whilst more correct in principle, is both costly and difficult of application to old houses.

Vaudoyer has the following remarks on these two methods: Imagine the wall of a basement to be affected by moisture, and to exhibit efflorescences on its external surfaces; it would be of no use to try to shut the damp into the wall, we must rather afford it an opportunity of being dried by the air, whilst endeavouring to remove the cause. With this object air channels should be inserted in the walls above the ground level, cellars may be excavated where none already exist, the inner and outer plastering of the walls may be removed, and any precautions similar to those which are employed in new construction may be adopted. In cases however, in which these precautions are no longer possible or when in spite of them the effects of dampness still continue to exhibit themselves, recourse must be had to other means, such as the following: To prevent the moisture which is present in the wall of a building, and shows itself on the interior surface, from influencing the air of the apartments, the best plan is to face the wall with hard tiles, set on edge at a distance of about an inch from the face of the wall so as to permit a circulation of air between the wall and the inner casing. It is beneficial to give the inner surface of tiles a coat of asphalt, especially those which are tied to the wall, whilst the outer surface may be coated with plaster(?), which when perfectly dry can be painted or plastered, or, since wall-paper does not adhere well to plaster of Paris, it may be pasted upon coarse linen.

This system would afford all needful security, and further harm would arise from the moisture even if it still remained in the wall which was originally affected by it; but even in the wall itself it would be markedly diminished by the ventilation which would be established between the wall and the inner casing. A less expensive expedient would be to erect wooden battens against the wall, with diagonal ties, to nail laths upon these, and then plaster the laths. This would give a thin partition, isolated from the wall. The wooden battens, being in contact with the damp wall, would have no great permanence; they should at least be well tarred, and have sheet-lead interposed between them and the wall; a free circulation of air is, moreover, absolutely necessary. Wooden wainscoting amounts in fact to an isolated partition, and it is certain that the partial, or, if necessary, the complete lining of the walls of a room with wood is a great protection against damp; nevertheless, the ill effects of moisture on the building itself will still have to be feared if a free circulation of air is not provided for behind the wainscot, the back surface of which, moreover, should be well tarred.

Although the system which has just been described is to be preferred to any other, it nevertheless has the disadvantage of reducing the size of the apartment considerably; we have therefore to consider whether other devices may not in some cases be adopted.

In cases where the wall in question is an interior wall separating two apartments, both of which require to be screened from damp, there is no alternative but to adopt the system of isolated partitions; for if any coating impervious to moisture were applied immediately to the wall, the result would simply be to enclose the damp in the substance of the walls, and would promote a destructive action which would be all the more detrimental because it would escape observation. But where the damp shows itself in only one of the rooms, it would seem that to suppress it on that side of the wall would drive it to the opposite one, where, however, it would not be so harmful as in the former case, because at that side the air might be relied on to evaporate it to a large extent. In such a case it is better to avoid the use of an isolated partition, and to apply directly to one side of the wall the waterproof coating which is regarded as the best protective. It must, however, be admitted that few of these will long maintain their coherence with a wall which is perpetually damp. Framed partitions take such a coating more readily than walls built of stone. The material selected for application should, if possible, be one that will penetrate into the substance of the wall. Such an application may also be employed for the inner surface of an exterior wall, if this has a favorable aspect. For if one of the surfaces is exposed to the influence of the air, the damp will be able to escape from the whole thickness of the wall.

Although this plan presents indisputable advantages in some cases, there are others in which the wall may be coated with glazed tiles, affixed with good mortar; or, in rooms where a tiled wall is not appropriate, the rough side may be left exposed, and can then be covered with paint and any desired style of ornamentation. In some instances, tiles saturated with asphalt may be used; in others the whole surface may be covered with thin sheets of lead. The chief difficulty in using metallic plates is to find a suitable material for attaching them to the wall. This is required not only to harden readily, but also to adhere firmly to both the surfaces to which it is applied.

It would be superfluous to remark that a damp wall to which cement, or any other waterproof material, is to be applied, should first be stripped of its former coating, and allowed to dry for some time before the new coat is laid on. And it must further be remarked that rendering with mortar consisting of hydraulic lime and sand gives a surface which is quite unsuited to receive a coat of oil paint, since the latter would not adhere well, but would speedily peel off.

C. G. Demich has proposed some extremely complicated ventilation attachments, which are so costly that scarcely any one would introduce them into old buildings, on which account I pass them over. But he also gives the following method for protecting against damp:—

An excellent method (he says) of preventing the escape of water vapour from damp walls is to cover them with small glazed clay tablets. These tablets, which can be made by any potter, are about $\frac{7}{8}$ inch square and $\frac{3}{8}$ inch thick, and are glazed on one side. They are attached to the wall, with the glazed side outwards, by good mortar or plaster and small clamps. A wall covered with such tablets has not an unpleasant appearance, but when lighted up at night, the glitter is injurious to the eyes. To avoid this the tablets may be fixed with the glazed side towards the wall, the rough side coated with a thin layer of fine cement, floated, and papered. When the damp is not excessive, the wall may be covered in the same way with old window glass, then floated with cement, and papered.

DRAWING AND ARCHITECTURE. —I.

BY PROF. PERCY E. NOBBS.

NOTE BY THE AUTHOR:—These three short papers on (1) Drawing and Architecture; (2) The Styles of Architecture; (3) Material and Design; are intended as an introduction to the study of Architecture for students assumed to possess no knowledge of the subject, and the themes are treated with regard to their bearing on study only. They were delivered at McGill University this September.

As a beginning to our first winter's course in Architecture, we shall devote three lecture hours to the consideration of what may be called the first principles, not of Architecture, but of Architectural Studentship, before taking up our studies in Construction, Theory and History. It is not likely that my students will at once fully understand all these principles imply, for it is very difficult properly to express any ideas connected with our art in words,—written or spoken.

In the "Elements of Drawing," Ruskin says to his reader:—"If you wish to learn drawing, that you may be able to set down clearly and usefully, records of such things as cannot be described in words, either to assist your own memory of them, or to convey distinct ideas of them to other people, * then I can help you, or which is better, show you how to help yourself."

Now it is with "such things as cannot be described in words," that we have to deal,—after all a specification gives a very poor idea of a building, even to the expert. But happily we have in drawing, a way of expressing architectural ideas and a way capable moreover of the utmost refinement of expression.

To-day we shall make a short enquiry into the relations which subsist between the art of drawing and the art of building.

The modern architect must draw, and draw well. We shall have no difficulty in coming to that conclusion. Before going further, however, I would impress it upon you as students, (and this will be the burden of my song, till such time as I have done with you,) that we must never regard drawing as an art worth cultivating for its own sake. Let us take all the pleasure we can in drawing well, and the more pleasure we find in it the better we shall draw; but we must never forget, that it is the rightness of the subject matter alone that is of any importance to the architect. True, a neat clean drawing is more pleasant to handle and peruse, than a dirty or careless one; but it is only so far as the facts on the paper are unimpeachably true, are easily understood, and have reason in them that the drawing is worth anything. The very great majority of students' drawings are worth less than half the value of the paper they are on, because both sides have probably lost their original whiteness by the time the drawing is finished. When we have come to regard our drawings in this light,—as damaged paper in no way beautiful, certainly not decorative, but, possibly a little useful,—then the first step has been reached on the stair which leads to the halls of architectural learning, and not until then.

Truth in a drawing is the only thing worth paying for, and he is paid best who puts most truth, with given labor, on a given area of paper. Speed in drawing is the only thing that makes it possible to earn a living as a draughtsman, and we may here remember with profit, that on leaving McGill we have several years to live as draughtsmen, before we can design so simple a thing as a rabbit hutch in the really, best possible way. Success in this profession, on which we have embarked, possibly with a very light heart, depends to a great extent on our drawing; for unless by this means we can be of real use to an architect on leaving college, our progress will be slow, and practical experience will come in a meagre measure, even in spite of enthusiasm and intelligence. In a word, on the lower rungs of the architect's ladder, there is no room for the man who cannot draw.

Now it is the practical experience that we gain in an office that is the really essential thing for the designer—that and the study of the work of those who have gone before us. Accomplished draughtsmanship is only accidentally essential—it is the means by which we attain to the really essential things.

George Edmund Street in one of his Royal Academy lectures commented on the fact that "Men built magnificently when they drew but poorly." It was only in quite modern times that it became necessary for a paper version of what was proposed to be built, and our business today consists very largely in the manufacture of paper versions. When we study the history and development of Architecture we shall realize how tremendous was the change which the Art of building underwent owing to the substitution of this indirect process, (by which one man makes himself responsible for the form and size of every part of a building from a tower to a turnbuckle), for the simple methods of former times.

We must not understand by this that the Gothic constructors did not scheme things out on paper or even that they did not use scale drawings but extant specimens of drawings and work show how very little attempt was made to make paper drawings give anything like a true idea of the real buildings. Drawing was unnecessary then and architecture had certain qualities as a result to which it is beyond the power of modern methods to attain. We must not let our reverence for ancient things blind us to the fact that something also has been gained by the genesis of the architectural draughtman. The men who were responsible for the Mediæval Cathedrals did not sit on a three legged stool in a city office and superintend a score of buildings at once—some of them hundreds or even thousands of miles away.

George Edmund Street somewhere in the inspiring set of lectures above referred to denies that the pencil has any magic power to help the designer when ideas run out or refuse to curdle into form before what the Scotch call the "mind's eye." His experience is not that of the rest of us, and it has even been hinted that had he allowed the pencil to guide him occasionally instead of guiding it so strongly his designs would not have suffered.

The point we are endeavoring to make is this, that facility in drawing—speed in execution, accuracy and sympathy in delineation—is an enormous help in design by the indirect process of paper drawings. This is especially so when we have recourse to the method of trial and failure i. e., drawing in and rubbing out till we satisfy ourselves that the parts of the thing are of the right size to give the impression we desire our work to convey (for the face of a building is like the face of a man in this that the least appreciable displacement of its eyebrows or the exact curl of the brim of the hat alters the whole expression). Even at the initial stage of a design drawings to scale conveying vividly to the practiced mind the idea of the actual bulk of what is under consideration are of utmost use, as till we can realize the size of the whole it is useless to materialize the proportions of the parts. And the longer we work the more we shall realize that design is a question of proportion,—of the sizes of things in relation to one another, and that that indispensable but subtle instinct called the sense of scale, can best be cultivated by drawing.

Ruskin says in the work above referred to which it were well for all to read. "Do not therefore think that you can learn drawing any more than a new language, without some hard and disagreeable labor. But do not on the other hand, if you are ready and willing to pay this price, fear that you may be unable to get on for want of special talent." It is indeed true, that persons who have peculiar talent for art, (and by art Ruskin usually means drawing only.) Draw instructively and get on almost without teaching, though never without toil. * * * But I have never yet in the experiments I have made, met with a person who could not learn to draw at all; and in general there is a satisfactory and available power in every one to learn drawing if he wishes, in a decent and useful degree, if his lot in life requires him to possess such knowledge."

Given patience on the one side, and right teaching on the other, the draughtsman can easily be made if he is not born.

To speak personally, my function here is to see that you draw the right kind of things, rather than that your drawing is well done; but incidentally, I shall, I hope, be able to give you such hints with regard to manner and method of work, as may help you to get the utmost good from the subjects you will study graphically. Later on when the ABC of our architectural language has been learned, in the only way in which an ABC can be learned,—by putting it down on paper,—later on, I say, we shall group the letters into words, and the words into sentences—grammatical sentences, I hope, with meanings in them.

The things that we shall study are the works of our predecessors from "Delos up to Limerick," and to that end we have here a truly magnificent collection of slides, photographs and books, for which we have to thank the wise generosity of Sir William McDonald, and the deep scholarship, sound taste and energy of Professor Capper.

Now we might exhibit, peruse and dilate upon the beauties represented in this collection for weeks on end, without getting further than a general agreement as to the wonder of all this fine old work. The moment we begin to draw examples however, we begin to solve the mystery of how the effects we admire are obtained and what are the real relative proportions of parts which look perhaps equal in our views upon the screen.

Moreover, it is only by drawing that our knowledge of the detail and mouldings of various periods attains to that definite

and concise degree which makes it possible at a glance to know the date of a piece of old work; and although it is quite immaterial for the designer to know what bishop or king endowed a church or build a chapel, the evolution of past architecture must be understood before a broad and sound view can be taken of the evolution that is going around us to-day, and dates are the milestones in this study. Therefore, on all accounts let us be patient and draw hard, much, truly and finely, and bear ever in mind that for us it is a means to an end, not an end in itself.

So that the facts be true, and the thoughts be right, the handwriting of this lecture is a very minor consideration. Not so in the "handwriting" of our true professional language; on the technique of our drawing, depends the amount of fact which a given sheet, nay, a given line, or a given dot may have power to convey. Take pride, therefore, in how much truth, both in degree and quantity your drawings contain, and as little pride as your temperament will permit in the intrinsic beauty of your drawings, for, therein lies a deadly snare, as every draughtsman knows to his cost.

ARCHITECTURAL PRACTICE, REAL AND IDEAL.*

By J. S. GIBSON.

There are many amusing and curious ways of obtaining a practice, and for all of us it is a serious question to determine how to start on our career. But it is to be settled at an early stage, or else it will effectually settle us. Some cut the Gordian knot by leaving the ranks and embarking into the maelstrom of "trade"; these are wise but inartistic ones. Some rely on the artistic blindness of the general public, and run lucrative drawing manufactories on business-like lines. These are the shrewd and "practical" ones. Some have relatives who are something big in the City of finance or Society, and these push their architectural appendages in the same manner as they do shares, or officers in the army. What Lord Melbourne said about the bestowal of the Order of the Garter, that "There's no damend merit about it," we may safely say that in reference to the practice of these fortunate ones. Some drift into that refuge of mediocrity, an official appointment in a Government office, and in the Office of Works, or such-like departments, do what they can to spread the commonplace over the land; these can hardly be said to practise, either really or ideally. Some enter into competitions, throwing all their energies and skill therein, in the hope that merit will be rewarded. These are the sanguine ones, and sometimes they are not disappointed. Some enter into partnerships with clever men of business, who "manage" the clients while they manage the office. These are the timid ones, likeable fellows who think the chief end of life is to get a cornice perfectly proportioned or a skirting-board properly moulded. Some attach themselves to vulgarly commonplace type, whose chief quality is to bulk, and whose erection in some slight degree justifies the short leasehold system of land tenure; these are the wily ones. Some develop an absorbing interest in rights of light, and devote precious time to the intricacies of party structures and then pass away full of years and riches; these are the canny ones. Some renounce art and become crafty, finding that the public will pay more willingly for the abnormal than the artistic; these denounce style, balance, composition, rhythm, grace, and are sharp-sighted leaders of the blind. Some determine to live for art's sake, and usually die for it instead; these are the foolish and artistic ones.

These are but a few of the thousand and one ways of practising our profession, and each of you must one day settle this great question for yourself.

Turning to the realities of practice one may say "happy is the man who knows nothing of them," for the whims and vagaries of the client are sometimes as difficult to deal with as the prejudices of the architect.

Among the first troubles likely to assail you are the reconciliation of the wants of the client with the amount of money he is willing to spend. In this matter it is well to show as kindly as possible the impracticability of expecting 5,000 worth of accommodation for 3,000 cash. Never estimate your buildings too low; it will prove easier to have a margin to meet the changing views of your client, rather than a deficit to ask him to wipe off.

Having satisfactorily settled the money question, you can, with a merry heart, set about the designing of your house; and if your client expresses a strong preference for any unusual dis-

position of rooms, you must give this your very best consideration, for, after all, he is the person who has to live in them. If you have hit on any particularly good arrangement, do not throw it at the good man, but lead him gently to it, and thereby gain his approval, for this is more often won by strategy than by force. Always be ready with examples of similar cases, and if these are already known to your client so much the better, for when he feels on safer ground; all clients prefer experience to experiment. When discussing any question never imagine that force of language will atone for lack of reason. You will often find your client expressing his views on the architectural styles, and, if he desires you to design him a house which shall be Palladian Renaissance outside and English Gothic inside, do not regard him so much as a lunatic as one who requires careful treatment, as his appetite for styles may be omnivorous.

Having matured your design and written your specification, do not think that your worries are ended. Under the present system of competitive tendering for work, you may find yourself face to face with a builder who solemnly assures you that Smith's blue lias lime is much stronger and better than Brown's Portland cement, that drain pipes are best jointed with clay, and that footings should rest on the solid earth without the intervention of any concrete under them. Should you meet such a man no doubt you will inform him of your good old crusted prejudices, and stick to the specification. Having taken a firm standing in your dealings with a builder of this kind, maintain this attitude to the end, and you will generally succeed in getting a creditable job for your client, although at some trouble to yourself. But we must not forget that we are paid for the trouble involved in getting our buildings properly erected, as well as for designing them.

One of the surprises of practices in their early stages, is the extraordinarily easy manner in which variations can be made on contracts during execution, so that when the accounts come in they often surprise the architect more than any other person. The apparently innocent suggestion to "omit the moulded beam and side brackets" over an opening, and just "put in a couple of semi-circular arches with a column and two pilasters," has in some mysterious way, been expanded into about five pages of a bill of extras, the total of which makes the architect gasp. The only safe rule in all these matters is to make a drawing and to get a price fixed before any work is done. If, however, you have made the variation without a price having been previously fixed, you may rely upon one friend in your extremity, the quantity surveyor. He is the man who can pull you through. How he does it I do not pretend to know; perhaps he has no bowels of compassion as far as builders are concerned; perhaps there is some free masonry of which you and I are ignorant; but at any rate, he will usually succeed in making a bill more palatable to your client and yourself, and we cannot be too grateful to him for these services.

In your dealings with your client, as with your builder, make up your mind on the matter in hand, and never depart from your determination. Do not be so foolish as to expect to get your own way always; you will be a lucky man if you get it occasionally, but if you show signs of indecision of character, depend upon it, you will never get it at all. Should your client, upon any vital matter, prefer his way to yours, let him clearly know that the responsibility for success or failure rests on him.

If your work be at a distance, and frequent visits are impracticable, do not be surprised at the variations the builder will quite innocently make on your designs. Some of the most charming results are often thus accidentally obtained.

Years ago a fellow architect said to me, "It's a poor design that does not admit of improvement in execution," and the ripening experience of the translation of drawings into solids will suggest the variations that are improvements. Do not worry too much about the finish of your drawings. The work itself is the heart of the matter, and, above all things, do not over-elaborate the details of your drawings. A multiplicity of detail does not ensure a fineness of quality, and I had rather see one good architrave round every door of a house than an abundant variety of commonplace sections. You may dash off sketches of facades and interiors; many of the happiest inspirations are the most evanescent, but as you grow older you will find it harder to let your full sizes go out of the office. These are the final stages in your part of the work and by them you will be, in a great measure, judged.

The requirements of modern civilization are so varied and complex and we live at such a rapid pace, that even the practice of architecture has been invaded by "specialists" who apparent-

* Abstract of a paper read before the Architectural Association in London.

ly imagine that a thorough knowledge of technical details will compensate for a lack of knowledge of the art of their profession. There is hardly any modern pretenders so lacking in justification by their works as that of the architectural expert or specialist. It may be argued that this is the only scientific method of dealing with modern complicated requirements; if so, its scientific efficiency hardly justifies its artistic barrenness. My earnest advice to you is to make your practice cover as wide a field as possible; shun specialism, however lucrative it may appear.

Within the scope of a moderate practice you will find extensive demands made upon your knowledge. Apart from the capacity to design, there must be the ability to design within the limits imposed by the requirements of the Building Acts of London, Provincial and Urban Authorities, to utilize in the best way the properties of steel, iron, and concrete, as well as the older building materials, stone, brick, and wood. You must also be conversant with the latest patents in pavement lights, have a knowledge of the virtues of glass tiling, know the strong features of burglar proof sash fasteners and give a warranty that your door knobs will never come off the spindle.

Besides this all-embracing knowledge that is required of us, a new danger is rising up, born of our advancing civilization. We are now in the glorious days of trusts and combines, when everything is on a colossal scale, especially the capitalization, and no doubt the inherent poverty of our profession is the only thing that, thus far, has saved us. Think of the waste of energy going on in the artistic world to-day, of painters and sculptors creating pictures and statues and trying to find a market for them—often in vain. Imagine the immense saving that could be effected by a Pierpont Morgan buying up the output of Sargent, Whistler, Shennon, Swan, Guthrie, Lavery, Brock, Gilbert, Frampton, and putting these artists on regular employment at a fixed wage, under healthy conditions in a factory complying with all the requirements of the Factories Act, whatever these may be. Saved from the rapacities of the "dealer," in Bond street and out of it, what magnificent works these men would turn out, while the public would no longer have to go to the dealers to be advised as to the safest thing into which they might invest their money, as if works of art were mining shares and dealt in for the rise or fall of an active market. The only bar to the success of such a scheme comes, strangely enough, from the artists themselves.

I have talked so long on some of the realities that little time is now left in which to speak of the ideal practice. It is like the promised land—before our eyes, but never beneath our feet. Of what would such a practice consist? we ask, and every one's temperament will dictate a different answer.

The ideal practice must surely be that which ensures the evolution of the individual in the advancement of his art. To progress along parallel lines with your art must be a desirable thing, though it can hardly be said that, as a rule, our practice affords many facilities of this kind. Some requirements necessary to this end are common to many of us; these may be summarized as follows:

Work which is congenial to our temperament, and in which a healthy interest may be taken.

Time to think out our problems as a whole, and evolve slowly every detail. Absence of all "rush and worry."

An appreciation of the good points in our designs by those for whom the work is done.

A few assistants, good men and true, who will carry the knowledge gained a step further on their own account.

I could guess the young practitioner's ideal to be, that his buildings would turn out as fine as his conception of them, but the hard facts of reality destroy the charm of those imaginings.

I could guess the middle-aged practitioner's ideal to be, to begin again, with all the vigor and enthusiasm of youth, coupled with the matured experience of his years, but this combination is impossible of realization.

I could guess the old man's ideal to be, to be spared to practice for a few years that great art to the threshold of which many years of travel has brought him, but the inexorable summons comes, he steps across another threshold, and the door closes behind him for ever.

As far as the necessities of living will permit us, I think we should do all we can to realize our ideal practice, to advance the science and art of our calling, to do justice to our clients, our builders, and ourselves, and to uphold the honor and dignity of our profession.

PRIZES FOR ENGINEERS.

The Austrian Minister of Commerce has offered prizes of £4000, £3000, and £2000 for the three best designs to be submitted, showing methods of raising and lowering canal boats for an elevation of 131 feet, with the least possible consumption of water, in crossing the watershed between Prerau (Moravia), the head of the March basin, and Altendorf, the head of the Oder basin of the Danube-March-Oden Canal.

The method of accomplishing the object is to be left entirely to the competitors, who are also at liberty to submit proposals for constructing the works in accordance with their designs, so that the competition should appeal to a wide circle of engineers. If the execution of the work is not entrusted to the person whose design is adopted, a premium of £8000 will be given to him, in addition to the prize, when the successful operation of the contrivance has been demonstrated. Information for competitors will be furnished gratis by the commissioner for the construction of water ways at Vienna and by various provincial governors of the Empire; and by various Austro-Hungarian embassies. Plans and drawings must reach the Minister of Commerce by March 31, 1904.

PRESERVATION OF STEEL BUILDINGS.

From a report by Mr. Jas. P. Whiskeman, Assoc. M. Am. Soc. C. E., to the Superintendent of Buildings of New York, giving the results of a careful examination of the Pabst Building, the following deductions are made relative to the conditions necessary to the preservation of steel structures:—That the preservation of steel depends mainly on the protection afforded by paint, or the encasing of members in concrete or lime mortar, and that steel can resist oxidation when these protective coverings have been thorough; that paint is not always reliable in damp walls; that cast iron withstands rust better than steel. The connections of iron and steel are most liable to be attacked by rust, and these should be well painted or covered with a material like cinder concrete. All the unpainted steel-work, tie-rods, hangers, and expanded metal were found rusted more or less, and also the angles and flanges of girders, showing that the paint had in many cases been rubbed off, or had not been coated after fixing. Considerable care and supervision is necessary in seeing that the specified coats are applied. The splice plates of columns are often found to have rusted behind, caused by scraping, or the paint has been rubbed off, so with heads of rivets, which are often rusted before the flanges and webs. All machined surfaces, pinholes, riveted work should be painted or coated with pure white lead and tallow, and after erection another coat of paint is necessary, or boiled oil should be worked into all joints.

The subscriptions to the fund for the erection of the Queen Victoria Memorial in London have reached the sum of £230,000. The architect, Mr. Aston Webb, and Mr. Thomas Brock, the sculptor, are proceeding with the work.

Sir Robert Giffen, in a paper recently presented to the British Association, showed that £223,000,000, or 16 per cent. of the total annual expenditure of the British people is spent for housing, including furniture, coal, gas and water. The speaker "considered the sum to be very large, and that probably in various directions, by individuals and classes, perhaps so much is spent that there is considerable economic waste; but for the mass of the people the housing arrangements are not sufficient for civilized life, or even for good health."

NEW CANADIAN EMIGRATION OFFICES.

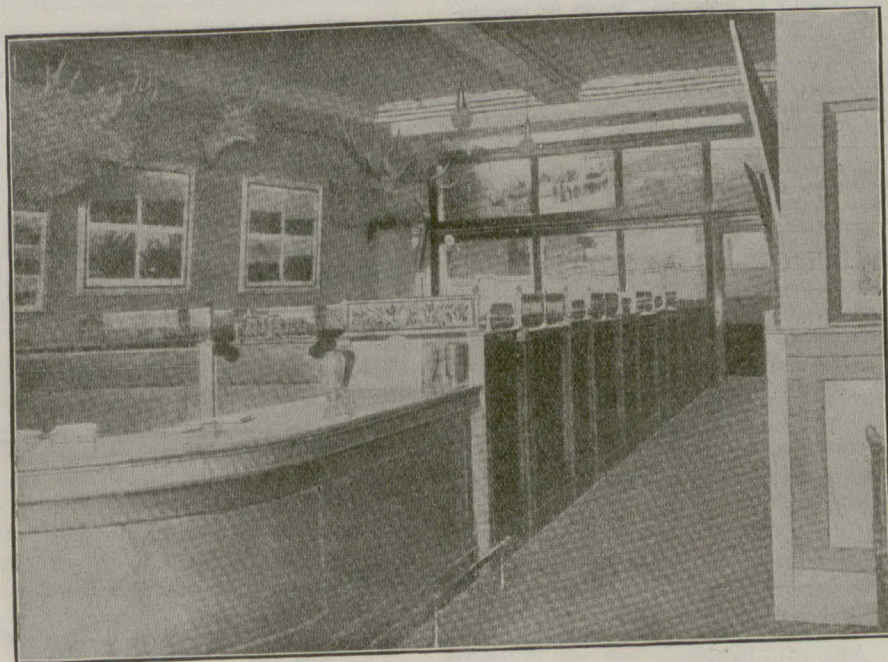
The remarkable growth of emigration from Great Britain to Canada has necessitated the erection by the Dominion Government of large new offices in London, England. These new offices, which were opened in April, are located at Charing Cross, in the centre of the Metropolis. They comprise a very imposing block of buildings of commanding appearance, and should provide adequate accommodation for the purpose for which they have been erected for many years to come.

The accompanying illustration shows a portion of the interior of the ground floor. It is partitioned off for various departments. The office of Mr. T.R. Preston, the Canadian Commissioner of Emigration, is on the ground floor. All the fittings are of Canadian wood, comprising bird's-eye maple, cherry, ash, and oak, the fittings having been mainly supplied by the Office Specialty Company, of Toronto, and the Canadian Office and School Furniture Company, of Preston. All the offices are admirably arranged to meet the work of

Secretary's scheme. Then as regards cement. During recent years the English market has been invaded with foreign cements: in 1901, more than 220,000 tons came from Germany, Belgium and the United States, as compared with 105,000 tons in 1900. America is likely to be a great competitor for the cement market of Canada; the latter country having largely deserted us of late in favour of the enterprising nation next her boundaries. In this latter connection account should also be taken of the rapid growth of cement manufacturing in Canada, the Canadian product having largely displaced the imported article.

THE COLOURS OF STAINED GLASS.

Mr. Walter Rosenhain points out, says the Builders' Record, that the loss of the secret to produce the tints of old stained glass is not indeed a loss, for the secret was never our's, but was always one of Nature's. Glass changes its colour under the influence of light, as anyone may perceive who will glance upward at an



NEW CANADIAN EMIGRATION OFFICES, LONDON, ENGLAND.

this department, which now comprises quite a considerable staff.

THE BUILDING TRADE AND MR. CHAMBERLAIN'S PROPOSALS.

The building trade of this country is very directly concerned with Mr. Chamberlain's fiscal proposals, says the London Builders' Record. We are largely dependent on other countries for certain building materials. Brick and stone are home products and may be set on one side; but wood, cement, joinery, rolled iron joists, glass and numerous other goods are imported in great quantities from countries which would be penalized by Mr. Chamberlain's tariffs. A few weeks ago we published some figures showing how the McKinley tariff of 40 per cent. on manufactured granite goods had affected the Aberdeen trade, the total value of granite shipped from that port to the United States having dropped from £112,382 in 1891 to £19,710 in 1902: so that the more favourable tariffs prevalent with our colonies (Canada being only 20 per cent. and Africa 10 per cent.) has led granite merchants to very seriously consider the Colonial

old railway terminus roof and notice how some of the panes have changed from their original greenish tinge to yellow or even pink. A large number of experiments have been made on this subject, and Professor Gaffield has carried out a series of tests, lasting in some instances over thirteen years. He found changes of colour, in what may be termed "white" glasses, as follows:—From white to light yellow, light green to yellowish green, brown and greenish yellow to various tints of purple, light green to light blue, and in some cases merely a deepening of the original tint. In the majority of coloured glasses he found little alteration except in violet and brown tints. Nevertheless, when ancient coloured glass is removed from its setting it is often found that portions of the glass which have been protected from the light are of a different tint from those portions which have been freely exposed. There can be little doubt, therefore, that we do not now see ancient glass windows with the colours they originally possessed. The change of colour is probably due to a change in the state of oxidization of the manganese and iron present in the glass. Professor Currie recently showed that the rays from radium have a powerful and ready effect in changing the colours of certain glasses.

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NOTES.

The method has been adopted in the United States in the case of certain classes of difficult undertakings of building with profits in the form of a commission on labor and materials. A firm of New York contractors who agreed to erect a large stone building at the actual cost of materials and labor plus 8 per cent. commission, binding themselves to the employer that the total cost including their commission and architects' fees should not exceed 20 cents per foot, are now bringing suit in the courts to determine a dispute as to what is due them.

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LEGAL

In the action for damages brought by the Metallic Roofing Co., of Toronto, against Local Union No. 30, of the Almagamated Sheet Metal Workers' International Association, Mr. Justice McMahon has decided that the officers of the local union are properly qualified to represent the other members of the local union, under rule 200. "That rule gives no power to order that the officers of the local union shall represent the other persons constituting the association, which is a foreign body, having its headquarters at Kansas, and under whose jurisdiction the whole of the local unions in the United States and Canada are placed." Order made that the individual defendants shall represent the other members of the local union. Costs in the cause.

Curiously enough the British Workmen's Compensation Acts which are mainly concerned with accidents to workmen, do not contain a definition of the word "Accident". A recent decision of English courts, however, gives us the legal interpretation placed upon it by the courts. A case which turned on the meaning of the word (Fenton v. Thorley & Co., Ltd.) was decided recently in the British House of Lords. Owing to some defect in a machine, a workman was injured in endeavoring to make it act. The County Court judge held there was no accident arising out of and in the course of the employment. The same view was taken in the Court of Appeal. Lord Macnaghten objected to the belief which prevailed in the Courts that there must be something fortuitous in the circumstances in order to constitute an accident. A workman acted stupidly and was injured, and unless serious and wilful misconduct could be proved he obtained compensation. Another did his very best, acted with energy and thoughtfulness: he was declared to be outside the Act, as the fortuitous element was wanting. His lordship considered the word "accident" should be interpreted in the ordinary sense. In conclusion he moved that the decision of the Court of Appeal and of the County Court judge be reversed, with costs in both Courts, and that the action be remitted to the County Court with a direction to the judge to ascertain the amount of compensation to which the appellants are entitled.

The general practice in building, that if the employer is dissatisfied with the manner in which a contractor is carrying out his work he may, after due warning, engage any other person to complete the work, has been once more upheld in Scotland. In a case lately heard, says the Builders' Reporter, the plaintiff was accepted for a contract to carry out the joinery work in three blocks of buildings. He claimed £210 19s. for work in connection with the buildings, and also £500 as damages for breach of contract in respect of the architect having taken the contract out of his hands after the roofs of the buildings were on. The owner of the buildings, who was the defendant, stated that he was willing to pay whatever sum the architect might certify to be due. The position he took up with regard to the claim of damages was

that the architect had power under the contract to take the contract out of the contractor's hands, and that he was justified in doing this owing to his dissatisfaction with the progress made with the work. The claim for work done was referred to an independent architect, who fixed the amount at £187 19s ½d. This sum was awarded to the contractor. The claim of £500 damages for cancelling the contract was dealt with at some length. The Sheriff-Judge, in his decision, found that the plaintiff was not entitled to damages for the following reasons;— That he did not fulfil the terms of the contract, but that at several stages of the work, in consequence of his materials not being forward, he caused serious delay and inconvenience to the other tradesmen, especially to the mason, and retarded the progress of the work. After several delays caused by the pursuer, it became apparent that he was not carrying on his work in such a way as was compatible with its being finished at the earliest possible date; that the defendant's architect, after reasonable warning, wrote to the plaintiff intimating that the contract was taken out of his hands; that the architect was justified in terminating the contract. The case exemplifies the disadvantages of splitting up the contract, for the speed of progress is thereby regulated by the slowest. For instance, the mason had to take his men for three weeks from the walls owing to the absence of joists. The delay about the joists was caused to a large extent by the plaintiff supplying joisting of an inferior quality to that which was specified. According to Mr. Morton, the wood merchant, he ordered joisting of a grade inferior to that specified, and at a price at which the specified quality could not be supplied. There was a similar delay when the walls were ready for the second-floor joists. The ceiling joists were not even ordered from the timber merchant at the stage when it was usual to lay them. The evidence was overwhelmingly against the plaintiff, and the decision could not do otherwise but reflect that fact.

The builders of high chimneys in Germany are now using a mortar composed of a mixture of cement, lime and sand (in the proportions of 1, 2 and 6) for the upper portion of the chimney stack, where the gaseous products of combustion of the fuel are comparatively cool; while for the lower portions of the stack the proportions are 1, 2½ and 8. If the lime is hydraulic the proportion of the cement may be reduced; but if the sand is very sharp the proportion of cement must be increased. For the cap of a tall chimney stack the proportions of the ingredients of the mortar may be altered with economy and advantage. In German practice the mortar is composed of cement, lime and sand; in the proportions of 1, 1 and 4. Mortar made of cement and sand alone is not at all suitable for tall chimney work, because it does not resist the action of heat well and is attacked by carbon dioxide, of which there is always a large quantity present in the fine gases; this is especially the case in the presence of moisture, and, of course, steam is always present in the gases found in a smoking chimney.

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STANDARDIZING OF BRICKS.

At a conference representing the Royal Institute of British Architects, the Institution of Civil Engineers and the Institute of Clayworkers held in London on June 19th last, approval was given to the proposal that in future bricks should be made to a standard size as follows:

1. The length of the brick should be double the width, plus the thickness of one vertical joint.

2. Brickwork should measure four courses of bricks and four joints to a foot.

Joints should be $\frac{1}{4}$ in. thick and an extra $\frac{1}{16}$ th, making $\frac{5}{16}$ ths for the bed joints to cover irregularities in the bricks. This gives a standard length of $9\frac{1}{4}$ in. centre to centre of joints.

The bricks to be measured in the following manner:

A. Eight stretchers laid square end and splay end in contact in a straight line to measure 72 in.

B. Eight headers laid side by side, frog upwards, in a straight line to measure 35 in.

C. Eight bricks, the first brick frog downwards and then alternately frog to frog and back to back, to measure $21\frac{1}{2}$ in.

A margin of 1 in. less will be allowed as to A, and $\frac{1}{2}$ in. less as to B and C.

This is to apply to all classes of walling bricks, both machine and hand made.

NOTES.

White walls are the latest mania of the art decorator, says the Daily Graphic. A good many smart houses are being done with walls of white Lincrusta all the way up—the hall, staircase, and rooms all to match. The friezes and dados of the library and dining-rooms are sometimes made of old oak, and the white walls make an excellent background for oak furniture.

The Toronto Chapter of the Ontario Association of Architects and the Toronto Engineers' Club, have decided to hold every Monday joint luncheons. Formerly the members of each society

met separately for this purpose. The new arrangement will no doubt promote acquaintance and sociability and enhance the general interest and success of these gatherings.

There is no branch of masonry construction which has experienced greater advances within the past few years, says Engineering Record, than Portland cement concrete. Applications for it are constantly being found in more or less new conditions, either with or without steel reinforcement. Some who formerly were apprehensive in regard to the weathering properties of its exposed surfaces have found that it may be made durable even under the most trying exposure. The best methods of its preparation have been found to make it so nearly watertight that it may easily be given that highly desirable quality for all practical purposes.

A writer in the "Yorkshire Post" observes that it is a curious fact, and one which emphasizes all the rest, that the most artistic of modern houses are those of the very wealthy and the very poor. The rich are building their own; the poor in a few favored places, are having their's built for them, and in their different ways they are the nearest approach we have to model homes. Between these extremes comes the great wilful and inartistic middle-class, for whom there is being provided on all hands architecture that would be laughable where it not so sad. Scores of examples of it may be seen in the suburbs of any growing town—painfully modern villas of every possible degree of ugliness and inadaptability. In general they are supposed to be imitations of various "styles" of architecture, but here and there may be found a case of absolutely original eccentricity.

With the object of forming a great dam to provide a water supply for the city of San Francisco, a great section of mountain was recently torn off by 10,000 lbs. of powder, lifted several feet straight up, and then pushed bodily forward 40 ft. or 50 ft., then falling 125 ft. into the desired position. On the surface and in places through the mountain side were placed big deposits of giant powder for the purpose of shattering the mass and lifting it up. According to plans the powder when it exploded would hurl the mass straight forward, making a bridge of granite across the gorge and blocking the stream. The plans were carried out with the greatest care, and with a successful result. When the dust cleared away, it was found that the powder had dislodged a mass of rock 400 ft. up and down stream and an average of 60 ft. in height, completely bridging the canyon. The engineers estimated that the amount dislodged weighed about 150,000 tons.

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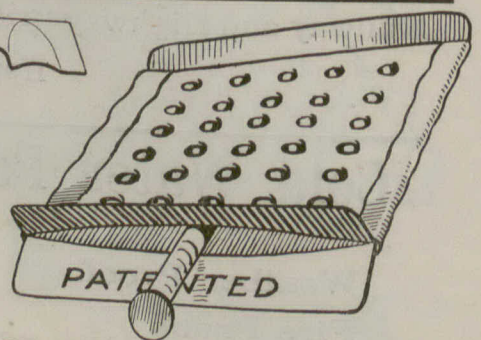
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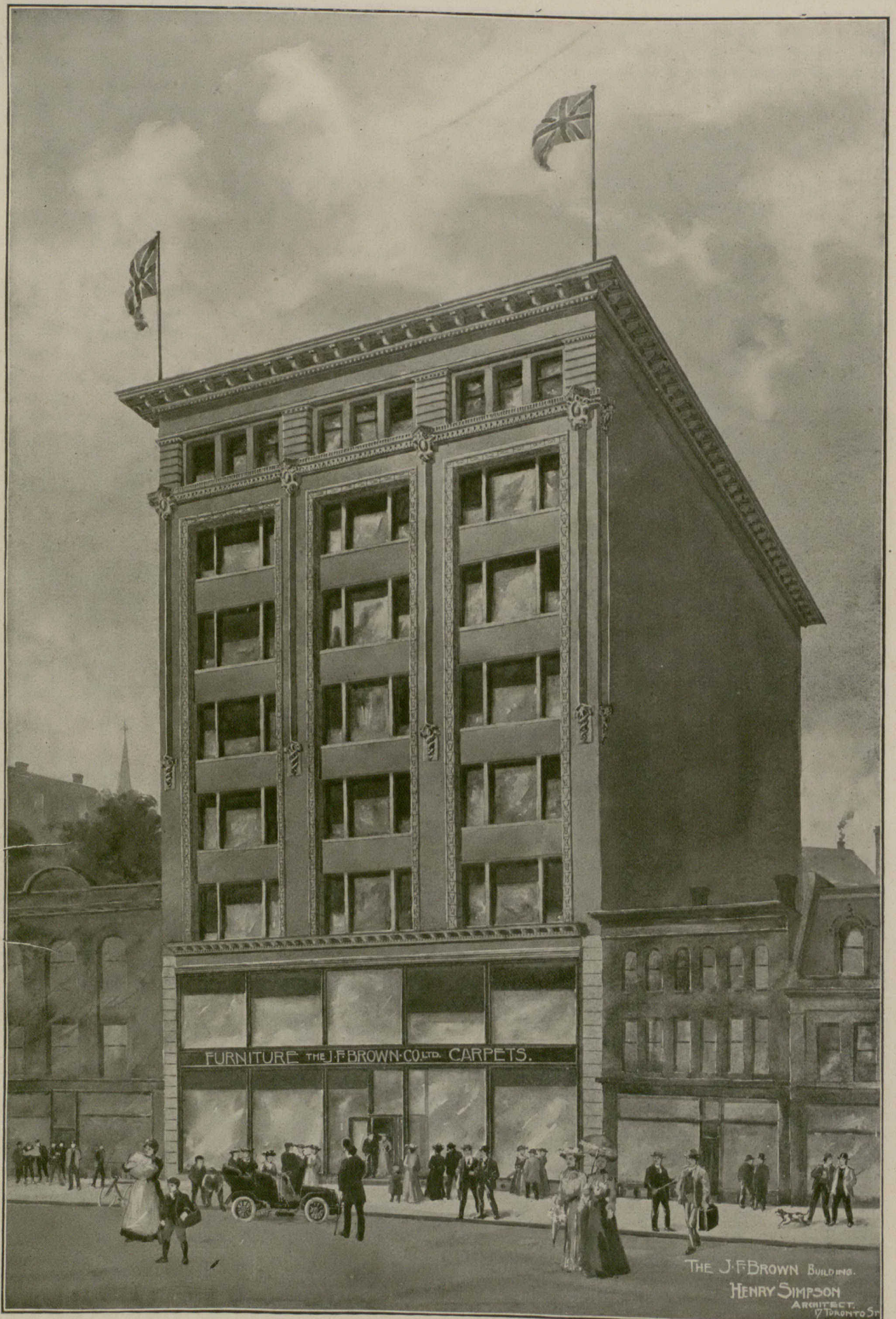


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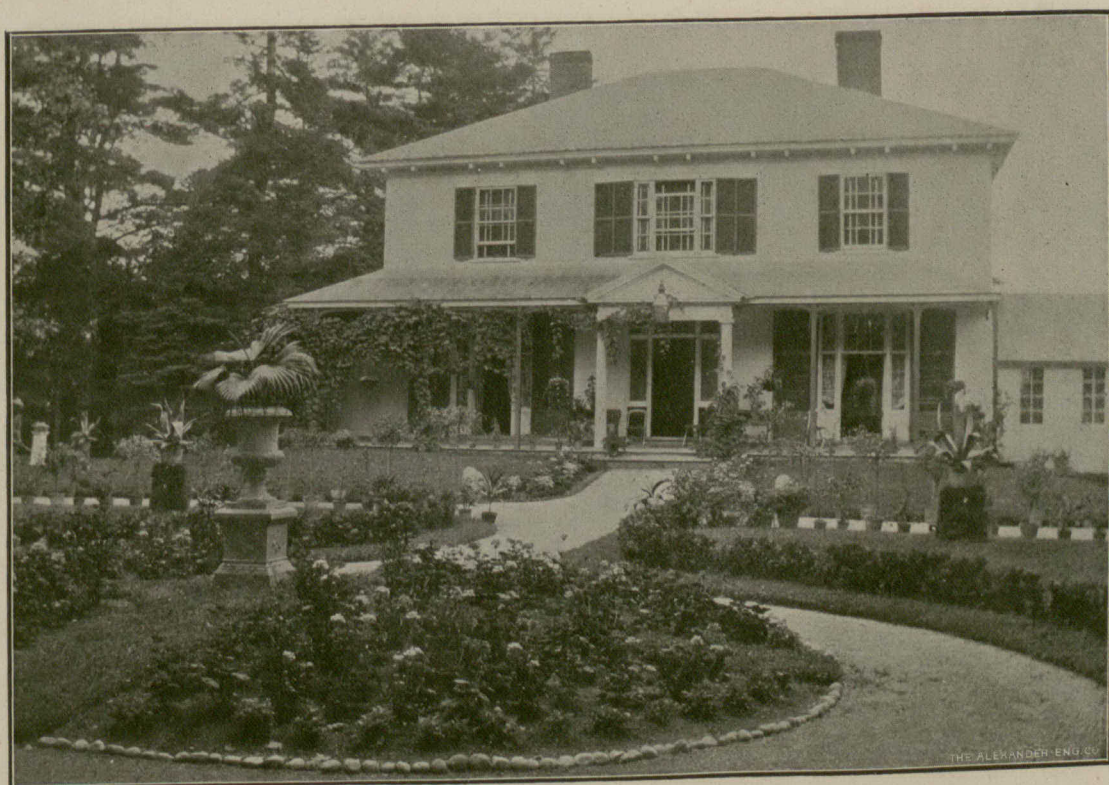
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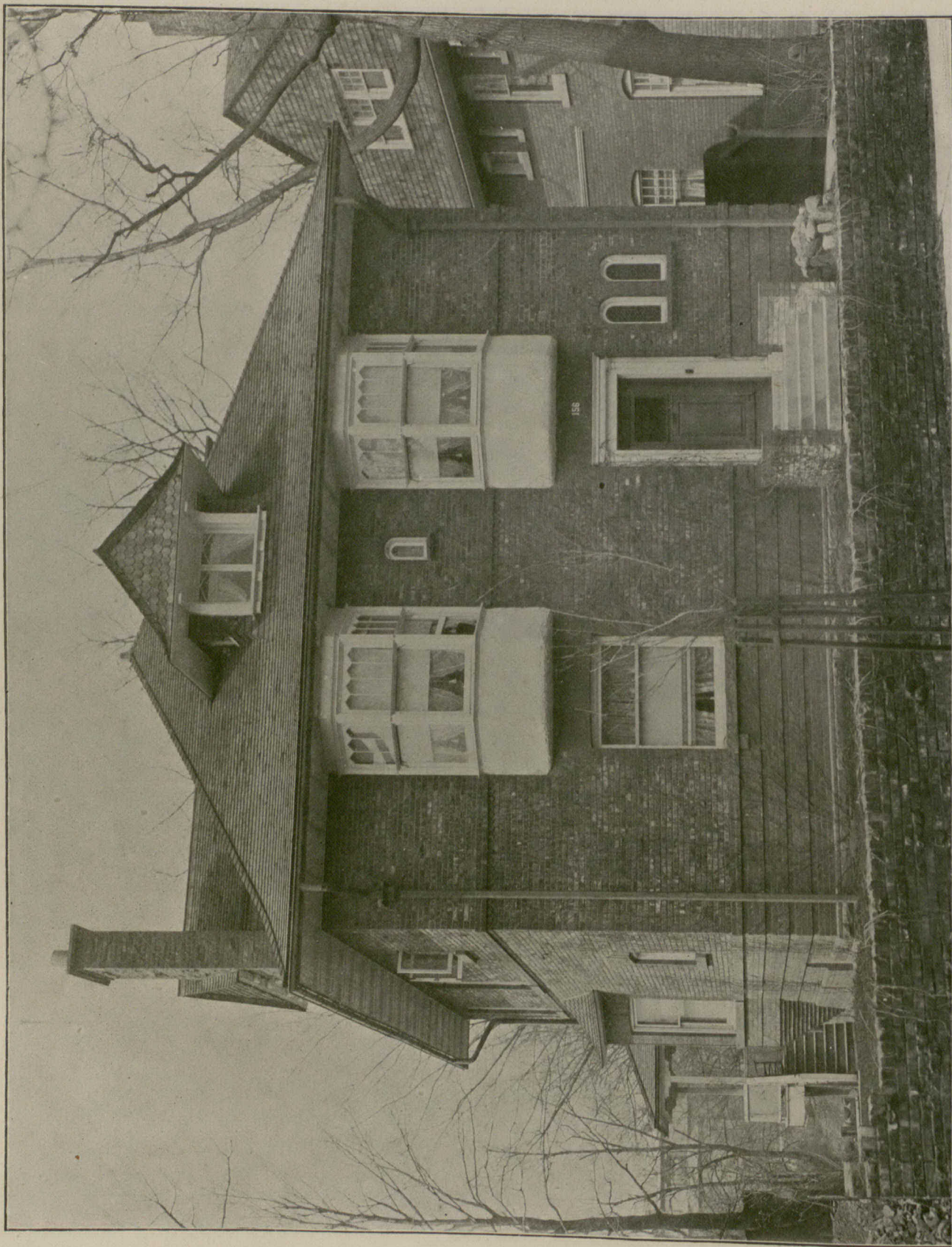
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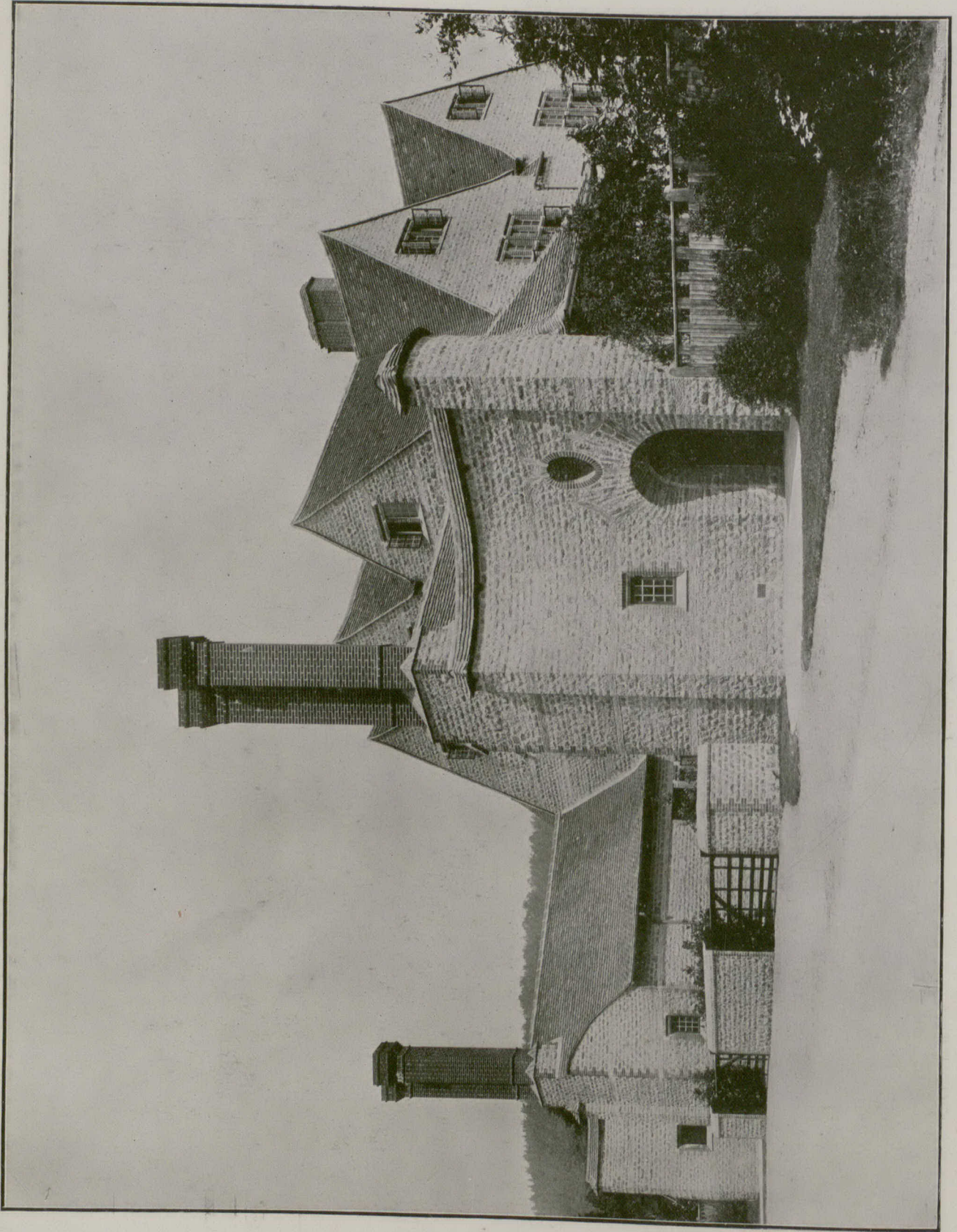
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COLUMN FOUNDATIONS.

A the foundations of a heavy building are sometimes the cause of anxiety, the following particulars relative to the Government Printing Office, Washington, may be both found useful and interesting. The building in question is a fire-proof structure of steel, brick and concrete, supported by 178 steel columns arranged about 12 feet apart in six rows, varying from 31 ft. 6 inches to 35 feet apart. All the columns are seated on battered solid concrete piers, carried down to a depth of six feet or more below the basement floor, according to the conditions ascertained in each case. Preliminary tests of the earth were made by excavating pits inside cylinders 6 feet in diameter; timbers measuring twelve inches square were then placed vertically in the pits, and it was proved that loads ranging from 8 tons to 12 tons could be imposed without settlement. Hence, the safe bearing power of the earth was taken at 4 tons per square foot, but the foundations were designed with a bearing surface of 1 square foot per 4 tons of dead load, and one square foot per 3 tons of live load. The soil consists of sand, with some gravel and clay, and is saturated with water nearly to the level of the basement floor. Therefore, foundation pits were sheeted, and wherever clay was encountered, they were sunk down to clean sand, regardless of cost. Separate piers are provided for the columns, all being proportioned for maximum loads of 20 tons per square foot at the top, and the sides are battered so as to provide at the bottom the bearing surface before mentioned. At least 12 inches of the lower part of each pier was made with parallel sides with the object of avoiding

weakness at the toe. The spaces in the pits around the columns were filled with concrete, and the tops of all the main piers were finished flush with the basement floor, being capped with grillages made of steel I-beams, arranged so as to form rivetted pedestals 6 ft. square, receiving the cast iron bases of the steel columns.—The Builder.

NOTES.

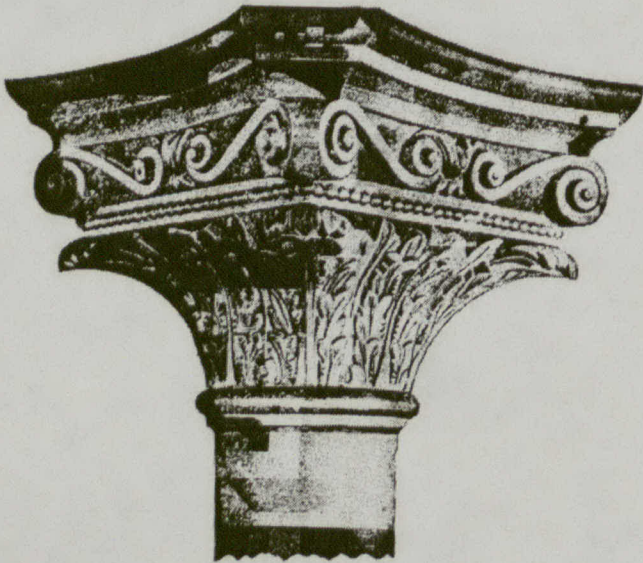
One of the most attractive exhibits, made at the recent Toronto Exposition was that of the James Morrison Brass Manufacturing Company, Limited, of Toronto. At one end of the prettily decorated booth was shown a thoroughly modern bath room fitted with high grade sanitary appliances. Grouped on the ceiling and decorating the side walls was a fine exhibit of gas and electric lighting fixtures. The exhibit also included a complete line of valves, gauges, steam traps, injectors, oil cups and other brass specialties.

A third revised and enlarged edition of Mr. George P. Merrill's book, "Stones for Building and Decoration," has been published by Messrs. John Wiley & Sons, New York. The chapter on methods of testing has been entirely revised. A brief chapter on the use of drift bowlders for building purposes has also been introduced. Some new illustrations, including five maps showing the geographic distribution of the more important stones, have been added. The price of the book in cloth binding is \$5.00.

A new metal, to which the name of Seliun has been given, is reported to have been discovered by Edward Mollard, a Frenchman. It is claimed for this metal that it can be produced at one-twelfth of the cost of aluminum and that it is stronger and lighter. It does not rust, and will therefore displace other metals for shipbuilding, water and gas pipe, cooking utensils, etc. Its specific gravity is 2.6. It is harder than lead or zinc and not quite as hard as iron. While its tensile strength is greater than iron and less than steel, it melts at 28.82 degrees Fah. Seliun contracts in melting.

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NOTES.

The building permits issued in Winnipeg up to the close of September numbered 1,127, their value being \$5,235,700. Last year up to the same date they numbered 888, of a value of \$2,213,100.

The Medical Health Officer and Public School Inspector of Toronto agree in recommending that baths be installed in certain of the public schools attended by children of the poorer class.

If according to the St. Louis Builder hotel projects now under way materialize, St. Louis will have hotels to burn after the World's Fair. Even now there is great danger of the supply of names becoming exhausted.

Rubber mats are coming to be a modern necessity in house and office furnishing. The Dunlop Tire Co. have introduced this season some splendid designs in these and in rubber matting. The best quality of strengthened rubber is used in these goods. The company have lately issued a new catalogue, which will be mailed for the asking.

At the annual convention of the International Association of Factory Inspectors held recently at Montreal, Mr. Geo. McLean, of Connecticut, read a paper on "Well-Lighted Work Rooms." Reference was made to the use of corrugated glass in buildings, which was considered injurious to those employed in such prem-

ises. In the discussion of the question it was stated that investigation had shown that headaches were frequent among workmen employed in factories where corrugated glass was used.

It is a curious irony of history, says the Toronto Globe, that there is no means of indisputably deciding in what building at Niagara the first Parliament of Upper Canada held its meetings. It does not settle the dispute to know that early official documents were sent out from "Navy Hall," which is still standing, for that was the Governor's residence. There is still some reason to believe that Parliament met in the old Indian Council House which stood on the Garrison Common until a few years ago.

A Nova Scotia correspondent of the Monetary Times writes: "There is one industry in Nova Scotia in which a greater advance might be made if the parties concerned only realized the value of co-operation. I refer to the free stone quarries in the north of the province. A comparatively small quantity of Nova Scotia building stone has so far been sent to Montreal and Toronto, notwithstanding the fact that stone of equal quality to that from Indiana can be laid down in Montreal at a cost of from two to three dollars per ton less. If our quarry owners would combine, and maintain a representative at western points, an immense business could be developed. As it is, local jealousy between quarry men hampers the development of a promising industry."

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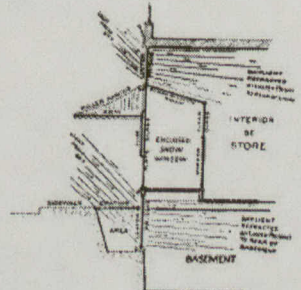


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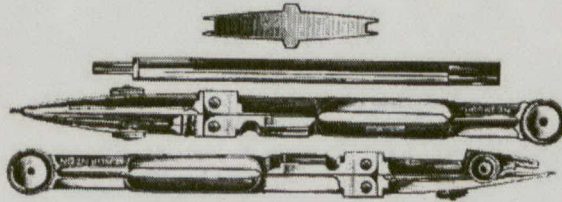
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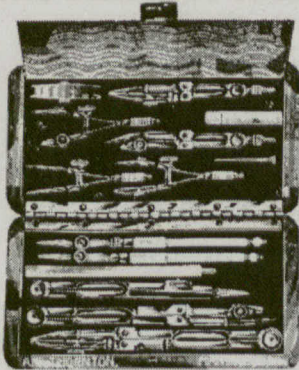
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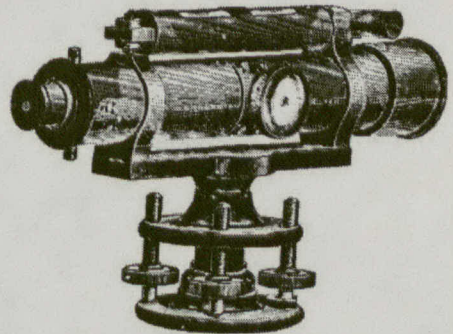
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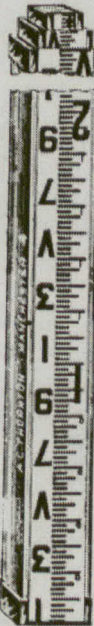
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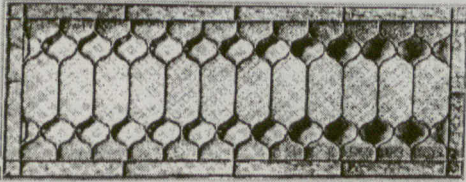
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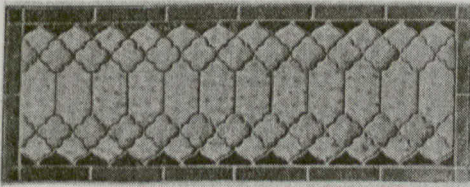
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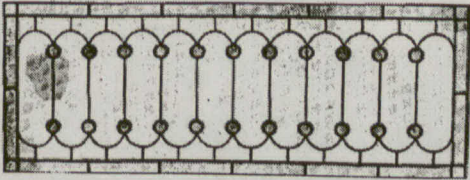
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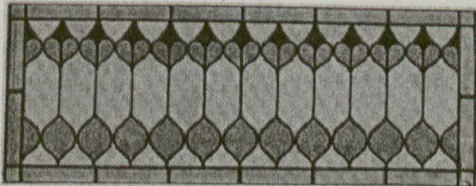
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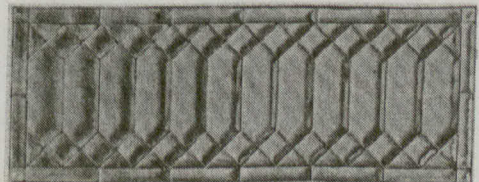
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