

**THE EVOLUTION OF THE
ENGLISH BUILDING REGULATIONS
1840 – 1914**

Volume II

THE EVOLUTION OF THE ENGLISH BUILDING
REGULATIONS 1840 - 1914

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Towards a National Building Act

The Public Health Act of 1875 marks the summit of the movement towards consolidation in public health legislation. With the consolidation successfully completed, (with the exception of London), it was inevitable that the same call for consolidation and uniformity should be heard from the area of building regulation, since it was so intimately bound up with the public health movement. We have noted the signs of the growth of this movement in the last chapter and we can now turn to consider its realisation, both in theory and in practice, in the years following the Public Health Act.

Until the appearance of the Model By-laws in 1877, it is clear that the basis of the idea of a national building act related to the principle of utilising the Metropolitan Building Act as a starting point, even though it was already twenty years old. After the appearance of the Model By-laws however - which were, though not so extensive in their range of controls, nevertheless more stringent in their technical requirements than the London Act - there is a marked change in emphasis, and the idea of using the Model By-laws as the basis of a national act becomes more dominant.

Let C.F. Hayward explain the view as it was seen in 1876:

"Surely", he said, "if a certain set of general rules were necessary in London..., surely the same rules might be applicable all over the country, subject to such slight modifications which might be provided for in by-laws, as local circumstances might render necessary" (1).

The theme was continued by the R.I.B.A. at their General Conference in June that year. J. Clarke of Liverpool and J. Honeyman from Glasgow both gave papers entitled 'General Building Regulations for the United Kingdom' and both took the Metropolitan Building Act as the basis for their proposals. Clarke suggested the removal of some of the older and less workable clauses in that Act and the addition of regulations for iron, concrete and timber (the latter, of course, still being operated in his home town), and the incorporation in one document of all the other miscellaneous acts relating to building (2) - a plea so often

made by architects but never pursued by the legislature. Honeyman's paper was more thorough, and although he based his proposals on the Metropolitan Building Act, he strongly advocated the removal of all 'sanitary regulations' from the new Act (it will be recalled that in fact the sanitary regulations in London were also, to a large extent, contained in the parallel Metropolis Local Management Act of 1855). Only regulations for public safety should be included, he maintained, and matters such as street widths, sewers, nuisances and overcrowding were "purely sanitary regulations", not affected by construction and should be covered by by-laws under the Public Health Act. He hoped that too much detail would be avoided and, in order to encourage invention within the building trade, he opposed the idea of too much 'paternal Government interference'. This, of course, was a characteristic Victorian principle, all reflected in Honeyman's own words: "Undue interference discourage invention, diminishes proper responsibility and self-reliance, and is in every way inimical to those principles of sound political economy to the recognition and application of which our country owes its pre-eminence among nations" (3).

Looking at the current state of building regulation in 1876, Honeyman made a clear and accurate assessment of the position. Every borough appeared to be making its own by-laws, often regardless of each other and sometimes of the old 1858 Form of By-laws. Where the regulations were made under special local acts, it was apparently invariable for the Corporation to reserve powers to make by-laws for themselves. In the minds of the civic rulers, Honeyman noted:

"a sort of unaccountable but distinctly pronounced jealousy of the outside public with a disinclination to be guided by, or even to listen to, any professional men, except their own officials". (4)

He was therefore still prepared to recommend the London Act as the best model, even though it was rather out of date, because the "highest professional talent" had been called in to help frame it - unlike the recent local by-laws". Honeyman saw no problem in framing a general act to cover the modifications needed for local variations (provided they were not too numerous or detailed):

"We need certain 'desiderata' not necessarily affected by locality, but which are necessary in the interest of the community and which must be made paramount to local prejudice or ignorance" (5).

In his proposals for a 'Boroughs Building Act' he would exclude therefore certain 'sanitary regulations', but bring back some of the constructional matters then currently residing in the Metropolis Local

Management Act - the draining of courts, habitable cellars, vaults under the road and hoardings and scaffoldings. He saw no need to exempt any buildings from the Act, and further suggested new regulations to cover buildings on 'formed ground', for iron pillars and girders (but not timber, surprisingly), for stone walls and to further increase the size of buildings which could be built without a fireproof division beyond the 216,000 cu.ft. limit.

In the discussion following Honeyman's paper, it became clear however, that not everyone favoured the idea of using the London Act as a basis. A Mr. Porter identified certain omissions which Honeyman had overlooked - certain sanitary regulations, the control of concrete foundations and the regulation of timber sizes. But T. Roger Smith wanted to keep London out of a national building act altogether, principally on the grounds of the value of the unique District Surveyors system. They were all practising architects and therefore more familiar with building than a mere paid official within a local authority. With a note of caution which history has since proved to have been justified, he added that if officials who were not in practice as well were allowed to carry out the Act, then architects "would find an amount of friction which would be unendurable" (6). Arthur Cates, who had just seen the first draft of the Model By-laws, was the only person to suggest the possibility that they might in fact become the basis of a new national set of regulations. But the main body of opinion at the conference still held to the idea of a national statute, and they unanimously carried the motion that "this meeting approves in principle that a general Building Act regulation applicable (within certain limits) throughout the kingdom is desirable". (7)

Even the R.I.B.A. Committee which was established to consider the proposed Model By-laws in 1876 tended to support the principles of the London system, although they did not follow Honeyman's lead in separating the sanitary from the constructional regulations. They reported: "It is essential that all building regulations, whether of a sanitary or practical nature, should be codified and ultimately comprised in a single document, having the same legal authority in the provinces as the Metropolitan Building Act has in London. All previous legislation, whether of a public or local character, and all the existing by-laws, would be repealed or would be superseded, and a definite and uniform system would be established throughout the country" (8).

The production of the Model By-laws in 1876 and 1877 is discussed in more detail in the following section, but even shortly after their publication in July 1877, there was still support for a national act. 'The Builder' noted for example in October:

"if the authorities of districts throughout the United Kingdom are permitted to make their own by-laws, with the confirmation and approval of the Local Government Board in London, one Imperial Act, embracing the general building regulations of Great Britain will surely suffice" (9).

Naturally it took a few months for the full significance and implications of the new by-laws to register, but from 1878 onwards it becomes clear that they were gaining the approval of the professionals (though not so much support from the local authorities - except notably Birmingham) because they were seen to be (within the limits imposed by the Public Health Act) to be comprehensive and well produced.

J. Douglas Mathews in March 1878 for example, gave some support and approval for the new by-laws at a meeting of the Architectural Association, and this was reinforced by the recognition of the increasingly important role of the Local Government Board as the effective central control:

"Although the system of centralisation is rapidly growing, often at the expense of local interests, a central authority has many advantages in obtaining information not possessed by smaller bodies, and the power to require compliance with its regulations throughout the country" (10)

These powers for compliance, being under the permissive framework of the Public Health Act, were however not so effective as Mathews intimated.

It was Mathews again who delivered the paper entitled "Model By-laws as a basis of a General Building Act" at the R.I.B.A. General Conference on June 6 1878 (11). This paper marks the confirmation of the swing away from the London Act as a basis, now that the Model By-laws could be seen by all to be more up-to-date and altogether a sounder base. Mathews was not perhaps the best advocate for the Model By-laws since, having spent many years as the District Surveyor for Stoke Newington, he was loathe to acknowledge the weaknesses in the London Act - "which for many years past has been found sufficient in practice", and he still supported, for example, the concept of the hermetically sealed drain and the use of the D-trap, both now prevented by the Model By-laws. Mathews, like a number of others in the architectural profession,

viewed the dominance of the medical profession in these matters of sanitary regulations with some alarm - "the medical profession have had a little too much their own way in framing these clauses". (12) But it will be recalled that the medical profession had acted more in concert, particularly under Dr. Liddle's leadership, than had the architects in the earlier years when these regulations were in an embryonic state. Mathews accepted however the need for controls on the use of timber, even though here he was right to point out that they would be difficult to formulate "as quality of materials would differ" (13). This was a problem underlying the timber regulations in Liverpool and there was at this time, of course, no nationally accepted standards to control the material. He also correctly pointed out that a general Building Act, based on the Model By-laws, should also include alterations to old buildings (an area omitted from the by-laws because of the limitations of the main Public Health Act under which they were made), though in his call for controls on party wall rights and dangerous structures he was again reflecting the London practice. The drainage regulations, which were already extensive even in the first Model By-laws, were considered by Mathews to be unsuitable for incorporation in a national building act - not for the reasons put forward by Honeyman, but because:

"Sanitary science can hardly be said to be so thoroughly understood that laws now made will of necessity be of the same value in twenty years time, and a building act should be so drafted to make constant amendment unnecessary" (14).

In part this was correct - the drainage regulations were to constantly change as new and improved techniques were developed, but it was also true that these changes were facilitated by the very fact that they were not in a rigid building act, and that the by-laws provided a better mechanism to accept changes since there was no need to refer back to Parliament for amendments.

The tension between local and central control was, as we have already noted in earlier chapters, a constant force underlying the scope and operation of the building regulations. Although Mathews had indicated in March his approval for central control, by June he appears to have reconsidered and modified his view:

"Although in some things centralisation may be good and advisable, yet if the power of conducting its own business is withdrawn from each town local interest and pride will in a great measure be lost" (15)

- and he quoted the example of the administration of the Poor Law, where central authority had superseded local, as an obvious example. But the move towards central control was a continuing force, as the increasing authority of the Model By-laws and the Local Government Board was to show, and this fact was difficult for Mathews and others of his generation to recognise.

When Mathews' paper was published in the R.I.B.A. Transactions, two other relevant papers were appended. One was from Honeyman, who was still pressing for the exclusion of all 'sanitary regulations' from a national building act; the other was from Boulton of Liverpool (16), whose commonsense and perspicacity in these matters we have already seen (see page 237).

Boulton returned to basic principles. Of course the regulations should control stability, fire risks, ventilation and drainage, but they should also be few in number and elastic to meet the needs of differing local conditions. They should also - and here was again a characteristic Victorian belief - "interfere as little as possible in all trading operations". But Boulton went further and challenged some of the then widely held views about the relationship between health and building. Sheer population density alone did not, he maintained, necessarily result in physical detriment - "as is hastily assumed". The mortality rate in model lodging houses, at 1500 persons (sic) per acre, was in fact less in areas of small houses at 250 persons per acre. Furthermore, the health of the community was more dependent on food, clothing and personal habits than on the arrangement and construction of dwellings. Both these observations contained much that was novel and relevant for the time. His enthusiasm for back-to-back housing is not so easy to uphold however. Again, he stated the mortality rate was low - but on what precise statistical basis he did not make clear - and he therefore had the temerity to question whether an open space on both sides of a dwelling were necessarily essential. "The advantage of open spaces around buildings appears to be over-estimated and misunderstood" - and he certainly had a substantial quantity of such back-to-back houses in Northern England from which to judge. 'Through houses' produced draughts, and indeed it was rare, Boulton claimed, to find all the windows open at once. (The fact that there was also a seepage rate even through closed

windows and a house had chimneys as ventilators, was not however mentioned).

Turning to drainage, Boult rightly stressed the importance of a well constructed water trap (a long standing requirement in Liverpool) and the need for proper ventilation for the drainage system. Furthermore, he correctly emphasised the need for uninterrupted drainage runs without a multiplicity of traps and intervening cesspools, because of an over anxiety to prevent the admission of sewer gas into a dwelling. Finally, he recommended the extension of the London District Surveyor system throughout the country, and made the practical suggestion that in rural areas, where it would be difficult to justify a separate Surveyor for each small authority, the authorities should combine and appoint an architect as the Surveyor for a group of authorities.

In spite of these calls for a national building act, no definite proposals for such a measure came from the Government, and it became clear that no national statute would be forthcoming. This was because the emphasis was in favour of a system of local by-laws - to acknowledge the fact of local politics and administration - yet controlled as far as possible by central authority in the form of the Local Government Board. Further, statute law was, as we have seen, a very rigid legislative device, and it was becoming clear that it was not the best device to handle the complex matter of building regulation - even the London Building Act had already spawned a number of by-laws itself. A good deal of expertise had gone into the Model By-laws and they were more extensive than any previous controls (within the limits set by the Public Health Act) - the time and cost which would have been involved in translating them into statute law would not have been desirable. With the machinery for the approval of local by-laws set in the Local Government Board's hands, they could be both unified and flexible enough to meet any local variations. The Model By-laws themselves therefore became, in a sense, the national building regulations.

Ideas of promoting a national building act gradually subsided, and interest turned to focus and concentrate on the content and operation

of the Model By-laws. The desire for uniformity throughout the country was still maintained however, and the theme was to be taken up again by Boulton in 1882. Before moving to that point however, we must now consider the production and the contents of the Model By-laws themselves.

Introduction of the Model By-laws 1876-7

Although the 1875 Public Health Act had, under Section 157, extended the range of subjects for which building by-laws could be made, the idea of producing a set of Model By-laws was not immediately taken up by the Local Government Board. Indeed, during the year that the Act was passed, they proceeded to confirm some 69 series of local by-laws which were based essentially on the Form of By-laws of 1858 (17), but in September they decided to write to all the urban sanitary authorities to explain the consequences of the new Act (18). There were a number of sections which touched on building, section 155 and 156 for example, which provided for the first time that if only the front, rather than the whole building, was taken down, then the authority could prescribe a new building line - with financial penalties for infringement. This is a matter to which we shall return later in this chapter (see page 300). Section 157 was the principal section controlling by-laws, and here the principal innovation was power to control chimney construction - though not hearths (see page 275).

The original move for a new set of Model By-laws appears to have come from the local authorities themselves - at least that was the official view put forward by the Local Government Board (20), with no doubt some awareness of the sensitive attitude of local authorities to any sign of central government domination. Yet it was also a deeper reflection of the general move towards consolidation which had characterised the Public Health Act itself and, as we have seen in our discussion of the moves towards a national building act, the topic of consolidation and uniformity was in the forefront of discussion in professional circles at the time. In the discussion following

T. Roger Smith's lengthy lecture on the Metropolitan Building Act at the Architectural Association in March 1876, it was P. Gordon Smith, the architect to the Local Government Board, who gave the first hint of the new by-laws when he said "an effort was now being made to bring them [i.e. the building by-laws] as much as possible into uniformity under the Public Health Act of 1874" [sic] (21).

The R.I.B.A. had, as we have seen, included the topic of the General Building Act in its General Conference in June 1876. In the Spring, whilst the preparations for this conference were under way, a particularly controversial matter arose which was to lead the R.I.B.A. into the heart of the production of the new Model By-laws. This was the matter of certain local authorities requiring architects to submit elevations, as well as plans and sections, for approval. This touched the sensitive nerve ends of the architects, implying interference in their privileged area of aesthetics as well as matters of copyright, and the R.I.B.A. Council reacted strongly. They sought the first hand experience of members throughout the country, wrote to the Local Government Board in protest, and sent a memorandum to the Home Secretary in April 1876, complaining bitterly about the matter (22). John Whichcord, as Chairman of the General Conference, referred to this correspondence with the Local Government Board, correspondence which had revealed that the Board had a new series of Model By-laws under consideration. A copy had just been sent to the R.I.B.A. and Sclater-Booth, President of the Board, had invited suggestions and criticisms from the General Conference. The Council in turn passed a resolution calling on the R.I.B.A. Council to appoint a committee to consider this matter, which the Council duly accepted and also offered its services to the Local Government Board (23).

The draft of the new model was therefore in the hands of the R.I.B.A. by the time of the General Conference, and Arthur Cates made a point of referring to them in one of the discussions. Although he obviously had not had much time to study them thoroughly, he generally welcomed them since they were a positive move towards the desired goal of uniformity. But two points concerned him - one that the by-laws should be consistent within the terms of the Act, and the other that they were perhaps too strictly limited by the framework of

Section 157 of the Act. He correctly foresaw that this limitation might well preclude the possibility of the scope of the by-laws being extended to further key areas in building and he advised the R.I.B.A. to bear that point in mind when they came to study the proposals (24).

The Committee which the R.I.B.A. established to study the by-laws and to advise the Local Government Board (25) immediately contacted all the local societies to obtain first hand accounts of the current local by-laws. They then analysed their findings and made the following suggestions. They regretted the limitations imposed by Section 157 of the Public Health Act (confirming the point raised by Cates), but in general approved the Model By-laws and stressed their support for the need for the universal application of the new code. They further emphasised the need - so familiar even today - for all the relevant legislation (the Towns Improvement Clauses Act, the Public Health Act and the Chimney Sweepers Act) to be brought together in one document. In more detail, they sought controls on hearths (but these were not to come, as we shall see, until 1890, since hearths could not be interpreted as being part of the wall structure under section 157), and also controls on timber scantling sizes. Dangerous structures, the rights of owners of party walls, controls for existing buildings and the idea of the payment of fees for administration of the by-laws by local authorities, were all raised - but again these were all based on the London Building Acts and were outside the scope of the Public Health Act (26). A number of relatively minor technical points were incorporated - all, as Charles Barry noted with satisfaction "without vexatiously hampering the action of professional men" (27).

The Local Government Board had hoped to have the Model By-laws ready by the end of 1876, but it had encountered what it called "some important questions" (not least those raised by the R.I.B.A.) and these had, as they said, "compelled us to proceed with exceptional care and deliberation" (28). Meanwhile the Board continued to receive building by-laws for approval from local authorities, and a further 65 sets were duly approved in 1876 - but without, of course, the benefit of the model set as a guide. It was not until July 1877 that the Model By-laws in their final form, were ready and issued to the urban authorities. Acknowledging the great help received from the

R.I.B.A., the Local Government Board pointed out in its Annual Report for 1877-8 that it had taken great care in their formulation, so that they should "invite confidence", have "strict conformity to legal principles", be "suitable for general operation" and further that "it was of manifest importance that in this [sanitary] respect the regulations of the code should be distinctly practical, and that the local authorities should be induced to look upon the model clauses as indicating approved methods" (29). This explains the elaboration of the detailed functional character of the sanitary clauses and also confirms the strong educative function, which turned the by-laws into something nearer a technical handbook rather than mere guidelines to basic principles of performance.

The Model By-laws were therefore the product of considerable care and attention to both the sanitary requirements and the technical capabilities of the building trade. They reflected the lowest common denominator of building construction in the latter half of the nineteenth century, and whilst being detailed and incorporating certain improvements, were not over-stringent - though at the time they were seen by many provincial towns as being over-oppressive (30).

What was new and what was generally welcomed was the apparent acknowledgement from all the sides involved that it was valuable and important to maintain a free technical discussion of the contents of the by-laws, and that this was now accepted as a two way process between the public and the legislature:

"Neither the Government nor the people direct public opinion or make by-laws. It is discussion, action and reaction between the two which brings about stable progress". (31)

This change of attitude marks the tone of the new period of building regulation. The technical aspects could no longer be handled by the legislature by itself - the complexities of building were demanding more specialised knowledge - and the value of open discussion was recognised and accepted.

The Model By-laws of 1877

This section analyses the contents of the Model By-laws, identifying

the main innovations and changes from earlier standards, and it discusses the reaction to them in their earliest years. The analysis follows the sequence of streets (32), structure, space for ventilation and drainage, and should be read in conjunction with Table 8.

Streets (Table 8, sheet 1)

The 1858 Form of By-laws was the source for the dimensions for streets widths, but a change of definition was made. A carriage road - 36'0" overall - was a street over 100'0" long, and a non carriage road - 24'0" wide - was a street less than 100'0" long and was used as a secondary means of access to a building. The widths of the actual road and footpaths were new regulations. The width of the roadway at 24'0" was apparently designed to enable three vehicles to pass side by side (33). The most elaborate and detailed set of controls were set for drainage falls and the height of kerbs above the road channels - all corresponding to the London clauses, but of a slightly lower standard. (e.g. clause 7 set dimensions of 3" min and 7" max for the height of the footpath above the channel, whilst the Metropolitan by-laws had 4" and 8" respectively). No provision was made for street sewerage in the Model By-laws, although the Public Health Act had allowed by-laws to be made for this purpose. The Local Government Board explained that such controls depended to such a great extent on the varying circumstances of the localities that such a model set would be of little use (34). The requirement for streets to have only one end open perpetuated the cul-de-sac, whilst London again maintained the more stringent requirement for a street to have two fully open entrances.

Even at the time, there seems to have been no known reason for the various discrepancies in the variety of street widths, both between London and the Model By-laws and between the Model By-laws and the provincial towns, other than the firmly held traditional standards of the various parts of the country (35). Two points of interest were raised in criticisms at the time - one was that there was no control over mews, where people could still live over stables without restriction, and secondly, that there was no control over the actual direction of streets (36). This latter point anticipated a more sensible

planning control - relating streets to slopes, to each other and indeed to the sun. This would have been a significant elaboration of clause 3, but implications at the time would have been profound. The interference with 'natural' rights of freedom for the individual and with the density conscious estate developer would not have been accepted, not least of all in political circles.

Structure (Table 8, sheet 1.)

Under the new by-laws for foundations, the builder now had to clear the site of all unsuitable material and he had also to lay down a layer of asphalt or a 6" bed of concrete. The asphalt layer was, as 'The Builder' noted, open to evasion, since it would prove to be of little use if it was not itself laid on a solid bed (37). Concern was also expressed at the cost of a 6" slab (38), 4" being considered adequate by many (39), but the 6" thickness was to remain as the standard.

The formula for the size of footings was recast (see Table 8, sheet 14.) but the model clause did not say that the footing had to be of the same material as the wall, as in London, nor was there any clear indication in clause 16 of the size of the concrete foundation under the footings.

An attempt by the Model By-laws to control the specification of cements and mortars in clause 11 was hailed as an improvement (40). But otherwise the controls on materials were not severe. Stone was still allowed for templates, blocks and slabs - "on which still more treacherous iron is to be laid" - and no controls were given for the quality of the stone (41). No real attempt was made to resolve the difficult question of fireproof construction. As 'The Builder' noted "No structure is fireproof, or even fireresisting, which depends for support upon ordinary stone or naked iron". Concrete was the material preferred by 'The Builder' for fireproof work - "the framers of the Building Acts and Model By-laws should really make a note of things generally known" (42). The word 'incombustible' replaced the word 'fireproof' of the earlier acts - Captain Shaw would no doubt, have preferred 'fire resisting'. Fire-stopping within floors, between

joists and partitions, was introduced in an effort to prevent the rapid spread of flame within these voids - but some critics felt that this was an impediment to proper ventilation and would lead to the formation of dry-rot between the voids in the floor (43). 'The Builder', however, supported the idea, suggesting that it be extended to ensure solid floors and partitions. This had the backing of Captain Shaw, and the journal also referred to a statement made in 1793 by the 'Associated Architects' to give strength to their cause "the great principle of prevention is to stop the progress and circulation of the air in all parts of the building concealed from the eye" (44). Yet the hollow timber floor, and partition, remains with us today.

Concrete, although not specifically mentioned, could now be used for walls, provided the walls were made the same thickness as brick walls. This was an advance over the London legislation, but concrete could still be made with lime, rather than with cement, thereby producing a stronger composition (45).

Wood was not explicitly forbidden in walls in the Model By-laws, as it was in the Metropolitan Building Act, although clause 31 in the model set did state that no timber, other than bressummers or joists, could be built into a party wall. This particular clause provided a good example of the perverse and ignorant attitude of the local councillors of the time. The term 'any plate, block, brick or plug of wood' caused Councillor Bussell of Kingston upon Thames in 1878 to ask "how could a man put up a wall without a brick?" to which the Mayor patiently answered that it was meant to refer to a 'brick of wood'. "Any builder would have known that, but it could prove ambiguous to the legal mind" (46).

The thickness of walls was based on the schedule in the Metropolitan Building Act of 1855 and, as a comparison of Table 8 sheet || and Table 6 sheet 8 reveals, there is a close resemblance in a number of areas, but the Model By-laws were an improvement since they gave a finer selection with more categories, and were therefore more flexible in the range of dimensions offered. In general the Model By-laws moved more in the direction of greater solidity than did their London

counterpart (47). This variation was queried by a number of critics - was the London act really so far astray, they asked? (48) In the Model By-laws a two storey wall could be 9" thick, but in London a 9" wall could rise to 25'0", thereby allowing a three storey building - more generous again than the new by-laws (49).

Again, in the model, cross walls now had to be taken up to the top of the topmost storey, whereas in London they were considered acceptable at two thirds the height of the building, although this was to alter in 1894 to be nearer the model by-law regulation. This need to rise to the top of the topmost storey was considered to be unnecessarily severe - as J.D.Mathews pointed out, its structural effectiveness really ceased above the level of the wall plate in the external wall (50).

There were two anomalies in the wall thickness regulations in the Model By-laws. One was the fact that although the schedule went up to a height of 100'0", there was nothing to prevent higher walls being built. This was also the case in London. Mr. Hankey, for example, was currently taking his flats in Queen Anne's Gate up to over 140'0" (51). The other anomaly was the inconsistent terminology for brick sizes. The Model By-laws referred to 9", 13½" and 18" (as multiples of 4½"), whilst London had 8½", 13" and 26" (rather than 22½" and 27"), there being no apparent reason for this discrepancy (52).

Party walls continued to take the same wall thickness as the corresponding external wall, following the precedent of the Metropolitan Building Act of 1855. Nevertheless, it was possible for the thickness to be reduced in flues in party walls - a curious variation, since it was a point of danger where a greater thickness would seem to have been more logical (53). In France, no flues were permitted in the party wall, which had to be 18" thick throughout its height. But as 'The Builder' noted, the English party wall was longer as a result of our narrower fronted taller houses, and a thicker wall would be "unnecessarily extravagant". This was considered to be reasonable in this country so long as English houses continued to be built on the 'vertical plan', but if the 'horizontal system be imminent' (i.e. flats), then the Parisian formula might be more appropriate, maintaining a certain thickness of solid material between each block.(54) The

possibility of flats on the 'horizontal system' received no acknowledgement from the framers of the Model By-laws, and the London Act had handled the matter in what 'The Builder' called "a magnificently contemptuous fashion". New flats were already under construction, in Parliament Street "on the Parisian model" - but still with timber floors. "In none of the great cities of Europe are floor joists and boards, such as are daily constructed in London, to be found" (55).

The party wall was more accurately defined in the Model By-laws than in the London Act, but the model made no reference to party structures - i.e. horizontal party arches and floors - as did London, and this "just when the notion of horizontality of arrangement in houses is getting so much talked of" (56). One regulation which was included however, and which was not in the London Act, was that which prevented openings being formed in party walls where one building was carried up higher than its neighbour (57).

The damp proof course was now accepted and included, unlike the London Act (58). Its belated appearance was welcomed, but there were reservations. 'The Builder' could not see how it would protect the horizontal face of a stone plinth and also pointed out that the weight of a stone building would probably squeeze out an asphalt damp proof course. 'The Builder's' alternative solution was based on a French precedent and included two courses of brick laid in bitumen and gravel (59). The height of the damp proof course at 6" was considered by one writer to be too low (60) - and one may recall the earlier proposals where 12" had been suggested (see page 192). A more critical problem was that of incorporating a damp proof course in the basement or cellar wall, and again there was the familiar complaint of the interference with the shopkeeping trade, if the introduction of a high damp proof course was to mean a flight of steps up to a shop front door (61). The problem of the basement could be solved, of course, by the use of an external open "area" adjacent to the wall (62), but the idea of a cavity construction or a vertical damp proof course in this situation was not to be made until later (see page 291). The problem of the shop floor level and steps was also later resolved, to a certain degree, by a form of miniature open area immediately under the threshold (see page 291).

The problem of projections, once so complicated in the London Acts, now turned on the briefest of descriptions in clause 13. It was decidedly vague, and the precise definition of an 'architectural decoration' was unfortunately absent. Was a corbelled-out bay window an architectural decoration or not? (63) The regulation of openings in external walls, in clause 23, was very close to that of London, but the builder was allowed a little more discretion in the model code. No reference was made for example, to a minimum proportion of supporting pier between the openings in each storey.

Since a timber building, if only 10'0" away from another building, could be exempt from the by-laws altogether, the requirement for a building to have parapet walls when it was within 15'0" of another, was clearly necessary (64), but the actual effectiveness of the parapet in preventing fire spread was again questioned, and it was felt that a fireproof eaves would suffice equally well - and not be so susceptible to damp penetration (65). The parapet took a long time to die - the 3'0" parapet for warehouses was still accepted (66), but its use in domestic work was lessening. In the very year of the Model By-laws, 1877, Slough had altered its by-laws, since the parapet had proved to be a constant source of damp penetration, except with the use of lead - "an excessively expensive material for small house work", it was stated. In the building boom of the period, of which Slough was eager to take its share, the worthy Council quickly bent before this pressure and altered the old by-law to allow the party wall to come up to the underside of the slates. "A questionable amendment" wrote Godwin in 'The Builder', but then he was only reflecting the long standing London tradition (67). To others, such as the younger District Surveyor, Thomas Blashill, (later to become the first architect of the L.C.C.), parapets, either on external or party walls, were a constant problem and were not to be encouraged (68). Within five years, the Model By-laws had been amended accordingly (Table 9 sheet 3).

Finally, chimneys - their control under the by-laws was now introduced for the first time, and their regulations were taken largely intact from the 1855 Metropolitan Building Act. Two additional rules were clauses 38 and 44. The former introduced a greater thickness of

brickwork to surround commercial flues than in the London Act, and the latter introduced the use of iron bars to support arched flues (such as those which sprang from a small outbuilding at the rear of a house to join the main stack or back wall of the house itself). This was considered, even when it was first proposed, to be "a remnant of an old building heresy which should be allowed to die out - an arch should be independent of this kind of perishable support" (69). The Model By-laws also now allowed chimneys to corbel out at any floor, instead of only above the ground floor as in London. Some parts of the chimney regulations in the Metropolitan Building Act were not transposed to the Model By-laws since certain matters - flue sizes, for example, were retained in the still valid, though in practice largely defunct, Chimney Sweepers Act of 1840.

Space about Buildings and Ventilation (Table 8, sheet 7).

Although the Model By-laws regulated the distance across the 150 sq.ft. minimum rear yard in relation to the height of a house, there was still no effective way of ensuring that this space, small as it was, would not be built over at a later date. It was apparently common practice to buy up adjacent properties, on an island site, and to rebuild a part of them to a higher level, under the guise of an addition to an old building - thereby avoiding the regulations and gradually reducing the remaining amount of open space. 'The Builder' vividly described this process as it was then happening in the area of the Strand and Piccadilly in 1877, and it was seen that the Model By-laws would not prevent this happening elsewhere (70). It was also seen however, that this rule did prevent a person from completely rebuilding his property to a greater height, if the former yard area was already at the minimum and incapable of further enlargement (71).

The Model By-laws introduced the regulation requiring a clear space in the front of a dwelling of 24'0" width - in London, it was still possible to have houses, in certain conditions, facing each other only 20'0" apart. At long last, the model clauses 55 and 57 required a window in a habitable room to open onto the open space and external air - again an advance over the London Act. Clause 53 meant that in a street say 15'0" wide, an owner rebuilding a house had to set it back

to give the required width of 24'0", and he was not allowed any financial compensation for this "sacrifice". The Metropolis Local Management Act of 1862, section 74, had however allowed compensation in a similar case, and in order to avoid the zig-zag effect that this rule might have had on the line of properties, the 1878 amendment Bill to the Metropolitan Act was to propose that the distance be measured from the centre of the road, rather than the opposite face of the buildings.

It was generally agreed that the clause 56 requiring a ventilation space under the ground floor was necessary to prevent rot, but to some the necessity seemed to be over-elaborate - "but what other good does it do?" (72) One critic felt that 6", rather than 3" clear would have been better, since rubbish tended to accumulate in the space (73), but to another, the whole idea of this space was abhorrent - it would be occupied by rats and filth - and he preferred a solid floor, which he considered would be cheaper anyway, even if it was covered with a wood block finish (74).

Drainage (Table 8, sheet 8).

Some fear was expressed over clause 62, where the drain beneath a building was required to be cast in concrete. "What if a blockage occurred? it was asked (75). It was also likely to be expensive and at least one critic maintained that clay would be just as good a protection (76). The same critic was concerned at the by-law requiring a w.c. to have a window to an external wall, since it prohibited the alternative of using a roof ventilator. The detailed specifications for the sanitary equipment would, of course, now eliminate the sordid hopper and pan closet as well as the dangerous D-trap, but again there was resistance to these improvements (77).

The most important change was the move away from the principle of the hermetically sealed drain and cesspool to the concept of proper through ventilation. Norman Shaw had used such a system with open rather than closed soil pipes for Cheyne House for Mr. Mathey on the Chelsea Embankment (78), as well as at his own house at No 6, Ellerdale Road, Hampstead in 1875 (79). T. Rogers Field had also experimented with the device of the disconnecting soil pipe in his own work since 1875. This

device had, he claimed, been used by the Uppingham Rural Sanitary Authority in 1876 and had been one of the first to be officially approved, since when it "was now established in the Model By-laws" (80). The range and nature of all these experiments confirms the fact that there was still a great deal of uncertainty surrounding the precise effectiveness of these devices. There were many patent versions being eagerly promoted by all sorts of 'sanitary specialists', and the profusion of these clauses in the Model By-laws reflects the keen attention and concern which the subject of proper drainage was generating at the time.

The Course of the Model By-laws 1878 - 1882

In general the Model By-laws were well received by the professional bodies concerned with building. Under the title "Common weal v. Bricks and Mortar", R.E.Pownall analysed the new by-laws at a meeting of the Civil and Mechanical Engineers' Society in March 1878. He reflected the favourable view, and particularly supported the fact^{that}/the Local Government Board had at last accepted that the State should provide, what was in effect, an outline specification for building standards. His main regret was that there was to be no special expert tribunal to resolve controversial issues, since this was to be left in the hands of the local magistrates. 'The Builder' also welcomed the new by-laws, but added a note of caution which was not ill-founded:-

"Looking at them [the Model By-laws] as the future course of building legislation we should say that they err a little on the side of being too minute, unless frequent new editions are contemplated" (81).

The most extreme view came from the older guard. Ellice Clarke, Surveyor for Brighton and Hove, was surprised to hear that the R.I.B.A. had approved any of them, because he found them "absurd and impossible to carry out" (82). He could see no good reason for banning wood in party walls for example, and grudgingly acknowledged that the new rules might just be feasible in South-East England - but not in Hanley in Staffordshire, where $4\frac{1}{2}$ " thick walls were the tradition. But he touched on one still valid point when he stressed that the main need was for the public to be properly educated in these matters, and as we see later in this chapter, there was still a wide gap between the standards of

the professions and the day-to-day practice of the local speculative builder.

The main shortcomings in the contents of the model by-laws were summarized by J.D.Mathews in his paper "The Model By-laws as a basis of a General Building Act" delivered to the R.I.B.A. General Conference in 1878 (83)

These were:-

1. they did not apply to alterations to old buildings,
2. there was no mention of hearths,
3. no controls were given for timber scantlings, or for iron construction,
4. the open back yard prevented the use of the entire ground floor for a shop,
5. there were no controls on public buildings (such as those controls which governed corridors and stairs in public buildings in London), except for the walls to be as for warehouse walls, and a need for adequate ventilation to be provided,
6. there were no provisions for determining the rights of the respective owners of party walls, as there were in London, and
7. the drainage clauses were too elaborate - The medical profession again came under attack - "they have had a little too much their own way in framing the drainage clauses".

To these points of Mathews we might add the following as further important omissions:-

1. these rules were designed basically (as the Public Health specified) for urban areas only - and this was to cause problems later when the same Model By-laws came to be adopted in rural areas (see Chapter IX),
2. there were no rules governing the relationship of hot water or steam pipes to woodwork - such a controversial matter in London in earlier days, but one which was undergoing considerable re-assessment, and which had only a few more years to run, in its more stringent form, in London,
3. the definitions of 'street' and 'building' were vague, if not virtually non-existent,
4. there was nothing regarding the underpinning of walls, cavity walls, the area of rooms or the height of rooms,
5. there were no controls on plastering, which at the time was often notoriously bad (84), the plaster being largely held in place by

horsehair and applied on such thickness to cover an uneven ceiling that it frequently fell under its own weight.

Finally, as Ellice Clarke shrewdly noted in 1881, it was in fact possible under the by-laws to build a house without any floors, without any doors or windows, of any height of room and without any plumbing (85). As with all these building regulations, great play was made of what should not be done - but there were no fundamental and positive controls to ensure that the basic requirements, even though generally understood, were incorporated as well.

How then did these early by-laws, based on the model, work in practice? A short selection of cases may serve to illuminate the picture as it appeared in the first six years of their operation. Whilst some towns which benefited from a more inspired local leadership, such as that given by Chamberlain in Birmingham, proceeded to produce new by-laws based closely on the new model code, many other areas were much slower off the mark. Some areas, of course, still had no by-laws at all. The medical department of the Local Government Board revealed examples in a report presented in 1881. One builder carried the first-floor joists in his cottages into and under the hearth. His defence was simply that "it was unlikely anyone would light a fire in an upper room" (86). Even if there had been by-laws in operation in that particular case, it was still true that the matter of hearths could not have been included in them, as we have just noted.

In suburban parishes around London, which were some of the most rapidly expanding areas of new housing, by-laws were introduced which were based in part on the model of the Metropolitan Building Act and in part on the Model By-laws (87), frequently producing a hybrid set of regulations as a result. In many areas, even where the spirit was willing, the sheer practicalities of implementation proved insurmountable. In the rapidly expanding suburb of West Ham, the Surveyor, Lewis Angell, told a meeting of the Association of Municipal Sanitary Engineers and Surveyors in 1881 that he would gladly have urged the adoption of the Model By-laws, but he felt there was no chance of them being observed over the seven and a quarter square miles of his district with the limited staff at his disposal (88). There was also ample room for corruption. In a case at Hove, three houses in Sackville Road had mortar made from gravel, loam and lime. The witness

for the defence turned out to be also a member of the prosecuting local authority, a member of the very committee which had instigated the proceedings (89). Little wonder that the local surveyor - who was none other than Ellice Clarke - took such a jaundiced view of the whole business of the by-laws. But 'The Builder' reassured its readers, in Hove at least, about the quality of the building, if not the corrupt practices of its councillors. "It must not be thought that Hove is very bad - there are some small houses there superior to many being built around London and in many provincial towns where the by-laws are utterly disregarded" (90). This was the reality of the whole situation in practice. By-laws existed, and they were not unreasonable in themselves, but the gap between what existed on paper and what was actually implemented on site was very wide. There was a building boom - Tottenham was approving five thousand house plans alone in 1882 (91), but the effective control was minimal. In nearby Leyton, houses were occupied, but not connected to a main sewer (92), and in Bedford Road, Finchley, houses were occupied which had no drains or traps, no vent pipes, no vents for cesspools, no ventilation under the floors, no concrete surrounding the drains under the houses and many more similar deficiencies. The defence of the local builder was that "he did not understand the by-laws", and his fine - merely one shilling for each part of the summons was not a particularly severe deterrent. (93) Mr. Jukes, builder of houses in Tewkesbury Road (off Seven Sisters Road), failed to provide solid foundations. "It will simply ruin me if I have to pull down these houses, as they are built up to the bedroom windows", he pleaded. The magistrate replied "You talk about ruining yourself if you have to pull the houses down, but what about ruining the purchaser?" Back came Jukes' retort "When a man buys a house he is supposed to do so with his eyes open, and if he is ruined that is his business" (94). With these examples it is clear just how wide the gap was between theory and practice, how ineffective the permissive controls, and how lax the administrative local machinery really was. There was ignorance of these matters on the part of the local builders and the general public alike. 'The Times', reviewing the work of the Local Government Board in 1881, noted that it reflected "more solid work than many a new Constitutional European Treaty" and it had been able to circulate Model By-laws "which have been very generally, even if sometimes only partially adopted but its one chief difficulty is the want of co-operation

and of a public opinion strong enough to overbear interested opposition" (95).

The Course of the Model By-laws Between 1882 and 1884

At a point some five years after the introduction of the Model By-laws it becomes possible to see more clearly the shortcomings of the regulations. By 1882, nearly a thousand urban authorities and some 600 rural authorities (under the powers of section 276 of the 1875 Public Health Act) had had their local building by-laws approved. In February that year Joseph Boult re-appeared on the scene at the R.I.B.A. and re-opened the subject with his lecture "Uniformity in Building and Sanitary Regulations" (96). This was followed the next year by H.D.Appleton's analysis of the changes taking place in the Model By-laws with his lecture to the Architectural Association (97) and with H.C.Burdett's lecture on the "Dwellings of the Middle Classes" to the Sanitary Congress in Glasgow (98). The changes that were made were included in Charles Knight's first edition of his invaluable guide - the Annotated Model By-laws, in 1883, and these changes are summarised on Table 9 (99).

In his lecture to the R.I.B.A., Boult drew comparisons between the Model By-laws, the London regulations and his own local regulations in Liverpool - which still maintained its own local act and which indeed, in the same year, 1882, was in the process of securing a new Building and Improvement Act (100). This measure, whilst following the general pattern of the earlier Liverpool Building Act, also introduced certain alterations which were derived from the Model By-laws. Boult's lecture is therefore of interest for three reasons - first, its theme maintained the trend towards uniformity in building regulation; secondly, it highlighted the more controversial areas within the regulations; and thirdly, it drew comparisons between the Model By-laws and the current legislation in London and Liverpool.

In general Boult found that the Model By-laws "result from a compromise between conflicting advisers : thus only can their inconsistencies and discrepancies be explained" (101). This was due, he surmised, to the lack of a systematic collection of facts, a lack of practical knowledge and above all, "the interference of the medical men". It

was time, he said, for the architects and engineers to return to the lead in sanitary science (102).

As an example of the inconsistencies, Boulton quoted the case of the ventilation regulations. Model By-law 58 called for one hundred square inches of ventilation in a room without a chimney - yet a chimney itself was quite commonly, even with a flue lining, 95 sq.ins., and the area of the chimney pot was rarely much over 50 sq.in.(At the same time it was still possible to follow the 126 sq.in., i.e. 9" x 14" of the flue size laid down in the Chimney Sweepers Act of 1840). Besides these variations, when one looked at the following by-law, No. 59, calling for adequate ventilation in public buildings, the requirements were vague, the terminology different and the style of language confused.

He could see no reason for this - although we have now seen with hindsight the differing root sources of these two regulations. To Boulton however, this all reflected 'a lack of systematic enquiry' and the inclusion of "foregone conclusions which experience had shown to be fallacious". How was it, he asked, that in Liverpool the w.c. was compulsory and the privy banned, yet in Manchester the w.c. was generally discouraged and the privy virtually universal? In answer to Boulton's call for a systematic enquiry there were indications of a more scientific approach being made to these matters. E.C. Robins, for example, in the discussion following Boulton's paper, described a visit he had made to a Dr. Pettenkofer's Hygienic Institute in Munich, where one Dr. Renk was working on the study of the passage of air and moisture through various building materials and elements, and on the study of 'ground air' in basements (103).

An example which brings out the three aspects described in the second paragraph of this section, was the case of the damp proof course. Where, queried Boulton, was the uniformity between the Model By-laws requirement for the damp proof course to be 6" above ground level, the London requirement (under the amending act of 1878) for it to be 12" above ground in external walls and 6" below the floor level in party and external walls, and the Liverpool requirement for it to be only 4" above ground level in every wall - although there it could be dispensed with altogether if there was a vertical cavity in the wall.

Furthermore all these regulations showed little familiarity with practical building. The London regulation did not require the damp proof course to be at the same level throughout, or to link it together, so the result would be a lateral spread of damp by capillary action, and the Model By-laws, being "admirably obscure", referred to "such a wall", and this phrase could be taken to mean each distinct length of wall so that, once again, if the front and back of the building were at different levels, a discontinuous damp proof course would result. The problem of taking the damp proof course around the front step to a shop was again raised, but now P. Gordon Smith, the Local Government Board architect, described a solution involving a small open area beneath the threshold, and this devious device was to be included in the revisions to the Model By-laws and duly appears in Knight's Annotated Model By-laws in 1883 (see Table 9, sheet 2).(104). The architect Ewan Christian took this matter further and described his own method of providing a damp proof course to a basement wall.(105) This involved two damp proof courses, one at the top and the other at the base of the wall - "to shut off the damp which may be supposed to run laterally from the ends". "The great point", he rightly stressed, "is the connection between the two" and for this he formed a 2" hollow cavity, which he had filled with asphalte. This technique had been used successfully by Christian for the Ecclesiastical Commission offices next to Scotland Yard. He maintained that there were no problems of bonding the two leaves of the wall together, since the asphalte had "such extraordinary tenacity for brick" that it became a solid body. This device was also included by Knight in 1883 (see Table 9, sheet 2), but the cavity was shown empty - since it had been determined legally that a vertical damp proof course did not form part of the structure, and therefore lay outside the enabling powers for by-laws contained in section 157 of the Public Health Act of 1875.

Boult's detailed analysis of the by-laws went on to discuss two more contentious issues - wall thicknesses and drainage.

The wall thickness rules were now seen to be far too complicated. Even though they were based on the London precedent, and the same rules were applied to both external and party walls, they were now questioned by Boult. Why should they be the same thickness? External

walls were weakened by the insertion of window openings, were exposed to the weather and were not usually tied back to the rest of the structure by the floor timbers. Yet the party walls were strengthened by the floor timbers and by the chimney breasts, and Boulton could therefore see no good reason why the party walls could not be thinner than the external walls. He suggested a reduction to one sixth of the external wall, with a minimum thickness set at $8\frac{1}{2}$ " in all cases. Liverpool, of course, with its old act, still maintained the system which had operated in London before 1855, with different thickness rates for the external and party walls. The simplification made in the London Act of 1855 has been discussed earlier (see page 165), but although it was administratively more convenient, it did not reflect an awareness of the structural implications involved - and yet it came through directly into the Model By-laws. Once again therefore we have a sign in Boulton's analysis of the awakening of a more rational and scientific method of thinking being brought to bear on the traditional rule of thumb methods of the earlier legislation.

The discussion on drainage related to three topics: first, the best position for the ventilation of the system. Boulton saw this not as a device to allow sewer gas and effluvia to escape without doing injury, but rather as a means of preventing fermentation from occurring and therefore preventing sewer gas and effluvia from coming into existence in the first place. Boulton's recommended position for the ventilator was between the disconnecting trap and the main sewer, where it would act as a safety valve. The Model By-laws stipulated a position on the house side of the intercepting trap, or, as it was later allowed as an alternative, an air inlet at the far end of the drain with a second ventilation pipe near the intercepting trap (106). The variations on this topic were tediously tossed about amongst the sanitary experts for some years, and their various theories, whilst interesting in themselves, are not an essential part of this study.

The second drainage topic was related more to advances being made in architectural design. By-law 66 prevented a drain inside a building. With an increase in hotel building the ideal place for the water closet, and for the new hydraulic lift, now so essential for the taller hotels, was towards the centre of the block, close to the main circulation area, and it thereby allowed the perimeter of the block

to be used more advantageously for the bedrooms. But lengthy internal pipes were classed as drains and the matter was further complicated in the case of flats, by such pipes having to pass through differing ownerships, making maintenance difficult. Linked to this was the third drainage topic, namely by-law 67 and the need for a w.c. to have a window on an external wall. This was often difficult to arrange, and Boulton could see no offence being caused in the current situation as it applied to railway stations (which were of course outside the regulations of the by-laws) where the w.c.'s were often ventilated from the covered courts to which passengers had continuous access. P. Gordon Smith was quick to stamp out that idea. It may have been satisfactory for a railway station, he said, but a house was "altogether something different". It was absolutely essential to have the w.c. window on an external wall - and not even a skylight would be an acceptable alternative. There were two other minor points to note on drainage. One was that it was nowhere stated to be obligatory for a local authority to lay sewers at a reasonable depth to facilitate the removal of water and sewerage from houses, and secondly, that the continuation of the old practice of discharging a sink waste in the open, over a trapped gulley, was seen even then to be a bad practice, "abandoned many years ago" said Boulton. It was prone to collect leaves and rubbish and also to freeze - but it remained a legitimate practice until very recent times.

Finally, Boulton mentioned again the earlier omissions - no definition of a building, no controls on timber in roofs or floors, (a matter still controlled in Liverpool), no party arches or fireproof construction in areas outside London, the anomaly of the parapet wall and the projections - and "why was it still possible for some buildings to be entirely exempt from any regulations?"

In Liverpool's new Improvement Act of 1882 a number of these topics were to be incorporated. Rules for the support of openings in external walls, wooden buildings, hearths, mortar specifications, concrete walls and timber sizes were all included, even though they were not to be found in any detail in the contemporary Model By-laws. On the other hand, the damp proof course (though only 4" above ground), the size of footings, and the table of wall thicknesses were adjusted on the lines of the Model By-laws.

Within the Model By-laws themselves, a number of changes were made and these are incorporated in Table 9. The damp proof course and parapet rules have already been discussed, but three other innovations deserve comment here. The need for a firm and healthy substratum, when a site had previously been excavated for a clay pit, reflects the common practice of the time to use the excavated material for bricks for the houses, and then to build the houses on the same site - on very insubstantial foundations. The demand for a hollow cavity wall was now recognised, although the precise wording of a suitable model clause came a little later (see Table 10 sheet 2) and, more surprisingly, the use of the half timber walls now reappeared in the regulations. This had been successfully banned in the London regulations, where all 'chain and bond timbers' had been prevented for fear of fire spread and rot in the timberwork, and its reappearance at this point is rather unexpected. It is true that in certain architectural circles there was a move towards a vernacular revival, and the particular case of Bedford Park is mentioned in this same context in the next chapter. It may also have been a concession towards demands from the 'genuine' rural areas, where bricks may have been scarce or expensive, and where the practice of using timber in walls was still employed as part of the traditional building technique of the area (107). With more and more rural authorities now adopting these primarily urban by-laws, there may have been some pressure brought to bear here, but there is no direct evidence for this latter supposition.

We may note in passing here an abortive Bill prepared in 1883, aimed at securing one detailed item not covered by the by-laws, but still concerned with public safety in buildings. This was the Public Buildings (Doors) Bill, which would have made it compulsory for all doors of public buildings to be hung so as to open outwards - in the direction of escape.(108) It was read twice in Parliament, but time was against it and it was withdrawn on 13 July 1883 (109).

Royal Commission on the Housing of the Working Classes 1884 (110)

Whilst this study maintains the course of analysing the evolving

pattern of the building regulations, and whilst it will have been clear in the preceding chapters that this subject was intimately bound up with housing, it must be noted that from about 1875 the emphasis changes, and the larger and more controversial subject of the actual provision of working class houses becomes more dominating and tends to overshadow the more mundane subject of building regulations. It is not the intention of this study to stray too far into this area of housing, a subject already well covered by a number of other writers. Nevertheless, whilst the housing field attracts more attention, there is still a steady development in building regulation, and at times the two areas still tend to overlap. One such area is the Report of the Royal Commission on the Housing of the Working Classes, and although the emphasis there is naturally on the provision of housing, it is still possible to identify certain matters related to building regulation, even though they are scattered at random throughout the evidence and only occupy a small part of the Commission's recommendations.

There were two main recommendations concerning building regulation, and both were limited to London. One was that more general rules should be framed, on the lines of the 1862 and 1878 amending Acts to control the height of buildings in relation to the open space in front; the second was to provide a space at the rear of the house - in both old and new streets - which would be free from obstructions, and which would extend the whole width of the building. A minimum depth would also be specified, and it would be a depth which would in turn be proportioned to the height of the house. It was also recommended that local authorities should both make and enforce their by-laws, and also to put in force such powers as they were entrusted with by law.

This matter of open space was raised by three witnesses, Octavia Hill (grand-daughter of Southwood Smith), Henry Armstrong from Newcastle upon Tyne and, indirectly, by Joseph Chamberlain from Birmingham. Miss Hill, admitting that her knowledge was based solely on the London situation, was particularly concerned at the limited 'breathing space' around new buildings; the fact that there was no relationship between the sizes of the space and the heights of rooms; and the fact that it

was still possible in London to build out over both front and back yards (111). The cul-de-sac was also a concern, but for her it was more the difficulty of being able "to keep any public opinion or order in them, than the difficulty of getting air" (112). The problem of obtaining a greater proportion of space in relation to the height of building was explained by the Reverend James Johnson in the 'Nineteenth Century' magazine. These regulations, he said, only affected the lessees or the builders and not the landowners. It was at the level of the landowners that the opposition would be felt, particularly since so many of the landowners were members of Parliament (113). Armstrong, referring to the Newcastle by-laws, which were not based on the Model By-laws since Newcastle operated its own local Act, considered that they were well enforced (although Laws, the local Surveyor, admitted elsewhere in the evidence that they were not so strictly carried out as they should have been, and that he was vainly trying to get more up-to-date by-laws passed (114)). In Newcastle the open space was fixed by leaving one quarter of the site of the house vacant for a yard. But Armstrong wanted the area of open space related to the height of the building - the Model By-laws only related the depth of the yard, not its area, to the height of the building - and Armstrong further suggested that every fifth, or perhaps every tenth site, in a large street should be left as a vacant site, presumably to aid the circulation of air between the houses (115). Joseph Chamberlain, who besides being the dynamic leader in Birmingham, was also the President of the Board of Trade, proudly referred to Birmingham's early recognition and incorporation of the Model By-laws, which had now "stopped jerry building" and had provided powers to supervise the erection of buildings (116). But for Chamberlain the Model By-laws still lacked one further essential, namely the power to prevent the cul-de-sac (117).

Other points raised concerning building regulation in the evidence to the Royal Commission were not so significant, but may be briefly mentioned here in order to complete the picture. Hugh Owen, Permanent Secretary to the Local Government Board stressed that the Model By-laws had been drafted with "the utmost care" (118). Andrew Young, Surveyor to the London School Board, objected to the Model By-laws, and complained that they were more stringent than the Metropolitan

Building Act - he could see no good reason for example to compel a cesspool to be at least 6'0" away from a house as the by-laws demanded. He also confirmed that the by-laws were not properly enforced, either because the rules were too strict or the local authority was too lax in its enforcement of the rules, and as a portent for the future, he felt that the Local Government Board would not really allow the local authorities to have any by-laws short of their own, the Board's, Model By-laws (119). William Lascelles, a builder with patent rights to a concrete walling system, spent his time before the Commission attacking the short sighted Metropolitan Board of Works who were preventing him from operating his system - and praising neighbouring Croydon for having put a special clause in their by-laws to allow him to erect his concrete houses (120). This topic of concrete is discussed more fully later (see page 352), as is the topic raised by George Lefevre, First Commissioner of H.M. Works and Public Buildings, asking for regulations to prevent building over graveyards. This was the result of the notorious Peel Grove case (see page 352).

The principal conclusion from the Royal Commission report was the need for a fresh look at the question of open space provision in relation to housing. P. Gordon Smith added a detailed report in the appendix (121) which compared the existing London standards and the requirements of the Model By-laws. 'The Builder' made the subject of open space about buildings the subject of its leading article in June 1884 (122), calling for fresh legislation, but mainly on the Metropolitan front. A pressing need was for a rule to require the provision of windows to relate to the yard area, the restricted size of the open space and the fact that it could still be built over once the house was inspected and approved (123). It was true that the 1882 Amending Act (see page 351) was beginning to have some effect, with varying sizes of yards related to the width of house frontages, as well as concessions for awkward sites, as the Model By-laws were also having to acknowledge (see Table 10), but it was still the case that the yards did not relate to the height of the buildings in London.

Two items of building legislation were secured in the year of the Royal Commission enquiry. One was the Act to prevent the erection of buildings on disused burial grounds, which came partly as a result

of the Commission's enquiry and partly from the Peel Grove case mentioned above (124). The other was the Public Health (Confirmation of By-laws) Act (125), a small but important measure which filled one loophole in the law by now actually giving the force of law to any by-laws passed by the Local Government Board. Up to this point, the courts had decided that by-laws did not require the confirmation of the Local Government Board in order to be legally valid. After this point therefore, the power of the Local Government Board was further strengthened, and another step was made towards centralised control.

Looking more to the future, H.H. Collins addressed the Institute of Health Exhibition on behalf of the Social Science Association in the same year, 1884 (126), on the subject 'What conditions are essential for a healthy dwelling, whether in an urban or rural locality and how far is it desirable that they should be rendered compulsory by legislation', a wide and elaborate title, but an interesting lecture which contained a number of pointers to the future.

First there was the continuation of the growth in a more scientific study of matters which impinged on the areas covered by building regulation. Collins referred, as had Robins earlier (see page 290) to the work of Pettenkofer at Munich, to the scientific analysis of the "Unclean ground air which impregnates water and ground poison the soil and you poison the atmosphere". Collins consequently recommended the use of better subsoil drainage, as well as the sealing of the site for the house by a layer of asphalt or concrete. Then there was the need for the house to face the sun, a consideration which Dr. Liddle had raised in 1876 (see Chapter VII, page 342), and Collins in a courageously bold move, had directly consulted the Astronomer Royal to ascertain the number of sunny days. All these innovations would, Collins maintained, inevitably lead to an improvement in health; and he went on to elaborate on the research work of Lister, Koch and Pasteur, stressing particularly the need for a constant supply of clean water and the avoidance of bad drains. The range of suggestions was wide - the dustbin should be abolished (or at least a new galvanised iron one obtained each year), room sizes should be proportioned to the number of 'inmates', and something, though he did not say exactly what, should be done about the "enormous height of the houses

now being built" (the Artizan Building in the Minorities then being built by the Metropolitan Railway Company, was already ten storeys high). Many buildings of this type had stairs only, the lift still being something of an expensive novelty, and Collins quoted the dire warnings of a Dr. Beddoe "that lofty staircases tell unfortunately on the health of those frequently ascending them, producing anaemia and functional affections of the heart". It was not philanthropy, said Collins, but "crass sanitary ignorance".

Collins' suggestions were fundamental and sound. There should, he said, be uniformity in both action and area, an abolition of the distinction between urban and rural districts, the application of the controls to the whole kingdom, with no exceptions and proper inspection. Finally, the permissive nature of the controls should cease - "legislation to be effective should be compulsory".

Collins' views may be extended by those of Lewis Angell, the Surveyor for West Ham in his address to the Congress of the Sanitary Institute of Great Britain at Leicester the following year (127). Regarding the operation of the by-laws, their adoption was of course still optional, and some authorities had been known to assume the right to suspend their by-laws - to suit themselves. Other authorities had decided to judge each case "on its own merits" and were therefore not above favouritism. Supervision was poor, many ratepayers objected to paying for the necessary staff, and although some towns (such as London, Bristol, Eastbourne - and West Ham) had a system of building fees, granted under local acts, the extension of such powers was opposed by, amongst others, Lord Redesdale, Chairman of the Committee of the Lords. In more technical detail, there was no requirement for a certificate of approval to be issued before a house was occupied, no powers to control the height of living rooms, or the construction of hearths. There were no controls over the addition or alteration to new or old buildings, and no power to ensure a proper constant supply of water to a w.c. And behind it all was the appalling ignorance on the part of the public for the need and importance of these controls.

The moves to meet many of these objections raised by Collins and Angell were to come in the Public Health Amendment Act of 1890, and

we shall return to trace these developments shortly. Meanwhile, we must pause to consider one isolated piece of legislation and to survey the operation of some examples of local building by-laws in practice in this period.

Public Health Act Amendment (Buildings in Streets) Act 1888

Bradford was one of a number of towns which included alongside its by-laws section 156 of the 1875 Public Health Act - a section which gave the local authority power to control the line of new buildings in streets. The clause stated:

"It should not be lawful in any urban district, without the written consent of the urban authority, to bring forward any house or building forming part of any street, or any part thereof, beyond the front wall of the house or building on either side thereof".

This did not therefore mean that there was an original building line; it simply meant that the line was determined by the first builder to arrive on the site - who could apparently proceed to build his first house wherever he liked. This then established the building line, and the authority could then insist that all other houses be related to this line. This of course had serious implications for the other builders along the street, whose economic returns may well have been controlled by a higher density or closer grouping of houses than that established by the first builder. The builders in Bradford wrote to 'The Builder' in 1885 to question this, but it seemed that this was in fact the case. Bradford could set a street width at 48'0", but it was not in a position to indicate the building line itself (128).

Wallesey Local Board, on the other hand, had set an original building line in a street but the first houses were built well back from the line. It was somewhat unfortunate therefore that a Mr. Williams was duly summoned under Section 156 when he went ahead and built his houses in front of his neighbours - but still behind the original line set by the local authority. The case went against Williams, but on appeal to a higher court the decision was reversed (129). The court determined that it was reasonable for the local authority to fix the line and then, if a person chose to build behind it there would

be no reason for his neighbours to lose the advantage for their own building (130). The law obviously needed altering and a bill was therefore prepared in 1887 (131) known as the Public Health Act (Buildings in Streets) Bill, introduced into Parliament in April (132) and passed into law the following year (133). The new Act repealed section 156 of the Public Health Act of 1875, but re-enacted its provisions in substance in such a form as to render them applicable not only to bringing forward but also to the erection of any building in a street (134). Clearly however, such new legislation took some time to permeate the country. At Ravensthorpe in 1890, a Mr. Hinchcliffe built a front main wall some 6'0" beyond the line of the adjacent house, though only to a height of 5" before he was summoned - under section 156 of the 1875 Public Health Act. Fortunately for Mr. Hinchcliffe the Court held that the wall was not a house or a building within the terms of the Act and did not therefore constitute an offence. But the magistrate made a point of calling for a revision of this section 156, apparently unaware of the amendments already made (135).

The Building By-laws in Practice 1886-1890

Although the Local Government Board had made sincere efforts to so frame the Model By-laws that there would be no ambiguity or confusion, their hopes were not to be realised. Misinterpretations abounded. Chiswick, for example, basing its by-laws on the model, interpreted the chimney regulations requiring a 9" back to mean 18" when chimneys were arranged back to back, and the $4\frac{1}{2}$ " thick sides to be likewise 9" thick when flues were adjacent to each other. "Imagine", wrote a local builder, "the effect on a stack of ten flues" (136). Another correspondent queried the anomaly caused by a cellar in relation to the thickness of the wall superstructure above. If a cellar was built, then the wall below the top storey of the house had to be 14" thick (and that could be in a two storey house), but in London only the wall of a cellar in a similar situation had to be 14" thick. Therefore, if a cellar only occupied half the area of the house, it meant that the ground floor wall on one side (away from the cellar) could be

9" thick, whereas the wall on the cellar side had to be 14" thick (see diagram with note 137),

The Local Government Board duly recognised these difficulties and amended the Model By-laws to clarify the regulations. Contrary to Chiswick's interpretation, withes had to be $4\frac{1}{2}$ " (not 9") and chimney backs 9" (not 18"). With regard to cellars, where a cellar occupied only up to one third of the area of the site of a building, it was not deemed to be a storey, and therefore the requirement for a thicker wall in the upper floors did not apply. This would have encouraged the use of only a small cellar in houses after 1887. Objections were also raised to clause 25, requiring parapets on the walls of buildings which were within 15'0" of another building, and this was also altered in the Model By-laws to the more relaxed distance of 10'0" - but this requirement was largely nullified from the point of view of fire spread because there was no prohibition on the insertion of a window in a gable wall. Finally, also in 1887, 'The Builder' noted that the area of the back yard was being increased to 200 sq.ft. and it was not to be covered in - but this change was not recorded elsewhere and would appear to be an error on the part of the correspondent. It would however, have paralleled the increase made in 1882 to the same topic in the Metropolitan Building Act (138).

All manner of excuses were commonly employed in order to avoid the by-laws. A Mr. Potter omitted the damp proof course from a wall in a house at Windsor. His defence was that the house was in the middle of a forest and he was unaware of the existence of the Sanitary Authority (139). When this plea failed, Potter changed his tune and maintained that the wall, which was of concrete, was itself satisfactory as a damp proof course. The architect, Tyler, had not apparently considered the damp proof course to be necessary, and architects from London came to support him, but the magistrate, faced with a difficult technical decision, decided that concrete was not impervious to moisture. Tyler neatly escaped a penalty - after all it was still the contractor's responsibility to satisfy the Sanitary Authority, and Potter had to pay the fine of £10 plus the costs (140).

The most revealing document to expose the abuse of the by-laws was the report on back-to-back houses prepared for the Local Government

Board in 1888 by Dr. Barry and P. Gordon Smith. Not only were back-to-back houses still being built in Yorkshire, but many local by-laws actually openly permitted them. They were preferred to 'through houses' in Leeds and Halifax, by the builders there, because they were cheaper to build, and, so it was said, by the inhabitants, to whom "the dirtier was cosier" was the appeal. Yet in fact it resulted in a difference of only one penny a week in the rent. Between 1876 and 1886, Halifax had built 61% of its new houses on the back-to-back principle, Morley 82%, Bradford 64% and in Leeds, between 1875 and 1887, 50,000 people lived in this type of house. It was considered extraordinary by 'The Builder' that there were by-laws which actually permitted the building of back-to-backs. Halifax, it noted, "positively revels in back-to-backs", for there the by-laws allowed blocks of eight houses, four each way with 15'0" space between the blocks. "This rule should not be departed from without the previous consent of the Corporation" ran their by-laws, and yet this rule was relaxed, but only to allow a worse situation, with blocks able to contain 16, 28 or even 30 houses. Keighley was only marginally better. There the houses were L-shaped, with four set back to back to form a cross, and some partial ventilation was therefore possible through the arms of the cross. As for construction generally, the report described party walls only 4½" thick, walls only taken up to the level of the top ceiling, floors timbers touching in the centre of party walls, and privies built up against the outside walls of houses.(141) A further report to the Local Government Board from Dr. Parsons described the high rate of mortality and the conditions of the properties in Dolgelly. There were rooms without light or ventilation, the windows being blocked up to stop the smell from a nearby tannery, the w.c. under the stairs without any light or ventilation. The density was 425 persons to the acre. The local by-laws were based on the Model By-laws, but were totally disregarded. Plans were submitted, but nobody took the responsibility to see that the provisions were complied with. This non-enforcement was due, in Dr. Parson's opinion, to the "disinclination often found in small places to appear disobliging to a neighbour, especially one who may have influential friends on the Board"(142).

The situation at Rawdon was perhaps the most scandalous. The local by-laws, based on the model, were ignored completely. The damp proof

course requirement was never enforced, cellars had water in them, the walls were damp to above ground level, party walls only went up to the level of the bedroom ceiling, timbers not only met but also passed right through the party walls, and no open space was provided at the back of the houses - in fact the back-to-back plan was approved by the Local Board (143).

These, and many similar examples, are typical of the extreme cases where the gap between the ideals of the Model By-laws and their realisation in practice was at its widest. Not all towns were so bad, but in general the effective control of the by-laws was, in the majority of towns, very limited.

Sheffield and the Model By-laws 1889

In spite of the appearance of the Model By-laws in 1877, Sheffield continued to operate its own by-laws which dated from 1864 (last referred to on page 232). Apart from one minor alteration in 1880, no changes were proposed until as late as 1888. It was then that the Highways Committee prepared a new set of by-laws which were extremely elaborate. The local Society of Architects was strongly opposed to them and protested to the Local Government Board (144). But it was the Town Council itself which finally decided that they were not acceptable (145) and a fresh set were prepared and approved in 1889. They now followed the Model By-laws very closely, but there were certain variations. These variations were the result of the pressures of local building practice and the retention of certain of the old by-laws of 1864, which the authority preferred to retain. The current state of the Model By-laws was reflected in the Third edition of Knight's Annotated Model By-laws in 1890, just a year after Sheffield's by-laws had appeared, and a comparison between the two, provides a useful picture of the state of the building by-laws, both in the model theory and in one case of local practice - in the period just prior to the major changes that were to be made under the Public Health Act of 1890.

Street controls may be taken first and show that local practice and

preference over-rode the model standard. The overall street width in Sheffield was set at 40'0" min, but the model width of 36'0" was only a minimum and Sheffield may well have been influenced by the argument raised in Knight's First Edition of 1883 where it was strongly suggested that the 36'0" could be "increased with advantage to 40'0". The controls on back streets - the narrower streets for secondary access only, were not included by Sheffield, which again reflects the opinion of Knight, who stated that "the provision of such streets might be hindered if the by-laws prescribed a really adequate width" (see Table 9, sheet 1). The inclusion of this was therefore optional, but it was obviously being considered seriously in some areas, for Knight's Third edition of 1890 provided a suitable clause to cover this matter (see Table 10 sheet 1), and furthermore it became legally possible to regulate these secondary streets under the Public Health Amendment Act of the same year. Sheffield, perhaps with some shrewd foresight, just timed its by-laws to miss this opportunity. One minor variation which may be noted was in the matter of footpath widths. Sheffield set these at 1/5th the width of the street (i.e. 8'0") whereas the model had set a minimum of 1/6th (i.e. 6'0" in a street 36'0" wide). In the area of streets and footpaths therefore, Sheffield went beyond the minimum of the model by-laws.

Under the topic of building structure, Sheffield, like many northern towns, omitted the requirement for parapets on external walls when they were within 15'0" of another building. We have noted earlier (page 282) the concern expressed generally about the stringency of this by-law, it was obviously unpopular and of little practical effect (it had been modified to 10'0" in 1887). By-law No. 26 which required party walls to project above the roof was omitted in Sheffield, as it had been in 1864. It was not local practice and the alternative and more reasonable by-law was substituted requiring the party wall to go up only as far as the underside of the roof covering, the slates being then properly bonded and solidly set in mortar on top of the party wall. The need for such an alternative had already been acknowledged by the Local Government Board and it had appeared as clause 26a in Knight's first edition of 1883 (Table 9 sheet 3).

Sheffield's controls on the external space about buildings followed

the Model By-laws, but the terminology of the 1864 by-laws was retained, for instead of referring to the height of houses in feet, it referred to the height in the number of storeys. The 1864 by-law controlling the height of a habitable room was also maintained, with 8'6" from floor to ceiling and 8'0" over not less than half the area of a room in the roof. It will be recalled that the use of a by-law to control room heights had been held to be ultra-vires, and it is doubtful if Sheffield was able to maintain it, even though it had been made before the 1875 Public Health Act. As it happened, the matter soon resolved itself, because the following year, 1890, the amendment to the Public Health Act gave legal approval for just such a by-law to be made. A minor point in Sheffield was the inclusion of a by-law to allow a clear space of 9" under a ground floor when the site was not covered with a concrete layer. This too was a feature of the Model By-laws by 1889 (Table 10, sheet 3 clause 56a), and acknowledges an alternative to the earlier by-law requiring the layer of concrete or asphalt. The cost difference, between 6" concrete and two courses of brickwork (measuring 6") may have been an important factor here, with the preference being for the extra brickwork.

The Sheffield drainage by-laws were generally in line with the Model By-laws, although the clauses covering the w.c., privy, ashpit and cesspool were retained from the 1864 by-laws, and were nothing like so comprehensive or so stringent as the parallel clauses in the Model By-laws. Sheffield also specified that no new house could be occupied until the drains were complete and had been approved - a requirement not in the Model By-laws. And although section 74 of the Towns Improvement Clauses Act of 1847 was in operation in Sheffield, the model clause 60a (see Table 10), requiring a suitable downpipe to connect with the gutter and to drain the roof water away from the building was also incorporated.

The two topics which had not been in the 1877 Model By-laws, namely the rules for half-timber work (Table 9, sheet 1, clause 11a) and the construction of a cavity wall (now elaborated in Knight's third edition of 1890 and described on Table 10 sheet 2 clause 11) were both included in Sheffield's new by-laws of 1889.

To complete the picture of all the legislation controlling building in Sheffield in 1889, the following regulations should be noted. Cellars were controlled under sections 71 and 72 of the 1875 Public Health Act, the size of chimney flues under the 1840 Chimney Sweepers Act and clauses 71 to 74 of the 1847 Towns Improvement Clauses Act (see Table 5 for details) - together with the other clauses in that act, peripheral to our main theme, but controlling the hoarding, lighting and protection of building sites and materials. The Disused Burial Grounds Act of 1884 (see page 297) was now in operation, as was the local Sheffield Corporation Act of 1883 where, under section 87, controls covered the ingress and egress to public buildings (schools, hotels, churches, but not hospitals, prisons or railway stations). Sections 88 and 89 controlled projections in streets and gave powers for their removal - matters which, outside London, had featured in Local Acts in the 17th and 18th centuries (see chapter III, page 126).

Three points concerning the Model By-laws as they were amended by 1889 (Table 10) may be noted here. The exemption of iron buildings in certain circumstances was now covered in clause 2a and this, like half-timber work, may reflect the pressures from rural areas for less stringent construction in agricultural buildings in low density areas - the first signs of growing concerns which were to become much more vocal later (see Chapter IX). The distances set for the iron buildings to be set back from the street by 8'0" and from the nearest building or land, and of a height not over 30'0" correspond to the exemption of buildings clauses in the 1877 Model By-laws (Table 8 sheet 10) and in turn to the earlier sources in the Metropolitan Building Act. Secondly, clause 53a resulted from the fact the "onus for providing sufficient land to secure the 24'0" of open space required under clause 53 is thrown upon the person who first erects such a building on one side of a narrow street, his opposite neighbour, who happens to rebuild at a later date, is altogether relieved from providing any such space. To deal with this objection and to prevent an irregular line of house frontages, clause 53a was introduced" (146). Thirdly, in the light of various difficulties

which had arisen through trying to interpretate clause 54 on awkwardly shaped sites, various compromises and suggested alternatives were incorporated in Knight's third edition, in an attempt to meet these various permutations. As a result there was some easing of the rules - for example, where a site was too shallow to allow the prescribed area of open space, it was now possible to provide that space at the side - the original clause, in an attempt to prevent back-to-backs had only allowed the open space to be at the rear. A selection of some of the permutations of this matter is included in Table 10 sheets 4 & 5.

A more significant development in regard to open space about buildings was taking place in Liverpool at this time. Outside the Model By-laws, Liverpool's rules for this topic were based on their 1864 Sanitary Amendment Act, which closely paralleled the 1877 Model By-laws and the 1858 Form of By-laws with 150 sq.ft., 15'0" between properties if two storeys high, 20'0" if three storeys and 25'0" if over three storeys. In 1890 however this was changed, and a new by-law (devised by Goldstraw) was introduced, in which the distance across the open space at the rear of every house was not to be less than the height of the rear wall of the house - in other words, an angle of 45° projected, and also this open space must abut on each of three sides to a similar open space or street. This angle of 45° was to be the precedent for the new rules proposed in London in 1893-4 for this same topic. (see chapter VIII, page 394) (147).

Public Health Amendment Act 1890

To conclude this chapter we return to the developments in the amendment to the enabling legislation of the Public Health Act and the consequent extension of powers to include further areas of control by means of building by-laws. Before focussing on the Health Act however, there were two other important pieces of legislation, not immediately related to building matters, but which were to have an important bearing on them. One was the granting of the franchise to the agricultural labourer in 1884, a move which increased the rural

representation and influence in Parliament and therefore ultimately on legislation; the other was the Local Government Act of 1888 which further extended the administrative framework of local authority control and which created the urban and rural district councils, as well as the county councils, with an attendant re-distribution of administrative controls from central government to county level. (It was this act which also allowed the formation of the new London County Council, following the demise of the Metropolitan Board of Works). The significance of both these new pieces of legislation was the growth of more influence and control in the rural areas - a point to which we shall have to return in Chapter IX.

The need for amendments to the health legislation, as it affected buildings, began to be voiced after a period of about ten years following the passing of the Public Health Act of 1875. In 1887, Lord Basing, (formerly Mr Sclater-Booth, President of the Local Government Board from 1874 to 1880) made a number of proposals in his address to the Congress of the Sanitary Institute of Great Britain. In building matters these included the need for powers to provide dual drainage systems (separating foul from surface water drainage, an ideal which has still to be realised in a number of places), the need for powers to regulate the ventilation and height of sleeping rooms (a constant demand as we have seen, for all habitable rooms, and a requirement which was to be accepted in the amending Act of 1890); powers to regularly inspect houses under construction, powers to prevent rooms being built over privies, and powers to prevent back-to-back houses (the need for this has already been exemplified in those cases of the Yorkshire towns cited earlier (148)).

Two years later, in 1889, there appeared a bill to deal with the particular aspect of house sanitation - the Sanitary Regulation of Buildings Bill (149). This concentrated, as its name implies, on sanitation only, but again it touched on certain matters which were to be eventually incorporated in the amending Act of 1890. The topics covered were the need for every w.c. to have a 'flushing service' distinct from every other water service; no cistern to be connected with any pipe connected to a soil drain; a soil vent to be required

(rising to a height of at least 2'0" above the highest window); a trap at the w.c. and an air chamber to be provided at the disconnecting trap (150).

These bills and suggested amendments form the basis of the sanitation amendments to the Public Health Act. The new Public Health Act (Amendment) Bill was first read on 12 February 1890. It then went to a Select Committee in March, and was duly reported in May. The discussion in Parliament highlighted two fundamental issues - the extent of the permissive nature of this legislation, and the question of the extension and adoption of these controls by the rural authorities. The granting of this extension to rural authorities was to be the most significant development in the operational aspects of building control, whilst granting of powers to extend the range of by-law control over further areas of building was long overdue.

The Royal Assent came in August 1890 (151). Powers to make building by-laws now became much easier for the rural authorities. Previously, under the 1875 Act, every urban authority had possessed the powers of section 157, but these powers could only be conferred on a rural authority by order of the Local Government Board - they could not be adopted by a rural authority. Now under section 23 of the 1890 Amendment Act the rural authority could adopt these powers. This method was not open to an urban authority, who could not obtain the powers of section 23 alone and who, in order to get them, had still to adopt the whole of Part III of the Act.

The Act gave powers for the extension of by-law control to the following matters:

- 1) a secondary means of access to buildings for the removal of house refuse. This had been optional up to 1890, now a local authority could make a by-law requiring this provision,
- 2) a minimum height for habitable rooms was allowed, but no precise dimension was given. It was generally known that the Medical Department of the Local Government Board preferred 9'0" though this was often modified in practice to 8'6" and at times even 8'0" was allowed (152),
- 3) The regulation of hearth construction was now allowed. It will

be recalled that this had not been possible under the 1875 Public Health Act, since a hearth was not taken to be part of the wall structure (although model clause 42 had allowed "back hearths" as part of the wall,

4) Controls could now be set in the by-laws for the sizes of timber joists, rafters and purlins, for the floors and roofs of new buildings, and for staircases,

5) The w.c. had now to be kept supplied with sufficient water for flushing and cleaning the drains, and there was now also the power to ensure the proper paving of yards.

This forms the basis for a new series of additions and amendments to the Model By-laws, as well as the extension of the by-laws into rural areas, and the account and analysis of these developments will be resumed in chapter IX.

In reviewing this chapter the first point to note is how once again the mood was right, at least in the professional quarters, for some form of national building act in the mid 1870's. To architects its advantages held considerable appeal, as indeed they still do in certain quarters today. Here was the chance for a single piece of properly co-ordinated legislation, embracing all aspects of building control and incorporating the most practical and universally accepted standards. Any architect practising anywhere in the country could design a building for any town - and as practices were expanding this was no small consideration - in the confident knowledge that his design would not be jeopardized by some obscure local by-law. London, where the level of building regulations was, as we have seen in chapter IV, now at its lowest point, would also have benefitted by having^{been}/brought into a national measure. But the power of local authorities, with their own prejudices and local politics, was still apparently the stronger force. Whilst a national statute could now be accepted for public health (although it was largely a consolidating measure and it still excluded London), a national statute for building was not acceptable. Building controls were still seen as being more properly a part of the public health sphere. The mood may have been

right in some circles, but in the circles that maintained the controls, tradition held back any progress.

The right of a town to establish its own rules, to respect local traditions and practices, however outdated or corrupt they might have been, still held the stage, as did the general suspicion of London's interference, although developments in communications were breaking down those barriers. Yet seen from a town some distance from London, what justification had the Local Government Board's officials in London to pronounce on the building practices of that town, particularly when the Model By-laws could not be put into practice in the very town in which they were produced, namely London itself? Considerable power nevertheless lay with the Board, for if a town chose to prepare its own by-laws and then submitted them as required to the Board for approval, the Board could, in its own wisdom, choose not to sanction any by-law which strayed too far from the example set in the Model By-laws. The final power however rested with the local authority - the by-laws were only permissive, and if they chose not to enforce them there was little the Local Government Board or any higher authority could do about it.

The actual Model By-laws themselves, as technical clauses, were a progressive step towards a more rational and centralized control. They were more elaborate and more consistent than any previous set of regulations, which was to their authors' credit, and they incorporated much that was sound from the earlier legislation. They did not, however, match up to the new demands of an increasingly complex building world, whose novelty was always some way ahead of a cautious legislature. Their standards were not particularly severe, they were limited in their scope (as was observed at the time), and they should not have had to wait until 1890 before they could be officially extended to control such essentials as timber construction, room heights and hearths.

The Model By-laws also betray another trend which was not anticipated in the earlier legislation - namely that of an educative function. They became over the years something of a textbook on basic building construction, particularly when they were reinforced by the annotated versions published by Charles Knight. Considering the amount of 'jerry-building' in speculative housing, it is understandable and the

results of this educative role in raising the standard of building construction must not be underestimated. They established a level of acceptable building construction, and it would be churlish to blame them entirely for the monotonous product that resulted from the application of their standards. The stubborn attitude of some of the more arrogant officials, who would tend to lay down the law with a rigid insistence, resulted in the by-laws being placed in a very poor light. This was particularly the view as seen from the higher end of the building spectrum, by any architect for example whose experience and expertise was being brought into question. At the other end of the spectrum the local speculative builder could shelter safely behind the minimum standards and assistance of the local officials.

Away from the level of practice, at the level of formulation, there were signs of more mutual understanding between the various professionals engaged on the drafting of the by-laws, as the demands of building became more technically complicated. The voice of the architect and engineer was heard with greater effect, but the medical profession seems to have suffered something of an eclipse. Their health controls were difficult to substantiate with accuracy, and as the architect and engineer in practice encountered these apparently precise rules, their actual imprecise basis became more apparent and they continued to lose credibility.

Of the architects and engineers whose voices were heard in this period, it is once again that of Joseph Boult which catches the attention with his sensible and relevant analysis of the problem. And with Boult there is coupled the re-emergence of Liverpool itself, coming back into a leading position in the field of building regulation in the 1880's after a low point in the preceding decade. With the support of the Royal Commission's recommendations made in 1885 regarding open space about working class dwellings, there is now a renewed interest in that topic, and it is Liverpool which in 1890 sets the example of the 45° angle to determine the relation between open space and building height - a device which is to be adopted and varied by London in its next major Building Act in 1894.

There are two final points to note. One is the interest and relevance

of scientific enquiry which, however crude, continues to be stressed and to grow in importance. The pursuit of the analysis of ground and air poisoning, by certain laboratories in Europe, is one of the more intriguing examples of this interest. The second point was perhaps not so obvious at the time, but it was equally as important, and it becomes of more relevance as this particular history develops. It is the growing awareness of the elements of what we would now call urban and town planning matters. Should not the streets, it was asked, respect the slope of the terrain and the housing be related to the aspect of the sun? Furthermore, if elevations are now required to be submitted in some towns - purely, as it was said, to help the inspectors interpret the plans - we are not too far away from the point when the appearance of the building and its relation to the context of the street comes to play a more significant part in the judgement being made by the local official and his lay committee. These are the early signs of a wider understanding of the possibilities of broader controls, the effects of which were to become clearer as the garden city and town planning movement emerges at the end of the century. But these must wait until a later chapter : it is time now to return to the main theme and to resume the developments in London as they occur over approximately the same period, from 1875 to 1891.

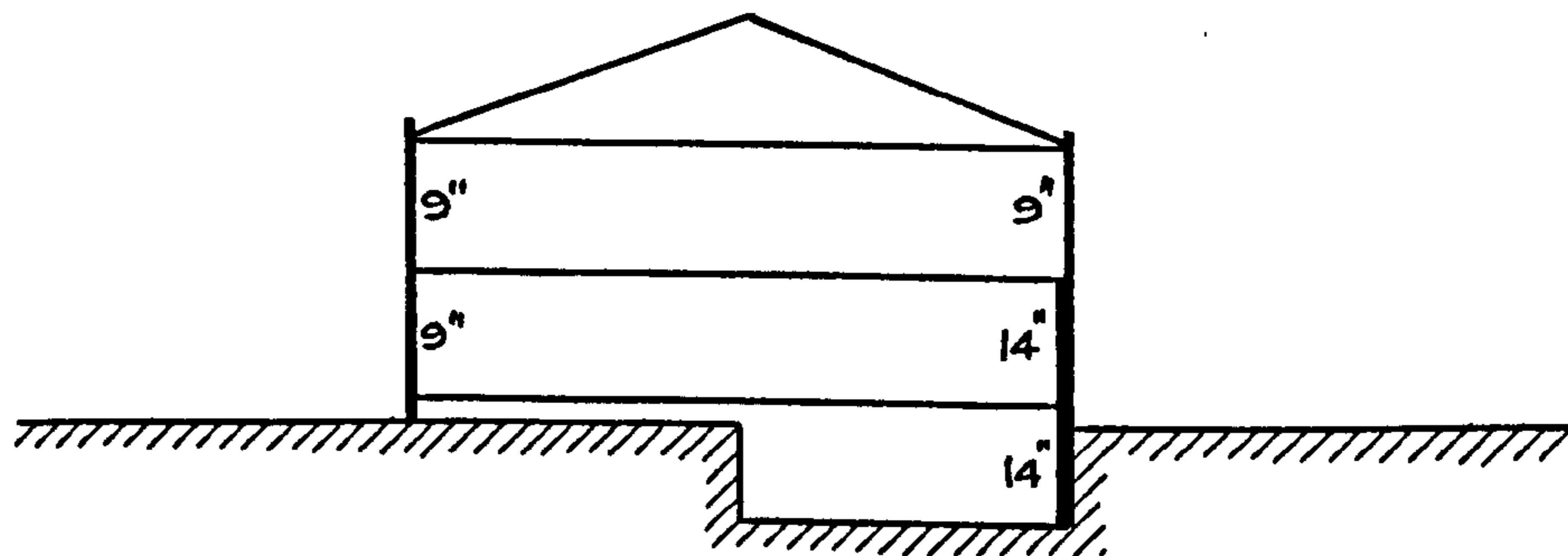
NOTES TO CHAPTER VI

- 1 In the discussion following T. Roger Smith, "On the Metropolitan Building Act", Architectural Association. 17 March 1876.
B.Vol.34 No.1730 1 Apr 1876 p.319.
- 2 B.Vol.34 No.1741 17 June 1876 p.594.
- 3 B.Vol.34 No.1743 1 July 1876 p.635.
- 4 B.Vol.34 No.1743 1 July 1876 p.634.
- 5 Ibid.
- 6 B.Vol.34 No.1742 24 June 1876 p.607-8.
- 7 Ibid.
- 8 R.I.B.A. Transactions, Vol XXVIII, 1878, p.294-5.
- 9 B.Vol.35 No.1809 6 Oct 1877 p.997.
- 10 B.Vol.36 No.1834 30 Mar 1878 p.317.
- 11 R.I.B.A. Transactions, Vol XXVIII 1878, p.277.
- 12 Ibid. p.282.
- 13 Ibid. p.281.
- 14 Ibid. p.281.
- 15 Ibid. p.284.
- 16 Ibid. p.291-292.
- 17 Local Government Board Fifth Annual Report, 1875-6, p.liv.
- 18 Ibid. p.60.
- 19 1875 also saw the passing of the new Chimney Sweepers Act, 38 and 39 Vic.cap.70. on 11 August 1875, (An Act for further amending the law relating to Chimney Sweeps), but this concentrated on the administrative procedure for the registration of approved chimney sweeps. This partly amended the 1840 Chimney Sweepers Act (3 and 4 Vic.cap.85. sec.6), but certain matters relating to the size of flues remained in force, though rarely put into operation. The Model By-laws of 1877 did not therefore control flue sizes, and as Table 8 shows, the clauses were all taken directly from the Metropolitan Building Act of 1855.
- 20 Local Government Board Sixth Annual Report, 1876-7, p.lx.
- 21 B.Vol.34 No.1730 1 April 1876 p.319.
- 22 B.Vol.34 No.1732 15 April 1876 p.367.
- 23 B.Vol.34 No.1742 24 June 1876 p.607-8.
- 24 Ibid.
- 25 The Chairman was John Whichcord and the members included Arthur Cates, Charles Fowler, J.T.Knowles, John Honeyman and J.D. Mathews.
- 26 R.I.B.A Transactions, Vol. XXVII 1877-8, p.294.
- 27 Presidential address to the R.I.B.A. November 1877. B.Vol.35 No.1814 10 Nov 1877 p.1124.
- 28 Local Government Board Sixth Annual Report, 1876-7, p.lx.
- 29 Local Government Board Seventh Annual Report, 1877-8, p.xcviii
- 30 B.Vol.35 No.1821 29 Dec 1877 p.1286.
- 31 B.Vol.35 No.1808 29 Sept 1877 p.970.
- 32 Habitable cellars remained in the 1875 Public Health Act, and the regulations maintained those of the 1848 Public Health Act. They remain in the Public Health Acts with little change to their technical requirements.
- 33 Knight's Annotated Model By-laws, Third Edition, 1890 p.74
- 34 Ibid. p.3 and letter from Local Government Board to Local Government Board to Local Authorities, dated 25 July 1877.

- 35 B.Vol.36 No.1834 30 March 1878 p.317 and
E.B.Ellice-Clarke M.Inst.C.E., "Some Anomalies in the Administration of the Sanitary Laws", Brighton Health Congress, 14 Dec 1881.
- 36 E.B.Ellice-Clark, op.cit.
- 37 B.Vol.35 No.1808 29 Sept 1877 p.971.
- 38 R.E.Pownall, "Common Weal v. Bricks and Mortar" Pamphlet, London 1878.
- 39 E.g: J.D.Mathews. B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 40 Ibid.
- 41 B.Vol.35 No.1809 6 Oct 1877 p.996-7.
- 42 Ibid.
- 43 B.Vol.35 No.1814 10 Nov 1877 p.1119.
- 44 B.Vol.35 No.1809 6 Oct 1877 p.996.
- 45 B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 46 B.Vol.36 No.1860 28 Sept 1878 p.1027.
- 47 For example, in London a wall up to 50'0" high and 30'0" long could be 1½ bricks thick (up to the start of the top storey) whereas in the Model By-laws it had to be two bricks thick (18"). If the wall was over 30'0" long, London required two brick thicknesss for one storey - the same location in the Model By-laws required 2½ brick thickness (22").
- 48 B.Vol.36 No.1834 30 Mar 1878 p.317.
- 49 B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 50 Ibid.
- 51 R.E.Pownall, op.cit.
- 52 B.Vol.35 No.1814 10 November 1877 p.1119.
- 53 B.Vol.34 No.1836 13 Apr 1876 p.387-8.
- 54 B.Vol.35 No.1809 6 Oct 1877 p.996.
- 55 Ibid.
- 56 B.Vol.35 No.1814 10 Nov 1877 p.1120.
- 57 R.E.Pownall, op.cit.
- 58 There had however been a hint of it in the 1844 Metropolitan Building Act which required the ground floor to be at least 6" above the level of the earth.
- 59 B.Vol.35 No.1808 29 Sept 1877 p.971.
- 60 R.E.Pownall, op.cit.
- 61 Ibid.
- 62 This was the traditional method, supported, for example, by J.D.Mathews. see B.Vol.36 No.1834 30 Mar 1878 p.315.
- 63 B.Vol.35 No.1814 10 Nov 1877 p.1119-20.
- 64 R.E.Pownall, op.cit.
- 65 B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 66 R.E.Pownall, op.cit.
- 67 B.Vol.35 No.1802 18 Aug 1877 p.845.
- 68 B.Vol.36 No.1836 13 Apr 1878 p.387.
- 69 B.Vol.35 No.1814 10 Nov 1877 p.1120.
- 70 B.Vol.35 No.1809 6 Oct 1877 p.996.
- 71 B.Vol.35 No.1814 10 Nov 1877 p.1119.
- 72 R.E.Pownall, op.cit.
- 73 B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 74 B.Vol.36 No.1836 13 Apr 1878 p.387.
- 75 B.Vol.35 No.1814 10 Nov 1877 p.1119.
- 76 B.Vol.36 No.1834 30 Mar 1878 p.314-7.
- 77 Ibid.
- 78 B.Vol.36 No.1823 12 Jan 1878 p.44.
- 79 R.Turnor, "The Smaller English House", London, 1952. p.172.
The drains at Ellerdale Road were remodelled to conform with

- the "trappists' view in 1928. See A.Saint, 'Richard Norman Shaw', Yale and London, 1976. p.182-4 and also B.Vol.67 No.2707 12 Dec 1894, where a correspondent refers to having used Shaw's system successfully for 15 years, but added that it was being changed on the orders of the local vestry.
- 80 B.Vol.36 No.1824 19 Jan 1878 p.69 and B.Vol.72 No.2835 5 June 1897, p.513.
- 81 B.Vol.35 No.1814 10 Nov 1877 p.1120.
- 82 R.I.B.A. Transactions 1877-8 Vol xxvii, p.287.
- 83 Ibid. p.277.
- 84 B.Vol.36 No.1836 13 Apr 1878 p.387.
- 85 E.B.Ellice-Clark, op.cit.
- 86 B.Vol.41 No.1988 12 July 1881, p.303.
- 87 J.Slater, "Building Legislation", R.I.B.A. Transactions, Vol VI, 1890, p.124.
- 88 B.Vol.41 No.2006 16 July 1881 p.88. West Ham was currently building 2,300 houses a year.
R.I.B.A. Transactions, Vol.XXXII, 1882, p.182 : Angell made the following analysis :
With 99 by-laws established, it would mean that when a surveyor entered the carcass of a house there would be 130 distinct provisions to observe and check. Assuming that each house was visited only once a month, then 2,600 distinct operations would have to be observed. But a monthly visit was obviously insufficient - it should be daily, and for this he would need at least 6 qualified men.
- 89 B.Vol.42 No.2041 18 Mar 1882, p.332.
- 90 B.Vol.42 No.2043 1 Apr 1882, p.405.
- 91 B.Vol.42 No.2043 1 Apr 1882, p.405.
- 92 B.Vol.45 No.2119 15 Sept. 1883, p.370.
- 93 B.Vol.45 No.2118 8 Sept 1883, p.336.
- 94 B.Vol.37 No.1889 19 Apr 1879, p.433.
- 95 The Times, 31 Aug 1881, page 9 col.c.
- 96 R.I.B.A. Transactions, Vol. IV (New Series), 1888, p.133.
(Lecture given on 6 February 1888).
- 97 H.D.Appleton, "Rural Sanitary Authorities and their By-laws".
Lecture to the Architectural Association. June 1883, B.Vol.45 No.2105 9 June 1883, p.772-3.
- 98 B.Vol.45 No.2122 6 Oct 1883, p.466.
- 99 Knight was not the first to illustrate by-laws. Sevenoaks Local Board for example had produced illustrations to show aspects of their sewerage by-laws - an innovation which The Builder said "other Boards should follow" B.Vol.42 No.2041 18 Mar 1882, p.330.
- 100 Liverpool Improvement Act 1882 (45 Vic.cap.lv) 19 June 1882.
- 101 R.I.B.A Transactions, Vol IV (New series) 1888, p.147.
- 102 Ibid. p.147.
- 103 Ibid. p:159. (E.C.Robins).
- 104 Ibid. p.157 (P.G.Smith).
- 105 Ibid. p.159 (E.Christian).
- 106 B.Vol.56 No.2402 16 Feb 1889 p.131.
- 107 According to T.P.Frank, it was introduced "in order to encourage and if possible revive timber framing, that old (and once standard) method of construction which enhanced the charm of the older English towns... In the latter half of the 19th century local authorities and their advisers were much afraid of timber framed construction, but ... timber framing is stable if properly put together and it does not lead to excessive risk of fire if

- proper precautions are taken".
Knights Annotated Model By-laws. Eight edition. 1928. p.91.
- 108 P.P. 1883, VIII, p.677.
- 109 Hansard, Vol.280.
- 110 P.P. 1885, XXX.
- 111 Report of Royal Commission on the Housing of the Working Classes in England and Wales 1884. Evidence of Hill, p.8853 and 9116.
- 112 Ibid. para. 8886.
- 113 Rev. J. Johnson, "How to Ensure Breathing Spaces" quoted in B.Vol.52 No.2310 14 May 1887, p.710.
- 114 Report on Housing of Working Classes 1884, Evidence of Laws, para.8391-3.
- 115 Ibid. evidence of Armstrong. paras, 7599, 7744-5, 7762, 7768.
- 116 Ibid. evidence of Chamberlain, para. 12367.
- 117 Ibid. para 12437.
- 118 Ibid. evidence of Owen, para. 354-360.
- 119 Ibid. evidence of Young, paras. 5995-6, 6073-6, 6082.
- 120 Ibid. evidence of Lascelles, para. 12, 305.
- 121 Ibid. Memorandum from P.Gordon Smith, Vol II, p.809.
- 122 B.Vol.46 No.2157 7 June 1884, p.813-4.
- 123 Quarterly Review, No 313, Jan. 1884
- 124 47 and 48 Vic.cap.72.
- 125 47 Vic.cap.12 19 May 1884, P.P. 1884, VI, p.277 and Hansard, Vol.287 p.115.
- 126 B.Vol.46 No.2160 28 June 1884 p.953-4.
- 127 B.Vol.49 No.2226 3 Oct 1885 p.457.
- 128 B.Vol.49 No.2214 11 July 1885 p.73.
- 129 Queen's Bench Division, No.718.
- 130 B.Vol.50 No.2257 8 May 1886, p.666.
- 131 P.P. 1887 V.p.393.
- 132 Hansard, Vol.313. 20 Apr 1887.
- 133 51 and 52 Vic.cap.52.
- 134 Local Government Board Eighteenth Annual Report, P.P. 1889, Vol.XXXV, p.cxlii.
- 135 B.Vol.58 No.2455 22 Feb 1890 p.128.
- 136 B.Vol.51 No.2281 23 Oct 1886 p.612.
- 137 B.Vol.51 No.2283 6 Nov 1886 p.682 and diagram below:-



- 138 B.Vol.52 No.2297 12 Feb 1887 p.243.
- 139 B.Vol.52 No.2307 23 Apr 1887 p.622.
- 140 Ibid.
- 141 B.Vol.55 No.2382 29 Sept 1888 p.225.
- 142 Ibid.
- 143 B.Vol.59 No.2482 30 Aug 1890 p.165.
- 144 B.Vol.54 No.2363 19 May 1888 p.363.
- 145 B.Vol.55 No.2370 7 July 1888 p.13.
- 146 Knight's Annotated Model By-laws, Third Edition, 1890, p.114-5.

- 147 B.Vol.67 No.2696 6 Oct 1894 p.239.
148 B.Vol.53 No.2329 24 Sept 1887 p.439.
149 P.P. 1890, VIII, p.227.
150 B.Vol.56 No.2420 22 June 1889 p.468.
151 53 and 54 Vic.cap.59.
152 Knights Annotated Model By-laws, Seventh Edition, 1905, p.191.
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DATE: 25 July 1877

SOURCE: Seventh Annual Report of the Local Government Board
 1877-8 Appendix A p.86.

Reference in Text : page 276

CLAUSE	SELECTED CLAUSES relating to building design and construction. Summary of contents	LINKS	
		ANTE	POST
3	STREETS Level of streets - to be of the easiest practicable gradient throughout entire length and to connect properly to other streets.	new	T21.c4
4	Carriage road = 36'0" min. width	T7.c1	T21.c5
5	Every street over 100'0" length to be a carriage road.		
6	Non-carriage road, not over 100'0" long to be 24'0" min. width, provided:- such street is not the principal approach to a building, but only a secondary access for removing contents of the privy, ashpit or cesspool.	T7.c2	T21.c6 and T9.c6 and T10.c6
7	Carriage road (36'0" overall) shall have:- a) carriageway = 24'0" min. b) falls from centre of road to side channels to be 3/8" min. and 3/4" max. per foot of carriageway width. c) Footpaths on each side = 1/6th. min. of entire width of street (i.e. 6'0"). d) Fall on footpaths = 1/2" per foot (non paved), = 1/4" min, 1/2" max. per foot. (paved, flagged or asphalted) e) Footpath kerb = 3" min, 7" max, height above channel of carriageway).	T7.c1 and c2	T21.c18
8	Every new street to have, at one end at least, an entrance as wide as the street and open from the ground upwards.	T7.c1	T21.c9 T18.c8
9	STRUCTURE No foundations on unsuitable material (faecal matter or impregnated with	T7.c6	T21.c10 T11.c1

	animal or vegetable matter) - all such material to be removed from the site.		
10	Whole ground surface or site of house to be covered with asphalt or cement concrete 6" min.	new	T9.c10 T11.c1 T18.c11
11	Walls - of good brick, stone or other hard and incombustible material, properly bonded and solidly put together with:- a) good mortar (e.g. lime and clean sharp sand), b) good cement, c) good cement with clean sharp sand.	T7.c7	T21.c14 T11.c2 T9.c11a
		new	
12	Cross wall, when used as a return wall in determining the length of an external or party wall, to be as clause 11 above.	T6. First Schedule	T21.c15 T.14.c8
13	No part of a wall to overhang any wall beneath it, except for architectural ornaments or a properly constructed corbel.	T6.c1 and c2	T21.c16 T14.c2 T9.c13
14	Every built at an angle to another wall to be properly bonded to it.	new	T21.c17
15	Every wall to rest on proper footings (for sizes of footings see wall thickness schedule Table 8 sheet 14).	T6.c8	T21.c18 T14.c1
16	All footings to rest on solid ground or on sufficient thickness of concrete or some solid and sufficient substructure.	T7.c6	T21.c19 T14.c1
17	Every wall to have a damp proof course (lead, asphalt, slate, etc) beneath level of lowest timbers and at height of 6" min. above surface of ground adjoining the wall,	T4.ScC in- directly	T21.c20 T17.c4 T11.c2 T9.c17
18	Rules for measuring height and length of walls: a) height of storeys: i) topmost storey - from floor level to underside of tie. If no tie, then up to half the vertical height of the rafters. ii) other storeys - from floor level to next floor level above. b) height of walls: From top of footing to highest part of wall (gable = to half height of gable), c) length of walls - from centre to	T6.c6	T21.c21 T14.c6 to c8
		new	
		T6.c6	

	<p>centre of return walls. (If only the return walls are external, party or cross walls, properly bonded and built as per these by-laws). A cross wall is a cross wall only if it is carried up to the top of the topmost storey, and if recesses and openings therein do not exceed half the vertical wall area in each storey.</p>		<p>T21.c21 T14.c 6 c8</p>
		new	
		T6.ScI	
19	<p>Wall thicknesses : domestic : external and party walls (bricks 9" min.length or stone in horizontal beds) see wall thickness schedule Table 8, sheet 11-12.</p>	T6.	T21.c22
20	<p>Wall thickness : public/warehouse building external and party walls (bricks 9" min.or stone in horizontal beds) see wall thickness schedule Table 8, sheet 13.</p>	T6.	T21.c23
21	<p>Cross walls - as above, but 2/3 min. of the thickness prescribed for walls under cl.19 and 20 and never less than 9" thick. But if cross wall carries an external wall then whole of cross wall to be same thickness as external wall.</p>	T6.ScI	T21.c24 T14.
		new	
22	<p>Walls not of good bricks, not less than 9" long or stone not in horizontal beds :</p> <p>a) stone or clunches of brick not in horizontal beds, then thickness to be 1/3 greater than schedule.</p> <p>b) other suitable materials : to be same thickness as for bricks as per clauses 19 and 20.</p>	T6.ScI	T9.c22a T14.ScI.
		new	
23	<p>If openings in external walls are greater than 1/2 the vertical area of a storey then :</p> <p>a) sufficient piers or other supports to be added to carry super-structure,</p> <p>b) sufficient piers or other supports at corners abutting streets,</p> <p>c) such piers to be within 3'0" of corner or angle of street.</p>	T6.c13	T21.c26
24	<p>Warehouse class - loophole frames (for goods delivery) to be 1 1/2" min. from face of external wall. All other woodwork, in all buildings to be 4" min. from external face of external wall (except for bressummers, storey posts under bressummers and door and window frames to shops).</p>	T6.c14	T9.c24
		T7.c9	T14.c55

25	Parapet - 9" thick, 12" above highest part of roof or gutter, to any external wall within 15'0" of another building.	T7.c8 and T6.c16	T9.c25a T14.c57
26	Party wall 9" min. thick to project above roof. i) warehouse: 3'0" projection above roof or gutter. other buildings: 15" projection above roof or gutter. ii) party wall to project 12" higher and wider than any turret, dormer or lantern light within 4'0" of party wall. iii) party wall to project 12" min. above any roof that is opposite to or within 4'0" of party wall. Party wall to corbel out, when eaves project beyond face of building, to full extent of eaves and to heights as in (i) above.	T6.c17	T21.c28a T14.c59 T9.c26
		T7.c8	
27	Top of parapet to be properly coped or otherwise protected.	T4.Sc.D	T11.c2 T21.c29
28	No openings allowed in party walls.	new	T21.c30
29	No recesses in external or party walls unless: i) the back is 9" min. thick, ii) sufficient arch over the recess. iii) the total vertical area of recesses in each storey where backs less than 9", is not more than $\frac{1}{2}$ the total vertical wall area, iv) side of recess nearest inner face of external wall is at least $13\frac{1}{2}$ " distant from such face.	T6.c13	T21.c31 T14.c54
30	No chase to be wider than 14" nor more than $4\frac{1}{2}$ " deep, nor with less than 9" thickness at back or at side, nor less than $13\frac{1}{2}$ " from other chase, nor within 7'0" from chase on same side of wall nor less than $13\frac{1}{2}$ " from a return wall.	T6.c18	T21.c32 T14.c60
31	No bond timber, plate, block, brick or plug of wood to be in any party wall.	T6.c15	T21.c33 T14.c56
32	No end of a bressummer, beam or joist to be less than $4\frac{1}{2}$ " from centre of party wall.		T21.c34 T14.c56

33	All girders to be borne on a template of stone, iron, terra-cotta or vitrified stoneware.	T6.c15	T14.c56
34	Every bressummer to have a bearing of 4" min at each end, on stone or brick pier or timber or iron storey post, in addition to its bearing on a party wall and other storey posts, iron columns, stanchions, piers as necessary to carry superstructure.	T4.ScD	T21.c35 T14.c56
35	All open spaces in partitions, or between joists to be stopped with brickwork, concrete, pugging etc at every floor and ceiling.	new	DEFUNCT By 1904
36	CHIMNEYS Every chimney to be on proper footings and solid foundation (as adjacent wall) and properly bonded to such wall - except corbels, which are allowed so that chimney does not corbel out more than the thickness of the wall underneath.	T6.c20	T18.c36 T21.c36 T14.c64
37	Inside of flues to be rendered or pargetted (unless fireproof stoneware piping 1" thick min. is used and unless spandril angles filled solid with incombustible material). Back or outside of flue (when not on external wall) to be rendered when brickwork is less than 9" thick.		T18.c37 T21.c37 T14.c64
38	Every flue for a steamboiler, close fire, etc. in manufactory or hotel etc, to be surrounded with 9" min. brickwork, for height of 10'0" min. from floor level upwards.	new	T21.c38 T14.c64
39	Chimney opening to have brick or stone arch or wrought iron bar. If breast projects more than 4½" and jambs at side are less than 13½", then abutments to be tied together by iron bar, 18" longer than opening and turned down at ends and built into jambs.	T6.c20	T21.c39 T14.c64
40	Jambs to be 9" min. width.		T21.c40 to c42 and
41	Chimney breast and brickwork to flue = 4½" min.		
42	Back of chimney opening (in party wall) in kitchen to be 9" min. thick for height of 6'0" above chimney opening and back of flue.		T14.c64

TABLE 8
Sheet 6

	Back of other chimney openings, from hearth to 12" above opening = $4\frac{1}{2}$ " in external wall and 9" in non external wall.	T6.c20	T21.c40 to c42 and T14.c64
43	Upper side of flues at angles less than 45° to the horizontal to be 9" thick.		T21.c43 T14.c64
44	Arch to carry flue to be supported by wrought iron bar. Bar secured to wall by $4\frac{1}{2}$ " min. one bar per every 9" of width of soffit of arch.	new	DEFUNCT by 1904
45	Chimney shaft - $4\frac{1}{2}$ " brick or stone all round to height of 3'0" min. above roof, gutter, etc. at highest point.	T6.c20	T21.c44 T14.c64
46	Chimney shaft - max height = 6 times the width (except for factories etc) or unless bonded to another chimney or otherwise secured.		T21.c45 T14.c64
47	No iron holdfast to be nearer than 2" to inside of flue.		T21.c46 T14.c64
48	No timber to be nearer than 9" to inside of flue. No timber under chimney opening to be nearer than 15" to surface of the hearth, No wooden plug to be nearer than 6" to inside of flue or chimney opening.	T6.c20 T7.c11 T6.c20 T7.c11	T21.c47 T14.c64 T14.c64 T18.c47 T21.c47 T14.c64
49	When brick or stone of chimney is less than 9" thick and face is less than 2" from timber, then such face to be properly rendered.	T6.c20	T21.c48
50	No openings for ventilating valves etc to be less than 9" from any timber.	T6.c20 T7.c11	T21.c49 T14.c64
51	No smoke pipe to be less than 9" from timber.	T6.c21 T7.c11	T21.c50 T14.c66
52	ROOFS Roof and turrets, dormers, lantern lights etc to be covered with slate, tile, metal etc (except for door or window frames to any turret, dormer, lantern light skylight etc), Every gutter, shoot, or trough in roof to be of incombustible material.	T6.c19 T7.c10 new T7.c22	T21.c51 T14.c61 T21.c60 T14.c73 T10.c52

53	<p>SPACE ABOUT BUILDINGS AND VENTILATION Clear open space to be provided at front of house (except for porticoes, gates, fences etc up to 7'0" high) for 24'0" min. to opposite side of street or to boundary of lands immediately opposite, and to extend the whole width of the frontage of house.</p>	new	T21.c52 T10.c53
54	<p>Clear open space at rear of house (except for w.c. earth closet, privy or ashpit) of 150 sq.ft. total. To extend the entire width of building and distance across to be 10'0" min. and If height of building = 15'0" then distance across to be 15'0" min or if height of building = 25'0" then distance across to be 20'0" min. or if height of building = 35'0" or over then distance across to be 25'0" min. (Height to be measured from level of open space to half the vertical height of the roof or to the top of parapet, whichever is the higher)- see diagram on Table 10, sheet 4).</p>	T7.c13 also L'pool Sanitary Amendment Act 1864	<p>T21.c53 T12.c14 T10.c54</p> <p style="text-align: center;">↓ L'pool Bldg Act 1890 - (45° angle) and then to T14.c41</p>
55	Every wall of every storey which abuts the open space (as in cl.54) to have windows to the open air for ventilation.	new	T21.c54
56	Lowest storey - to have boarded floor, on joists 3" clear of site concrete or asphalte cover, with sufficient air bricks.		T21.c55 T14.c70 T10.c56
57	Every habitable room to have at least one window to external air. Total area of windows, clear of sash frames, to be at least 1/10th the floor area of the room. One half of the window to be openable and the opening part to extend to the top of the window.	T7.c16	T21.c56 T14.c70
58	Habitable room without a fireplace or flue to have special means of ventilation i.e. an aperture or airshaft of 100 sq.in.min.	T7.c17	T21.c57
59	Every public building to have adequate means of ventilation,	T7.c18	T21.c58 (DEFUNCT BY 1928)

60	DRAINAGE Subsoil to be properly drained.	T7.c22	T21.c59 see also T10.c60
61	Sufficient drainage for lowest storey of building.	new	T21.c61
62	Pipes to be glazed stoneware or similar - not less than 4" dia - watertight joints. If under building then at depth equal to dia. of drain - laid in straight line - laid in concrete 6" thick min. all round - ventilated at each end - inlets to be trapped.	T7.c20	T21.c62
		T7.c21	
63	Trap at point before drain discharges into a sewer.	new	T21.c63
64	No right-angled junctions - junctions to be oblique in line of flow.	T7.c21	T21.c64
65	Ventilation of drains - by two untrapped openings:- a) at disconnecting trap prior to entering main sewer and b) at farthest end, to a height to prevent foul air to escape into building (10'0" min) OR the reverse arrangement of a and b above. Openings to have gratings over. Ventilation pipe bore size not to be less than pipe to which it connects and not less than 4". No bends or angles in vent pipes, unless unavoidable. Soil pipe may be used as vent pipe.	T7.c21	T21.c65
66	No inlet to drain (except w.c.) to be inside a building. Soil pipe from w.c. 4" dia. min. on outside of building, to carry upwards to vent to open air. Bath and sink wastes and overflow pipes from 'safes' to discharge in open air over channel or trapped gulley at least 18" distant. (If used for conveying solids or liquid filth then pipe to be as for soil pipe to w.c. as above.	new	T17.c19 and c20 T21.c66 T13.c39
67	W.C. and Earth Closet. One side to be on external wall.	new	T21.c67 T13.c39

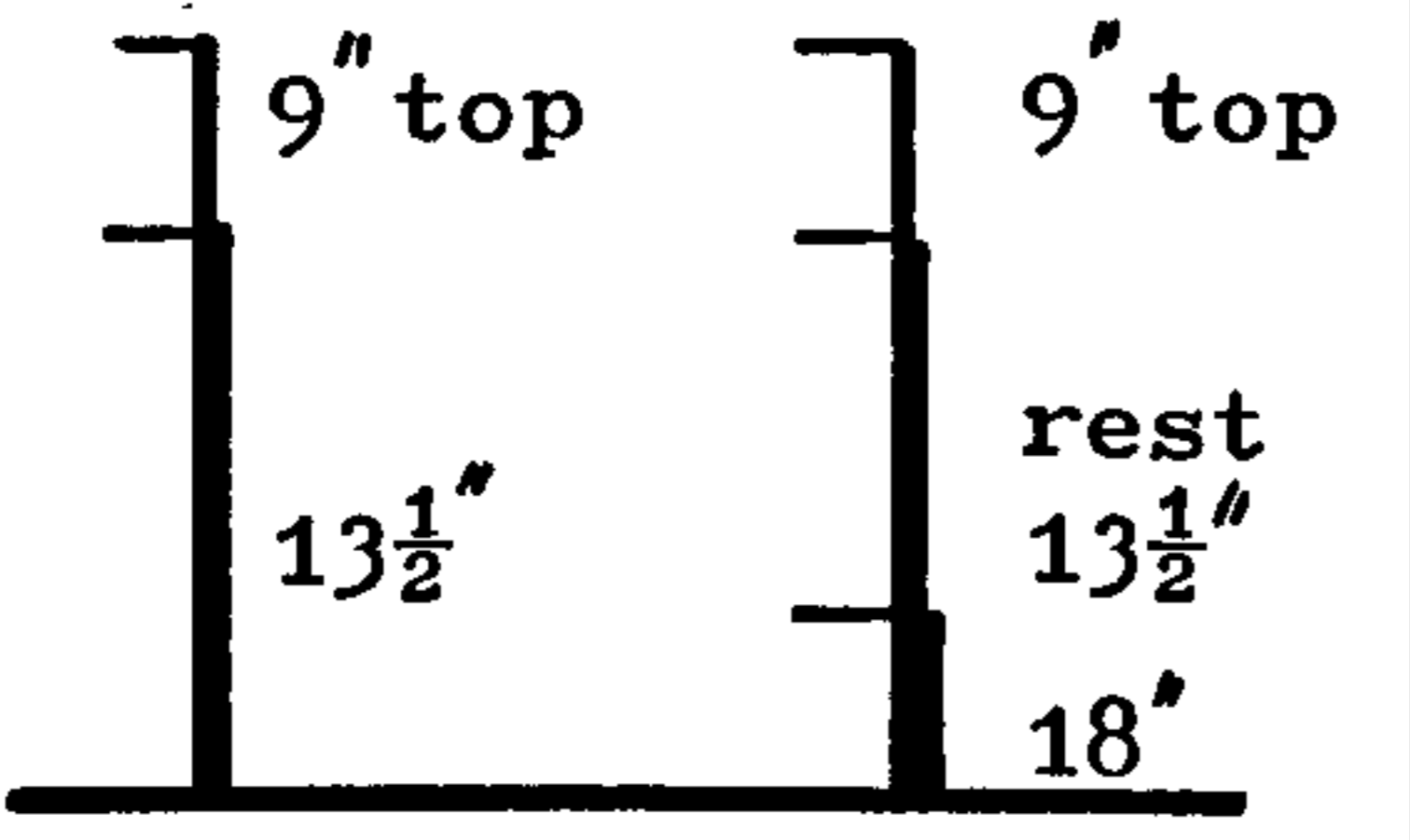
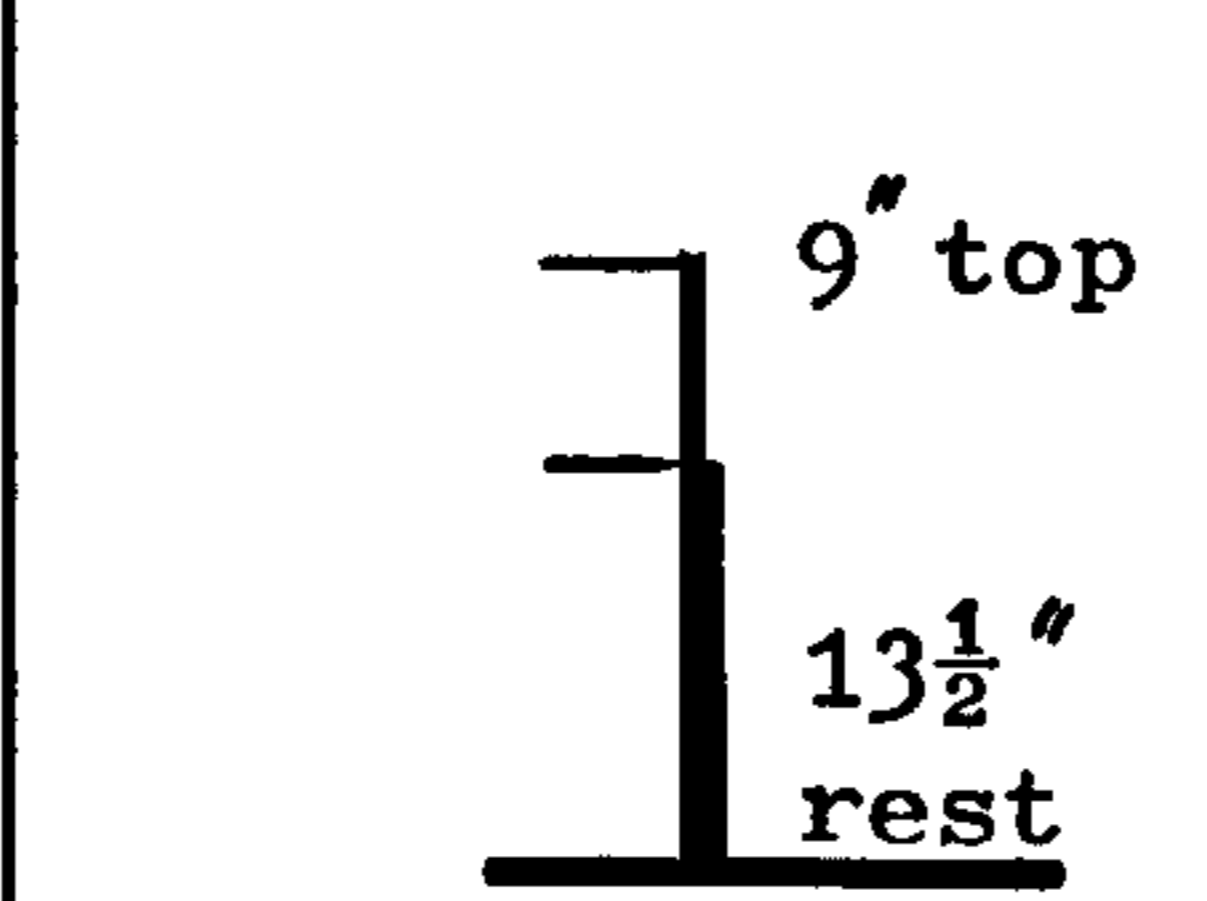
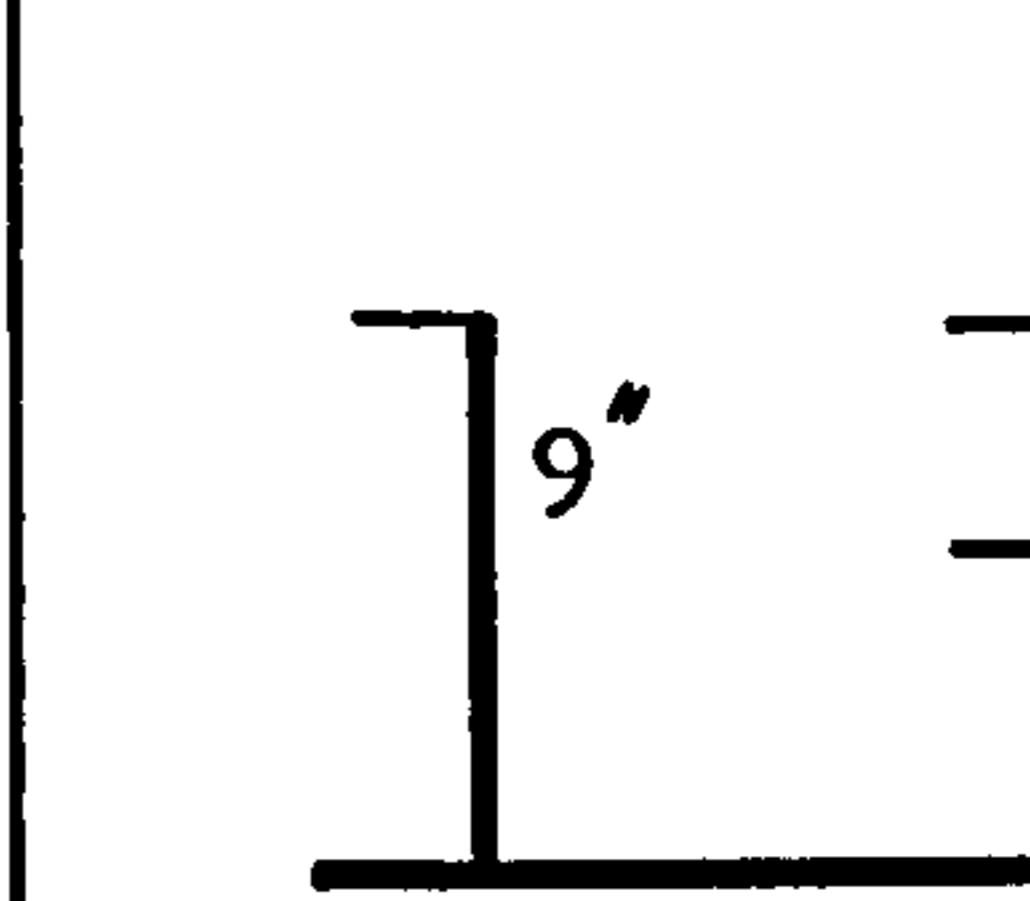
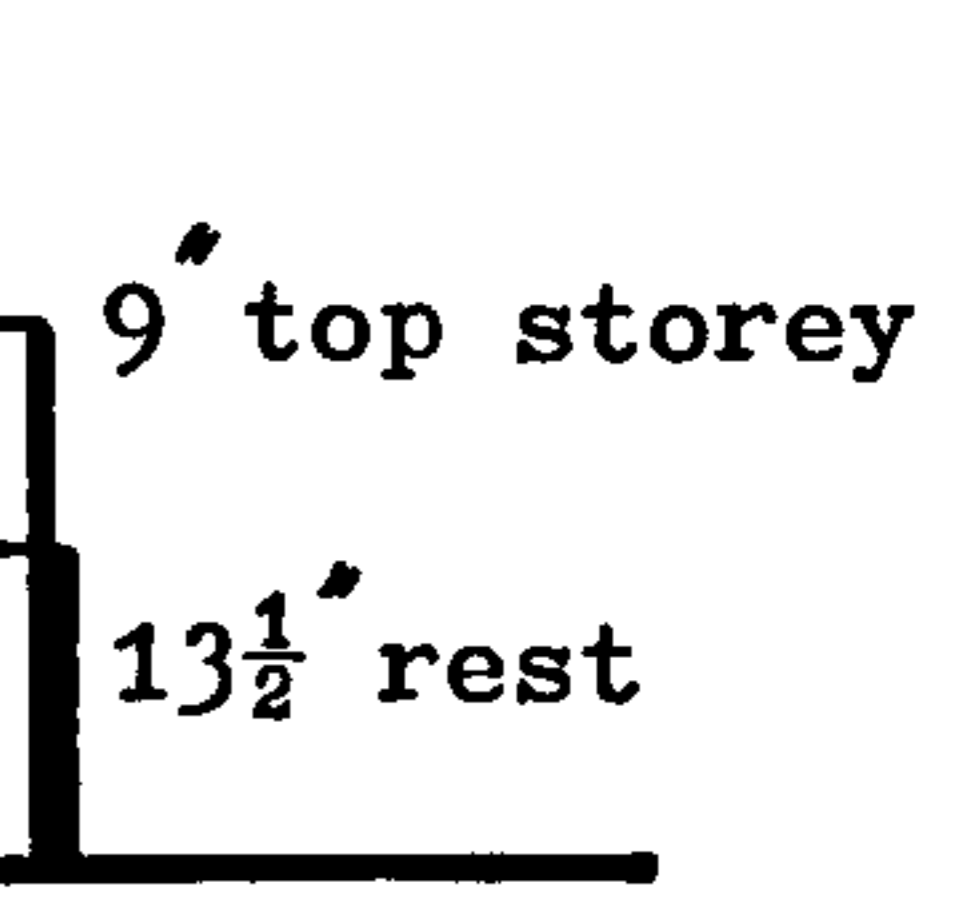
68	Window to w.c. to be 2'0" x 1'0" min. in external wall and to have air brick also.	T7.c23	T21.c68 T13.c39
69	Cistern required to w.c. Proper design of pan, non-absorbent etc, no D-traps.	new	T18.c69 T13.c39
70-72	Earth Closet - receptacle required.		T10.c71
73-79	Privy - 6'0" min from house - certain distance from water supply for drinking - access for cleansing - ventilation to open air at top - non absorbent floor - seat construction - size of receptacle etc.	T7.c23	T17.c25 T13.c39
80-85	Ashpit - 6'0" min from house - not near drinking water - of size to take one week's accumulation of ashes etc - pit to be of 9" brickwork, rendered, flagged and slate floor.	T7.c25	T17.c31 T13.c39
86-89	Cesspool - certain distance from house and from drinking water - of easy access for cleaning - contents not to be carried through house - not to be connected to sewer - built of good brick work, rendered, with 9" min well puddled clay around brickwork and beneath - to be ventilated.	T7.c24	T13.c39 T17.c39
90-99	(By-laws for closing buildings unfit for habitation and administrative matters concerned with notices for the deposit of plans etc).		
1	PRELIMINARY MATTERS Interpretation of terms.		
2	Exempted buildings:- Royal buildings, lunatic asylums, sessions houses, gaols, river canal and dock buildings, mine buildings, buildings under the Improvement of Land Act 1864, buildings authorized by the Secretary of State. ALSO Plant houses, poultry houses, aviaries etc at least 10'0" from other buildings, not heated by hot water and with detached fireplace (if any) and with no flue of any	T7.c12	also see T10.c2a
		T6.c6 and T7.c12	T14.c201

	<p>kind inside. ALSO Any building not public, not over 30'0" high, not over 125,000 cu.ft. not habitable or used for employment, at least 8'0" from street and at least 30'0" from nearest building or land adjoining. Any building, not public, over 30'0" high, over 125,000 cu.ft. not habitable or used for employment, at least 30'0" from street and at least 60'0" from nearest building or land of adjoining owner. ALSO Any temporary hospital for infectious diseases.</p>	<p>T6.c6 and T7.c12</p>	<p>T14.c201</p>
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NOTES

- 1) Railway buildings were still exempted by reason of Section 157 of the Public Health Act of 1875.
- 2) Sizes of chimney flues were still covered by the Chimney Sweepers Act of 1840 (3 and 4 Vic.cap.85 sect.6) - at 14" x 9".

<p style="text-align: center;">HEIGHT 90-100'0"</p> <p style="text-align: center;">Length up to 45'0" over 45'0"</p>	<p style="text-align: center;">HEIGHT 80-90'0"</p> <p style="text-align: center;">Length up to 45'0" over 45'0"</p>
<p style="text-align: center;">HEIGHT 70-80'0"</p> <p style="text-align: center;">Length up to 45'0" over 45'0"</p>	<p style="text-align: center;">HEIGHT 60-70'0"</p> <p style="text-align: center;">Length up to 45'0" over 45'0"</p>
<p style="text-align: center;">HEIGHT 50-60'0"</p> <p style="text-align: center;">Length up to 45'0" over 45'0"</p>	<p style="text-align: center;">HEIGHT 40-50'0"</p> <p style="text-align: center;">Length up to 30' 30'-45' over 45'</p>

HEIGHT 30-40'0"	HEIGHT 25-30'0"	HEIGHT UP TO 25'0"	
			
<p>Length up to 35' over 35'0"</p>	<p>any length</p>	<p>Length up to 30' and not more than 2 storeys</p>	<p>Length over 30' or more than 2 storeys</p>

- 1) If any storey is over 16 times in height the thickness of its walls, the wall thickness is to be increased by 1/16th part of the storey height and walls below increased in proportion.
- 2) Every external and party wall in any storey over 10'0" high to be 13 1/2" thick min.
- 3) In walls over 60'0" high and 45'0" long, or in storey height over 16 times the wall thickness, the extra thickness may be confined to piers properly distributed - of which the total widths = 1/4 the length of the wall. Width of piers may be reduced if projection is proportionately increased, the sectional area not being diminished and projection of such pier is not to exceed 1/3 of its width.

HEIGHT 80-100'0"			HEIGHT 60-80'0"	
Length	up to 45'0"	over 45'0"	up to 45'0"	over 45'0"
Thickness at base	26"	30"	22"	26½"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"

HEIGHT 50-60'0"			HEIGHT 40-50'0"		
Length	up to 45'0"	over 45'0"	up to 30'0"	30'0"-45'0"	over 45'0"
Thickness at base	22"	26"	18"	22"	26"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"	13½"

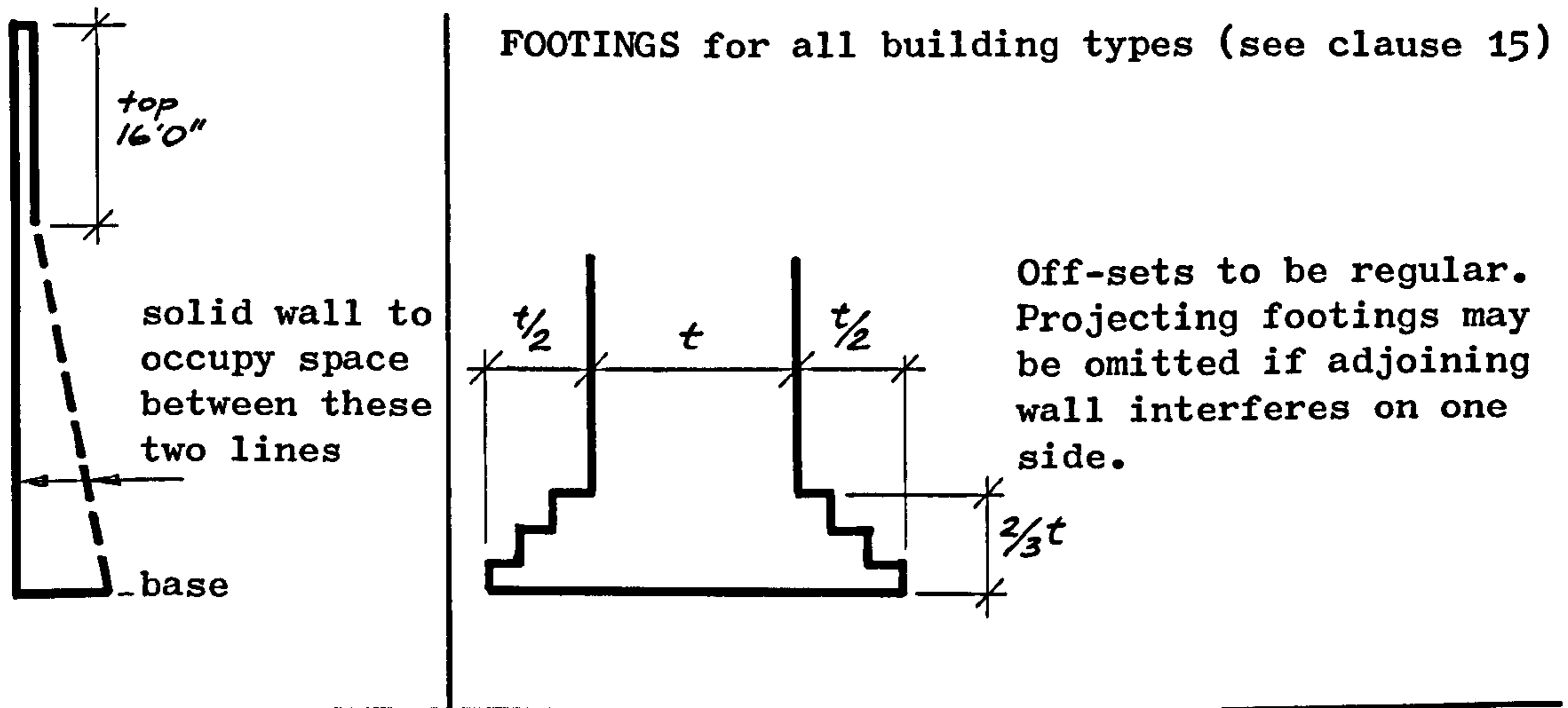
HEIGHT 30-40'0"			HEIGHT 25-30'0"		
Length	up to 35'0"	35'0"-45'0"	over 45'0"	up to 45'0"	over 45'0"
Thickness at base	13½"	18"	22"	13½"	18"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"*	13½"*

HEIGHT UP TO 25'0" = for any length of wall, thickness at base = 13½" and thickness for top 16'0" of wall = 13½"*.

NOTES

- 1) In walls not over 30'0" high, the thickness of the top 16'0" of wall may be reduced to 9" thickness in the top storey, if the top storey is not over 10'0" high. (Dimensions marked with * in table above).
- 2) If any storey height is over 14 times the wall thickness prescribed the thickness is to be increased by 1/14th the height of the storey - and the walls below increased in proportion.
- 3) Every external and party wall in any storey over 10'0" high, to be 13½" min. thickness.
- 4) Where walls are over 60'0" high and 45'0" long, or the storey height is over 14 times the wall thickness prescribed, the extra thickness may be confined to piers properly distributed, of which the collective width = 1/4 the length of the wall. Width of piers may be reduced if projection is proportionately increased,

the horizontal sectional area not being diminished, but the projection of such piers is not to exceed 1/3 of its width.

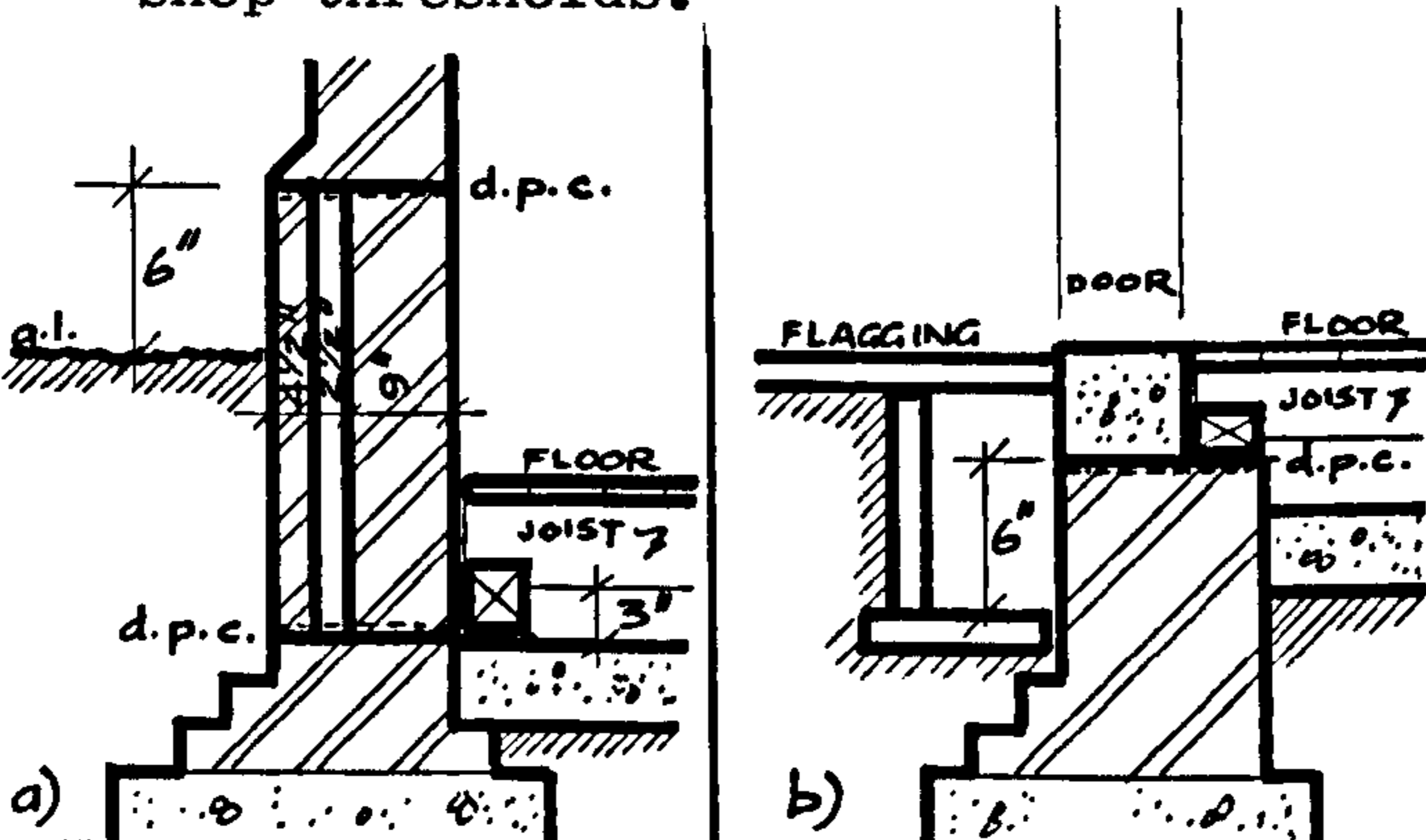


SUMMARY OF AMENDMENTS MADE TO THE ORIGINAL SET BETWEEN
 1877 and 1883

(to be read in conjunction with Table 8)

SOURCE : Knight's Annotated Model By-laws. First Edition, 1883
 Reference in text : page 294.

CLAUSE No as per Table 8	SELECTED CLAUSES relating to building design and construction. Summary of contents	LINKS	
		ANTE	POST
6	<p>STREETS (It was suggested that the 24'0" min. street was now unwise, and that the minimum should now be 36'0" for all streets. "Indeed, that minimum width might in many instances be increased with advantage to say 40'0"). It was noted that no widths were specified for Back-streets, such streets could not be required under a by-law and indeed "the provision of such streets might be hindered if the by-laws prescribed a really adequate road".</p>	Knight 1883	T10.c6
10A	<p>STRUCTURE LOW LYING SITES In low lying sites and areas used for brick earth excavation, it was now possible by means of by-laws, to control the substratum of the site prior to building on it. Following the removal of clay etc, a layer(s) of sound and suitable material was required sufficient to elevate the site and to form a stable and healthy substratum for the foundations.</p>		see also T10.c10
		(as used at Sculcoates R.D.C. Yorkshire)	T21.c12
10B	<p>On low lying sites near a river, the clause was above, with an allowance for cement, concrete, masonry or brickwork as well, in order to bring the level to a certain specified level above the ordnance datum level.</p>		T21.c13
11A	<p>HALF-TIMBER WORK The following clause may be incorporated:- a) House, 15'0" min. from adjoining building, external walls may have timber framing if: i) properly put together and spaces</p>	Knight 1883	T18.c14

	<p>between timbers filled with brickwork, and</p> <p>ii) $4\frac{1}{2}$" min. of brickwork behind all timbers and bonded to the infill brickwork.</p> <p>b) Block of 3 houses (max), 15'0" min. from other buildings, external walls may have timber if:</p> <p>i) each house is separated by a proper party wall, as per relevant by-law, which projects 1" in front of any timber in the adjoining external walls, and</p> <p>ii) as for i and ii in part (a) above. (The use of this clause therefore modified clauses 22 and 24, see below).</p>	<p>Knight 1883</p>	<p>T18.c14</p>
<p>17</p>	<p>DAMP PROOF COURSE</p> <p>It had been suggested that a vertical d.p.c. be employed in cellar walls - but it was held legally that it did not form part of the <u>structure</u> of the wall, for which the by-laws were only allowed. However, the following alternatives were possible</p> <p>a) with two d.p.c.'s and a cavity in the wall below the ground level, (the cavity could then be filled with asphalte). Iron or vitrified stoneware wall ties were to be specified at intervals of 3'0" horizontally and 18" vertically.</p> <p>b) shows the solution suggested for shop thresholds.</p> 		<p>T11.c2</p>
	<p>CAVITY WALLS</p> <p>It was also noted at this time that hollow (i.e. cavity walls) were now recognised and that a special proviso was sometimes inserted 'as otherwise some inconsistency might be held to attach to the retention of the word "Solidly". It was also sometimes considered desirable to further</p>	<p>Knight 1883</p>	<p>T10.c11</p>

	require the cavity to be provided with proper means of draining away water from it".		
22A	(For use when clause 11A was employed) a) stone or clunches of bricks - walls to be 1/3 greater than normal brick wall. b) wall in which brickwork equals at least 1/5 the entire content of the wall, properly distributed with piers and with horizontal courses or of half timber work - shall be of sufficient thickness the same as wall built of bricks.		T21.c25
24	(For use when clause 11A was employed) Modified to exclude also the timber framing in external walls, as well as the bressummer, storey posts under a bressummer and shop door window frames.		T21.c25
25A	(Clause 25 now modified to apply only to larger buildings and to exempt small dwelling houses). Every public building, warehouse, dwelling house shop, etc, <u>over 30'0" high</u> to have parapet 12" high, 9" thick, whenever the building is closer than 15'0" to another building.		T21.c27
26A	Clause 26 now modified in many districts so as not to apply to houses less than 30'0" high, provided that the party wall is carried up properly to the underside of the roof slates. (This clause may be omitted where clause 109 of the Towns Improvement Act 1847 still operates). Roof covering solidly bedded on mortar to top of party wall - no timber to extend upon or across the party wall.	Knight 1883	T21.c28
13	(now altered to omit balconies).		T21.c16

SUMMARY OF THE FURTHER AMENDMENTS MADE TO THE ORIGINAL SET
 BETWEEN 1883 and 1889
 (to be read in conjunction with Tables 8 and 9)

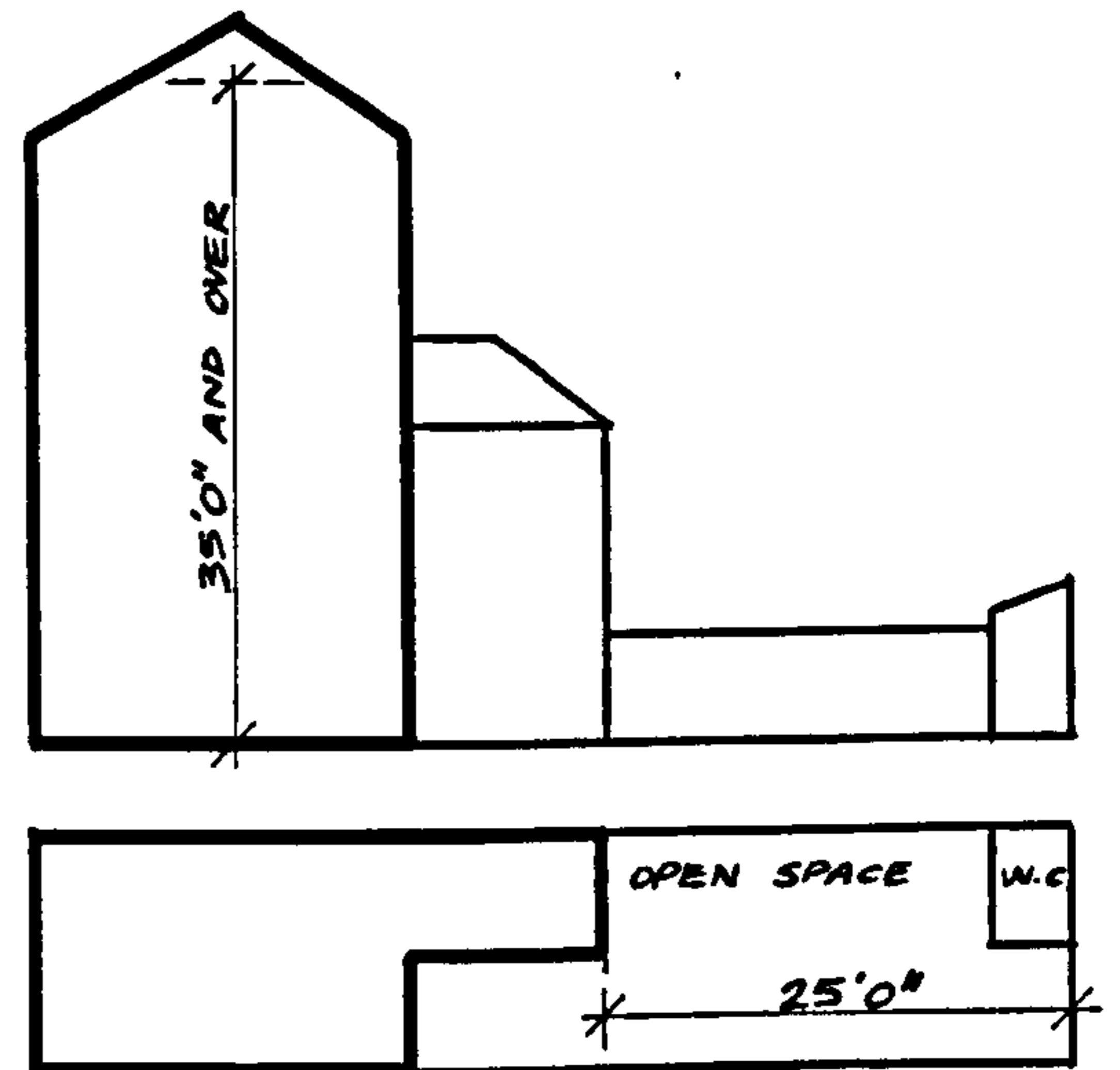
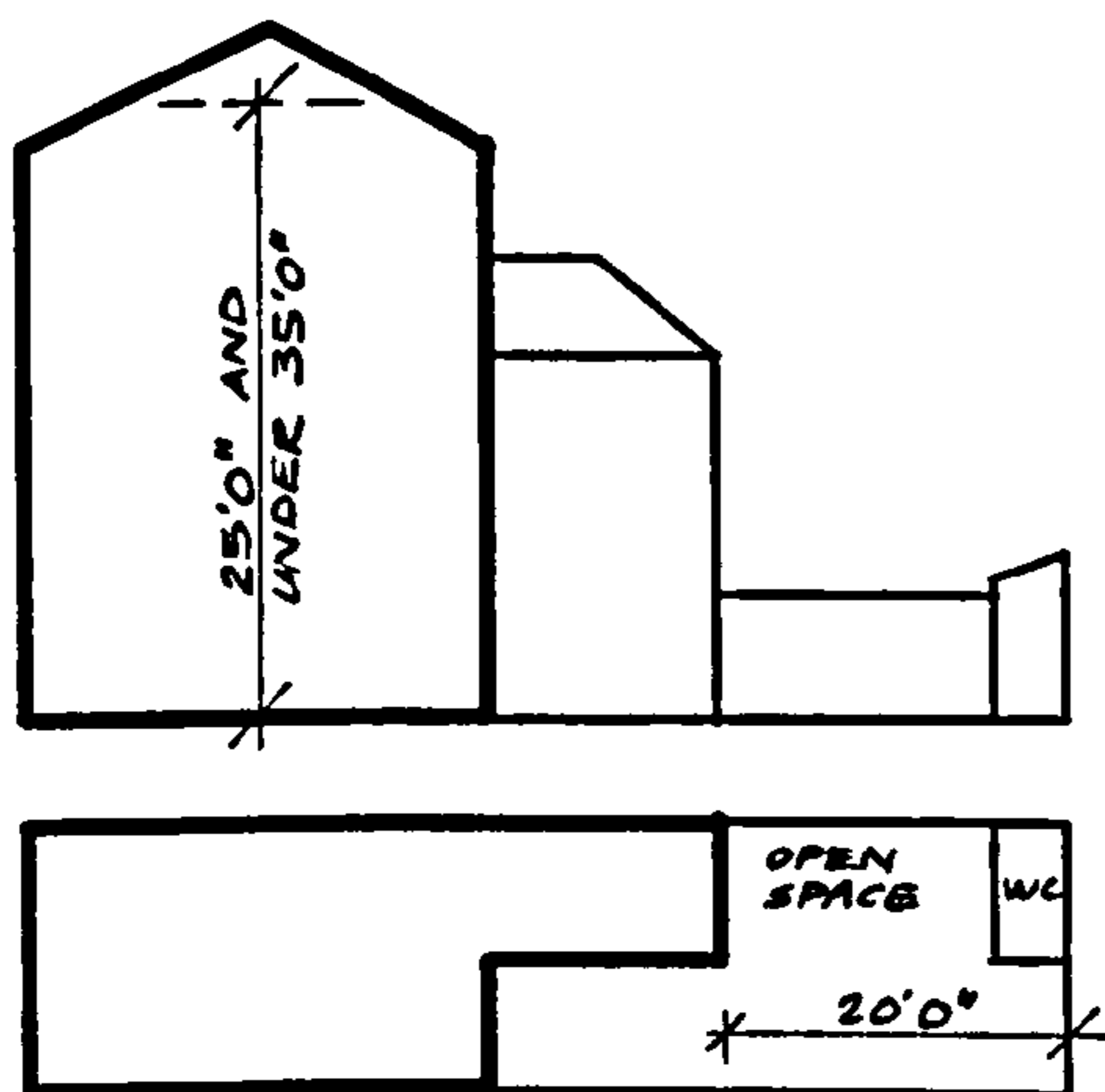
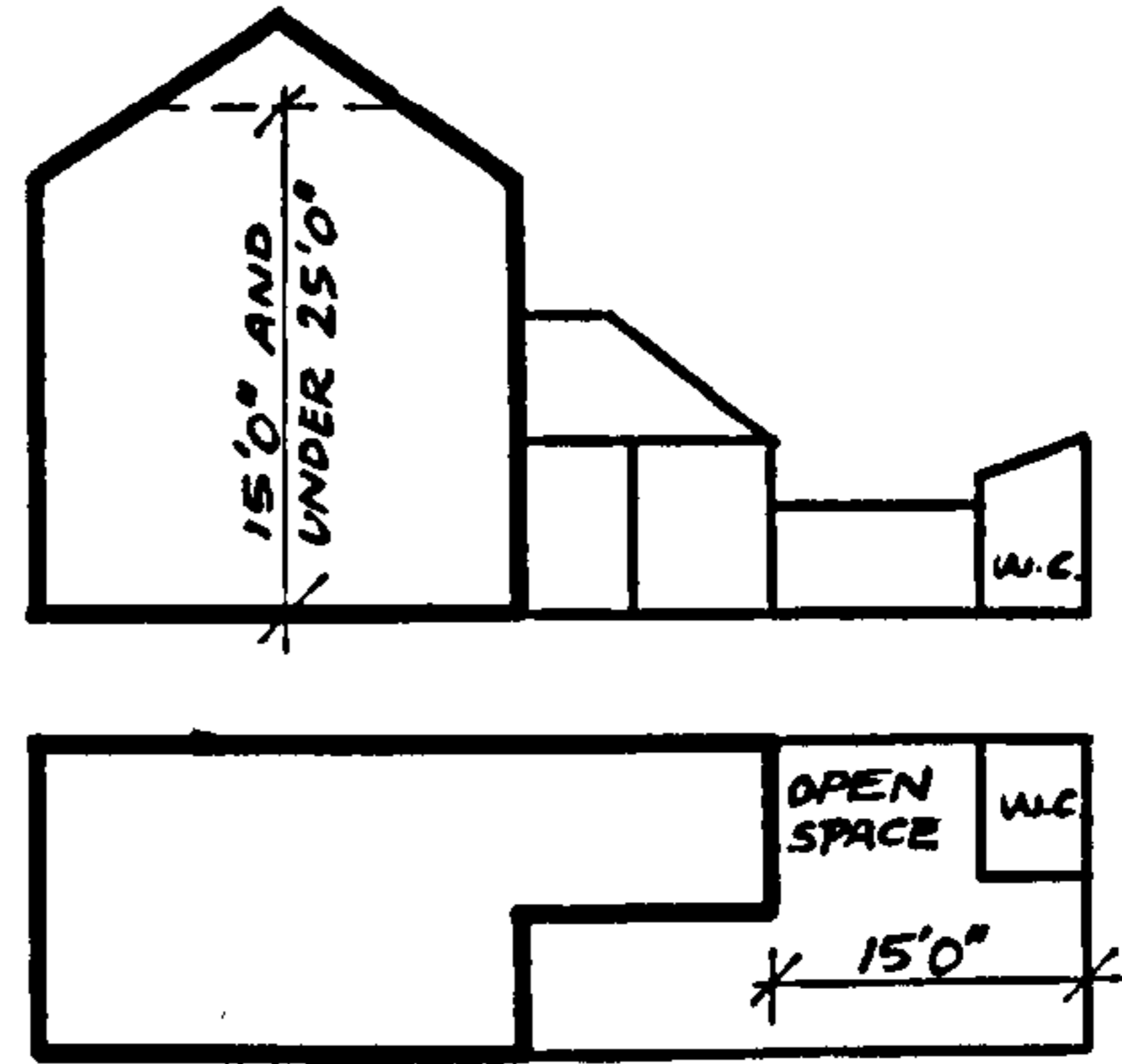
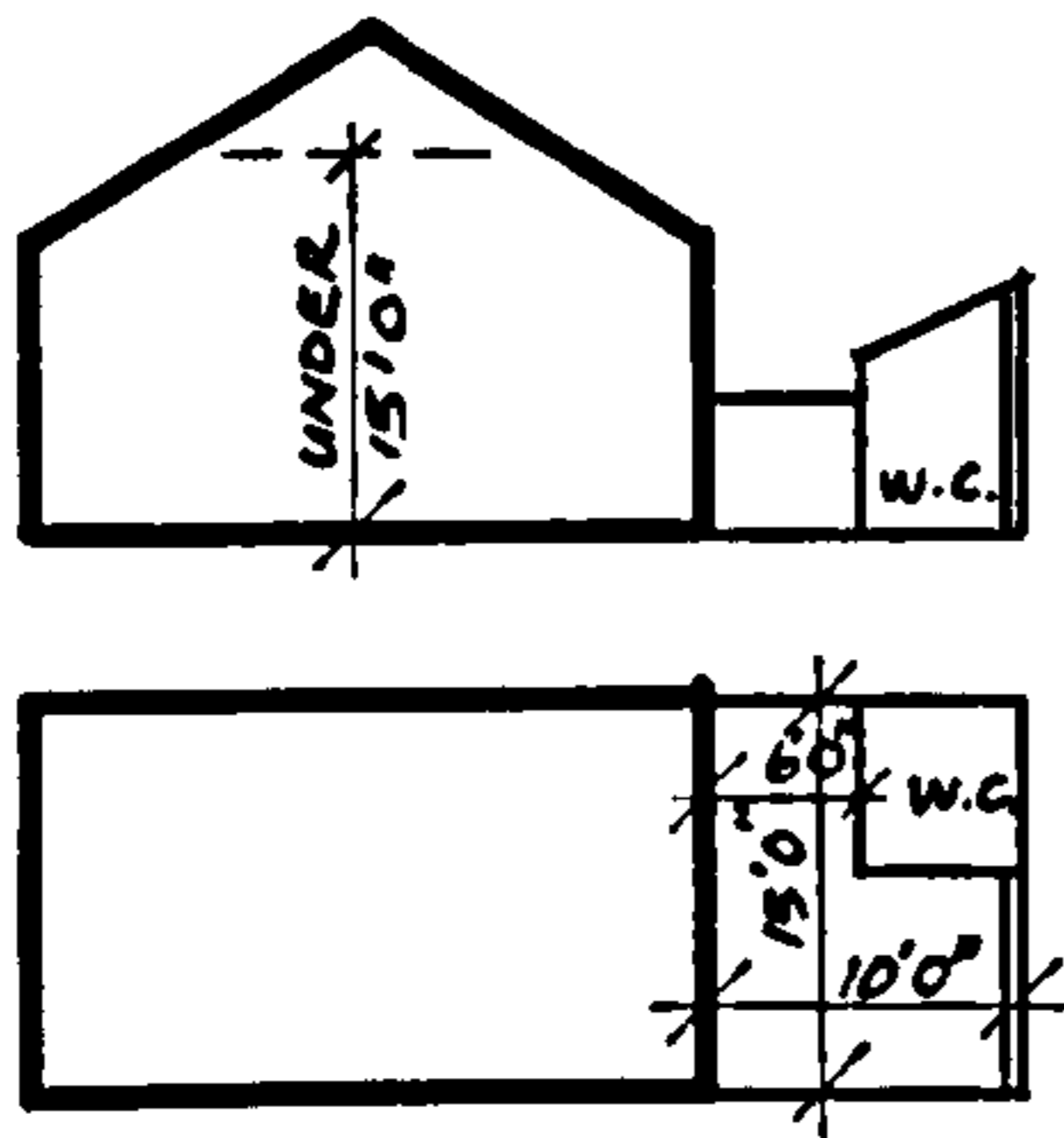
SOURCE : Knight's Annotated Model By-laws. Third Edition 1890
 Reference in text : page 304 & 307.

CLAUSE No. As per Tables 8 and 9	SELECTED CLAUSES relating to building design and construction Summary contents	LINKS	
		ANTE	POST
2A	<p>GENERAL EXEMPTION OF IRON BUILDINGS The following buildings could now be exempt from by-laws 11 - 35 inclusive:- Single storey : with iron walls, not over 12'0" high, not over 2,000 cu.ft. not for human habitation, and at least 10'0" boundary Single storey : iron walls, between 12 - 15'0" high, not over 15,000 cu.ft. not for human habitation, 8'0" min. from street and 15'0" min. from nearest building or land in other ownership Single storey : iron walls, between 15-30'0" high, not over 80,000 cu.ft. not for human habitation, 8'0" min. from street and 30'0" from nearest building or land in other ownership.</p>	Knight 1890	T21.c3 and see also T12.c12
6 6A	<p>STREETS Notwithstanding the remarks made in 1883 on the topic of backstreets (see Table 9) it was now suggested that if a back street was included in the by-laws, the min.width should be 10'0". However, a model clause was also suggested as follows:- STREETS FOR ACCESS FOR CLEANSING ETC, NOT THE PRINCIPAL APPROACH:- 16'0" min.width. If such street not over 300'0" long, then the width could be 13'0" min.</p>	Knight 1890	T16.c3
10	<p>STRUCTURE (It was noted that if the concrete site layer was ever omitted, then the distance under the floor space should be increased from 3" to 9". This would however add two courses of brickwork all round the building. It was also pointed out that the</p>	Knight 1890	

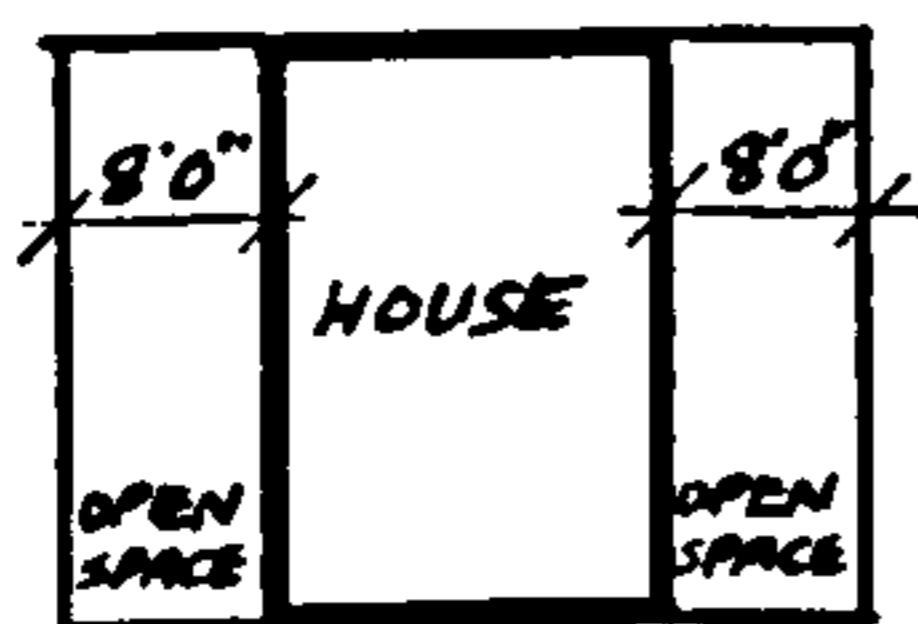
	<p>concrete floor was in itself satisfactory as a floor finish in lobbies, kitchens etc).</p>		
<p>11</p>	<p>CAVITY WALLS The following by-law could be made</p> <ul style="list-style-type: none"> i) width of cavity = 3" max. ii) the two leaves tied together by galvanised iron, tarred, iron or glazed stoneware ties, spaced 3'0" horizontally and 18" vertically max. iii) thickness of each leaf to be not less than 4½". iv) thickness of the two leaves together, excluding the cavity, shall not be less than the min. thickness for a solid wall of the same height and length and in the same class of building. v) wooden lintels under cavity walls to have a layer of lead or similar, on upper side, to protect the wood work from any moisture in the cavity. 	<p>(see also T9.c17)</p> <p>Knight 1890</p>	<p>T18.c14</p> <p>T21.c14</p>
<p>52A</p>	<p>All water falling on a roof to be received into suitable gutters, etc, and then discharged into a pipe. (see also cl.60A). These two clauses used only where section 74 of the Towns Improvement Clauses Act 1847 (10 and 11Vic.cap.34) is not in operation. (see Table 5) in rural areas.</p>	<p>(T7.c22)</p>	<p>T21.c60</p>
<p>53A</p>	<p>SPACE ABOUT BUILDINGS AND VENTILATION</p> <p>An alternative clause for open space in front of a building.</p> <p>Where a new house fronts onto a street less than 24'0" width (i.e pre-by-law), an open space is to be provided in front, measured to opposite side of street throughout the whole line of frontage and extending to a distance equal to the width of the street plus half the difference between such width and 24'0".</p>	<p>Knight 1890</p>	
<p>54 54A</p>	<p>Open space at rear.</p> <p>Alternatives were now allowed to cope with buildings on awkwardly shaped sited - for two streets meeting at an acute angle, at a right angle, on</p>		<p>T21.c53 and T18.c53</p>

TABLE 10
Sheet 3

56A	shallow sites adjacent to pre by-law streets and sites tapering at the rear, A range of solutions is shown on Table 10 sheet 4 overleaf).	Knight 1890	
	Alternative - allows a 9" air space under a boarded floor if the ground is not covered with either concrete or asphalte.		T18.c55
60A	DRAINAGE A suitable pipe required, from roof to ground, connected to gutter, to receive roof water and to carry it away from walls and foundations of buildings. (see also clause 52A above).	(T7.c22)	T21.c60
66	Possibility of regulating for 'trough closets' e.g. for use out of doors for schools etc, was now recognised.		T18.c67
71A 71B 71C	These clauses replaced former clause 71 and 72 and were designed to prevent earth closets being fixed inside houses.	Knight 1890	T21.c71 T13.c39

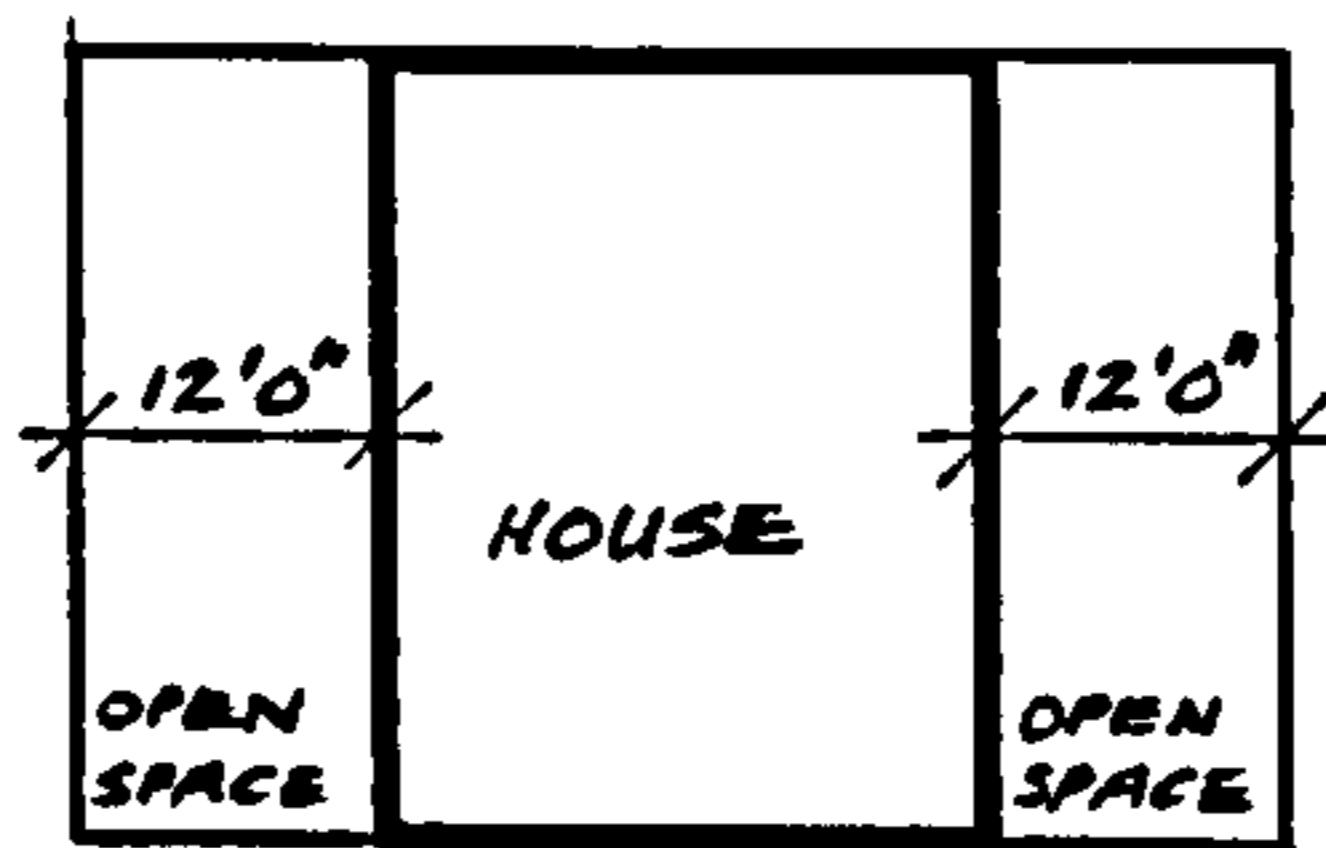


The standard condition covered by Model By-law 54, described on Table 8, sheet 7.



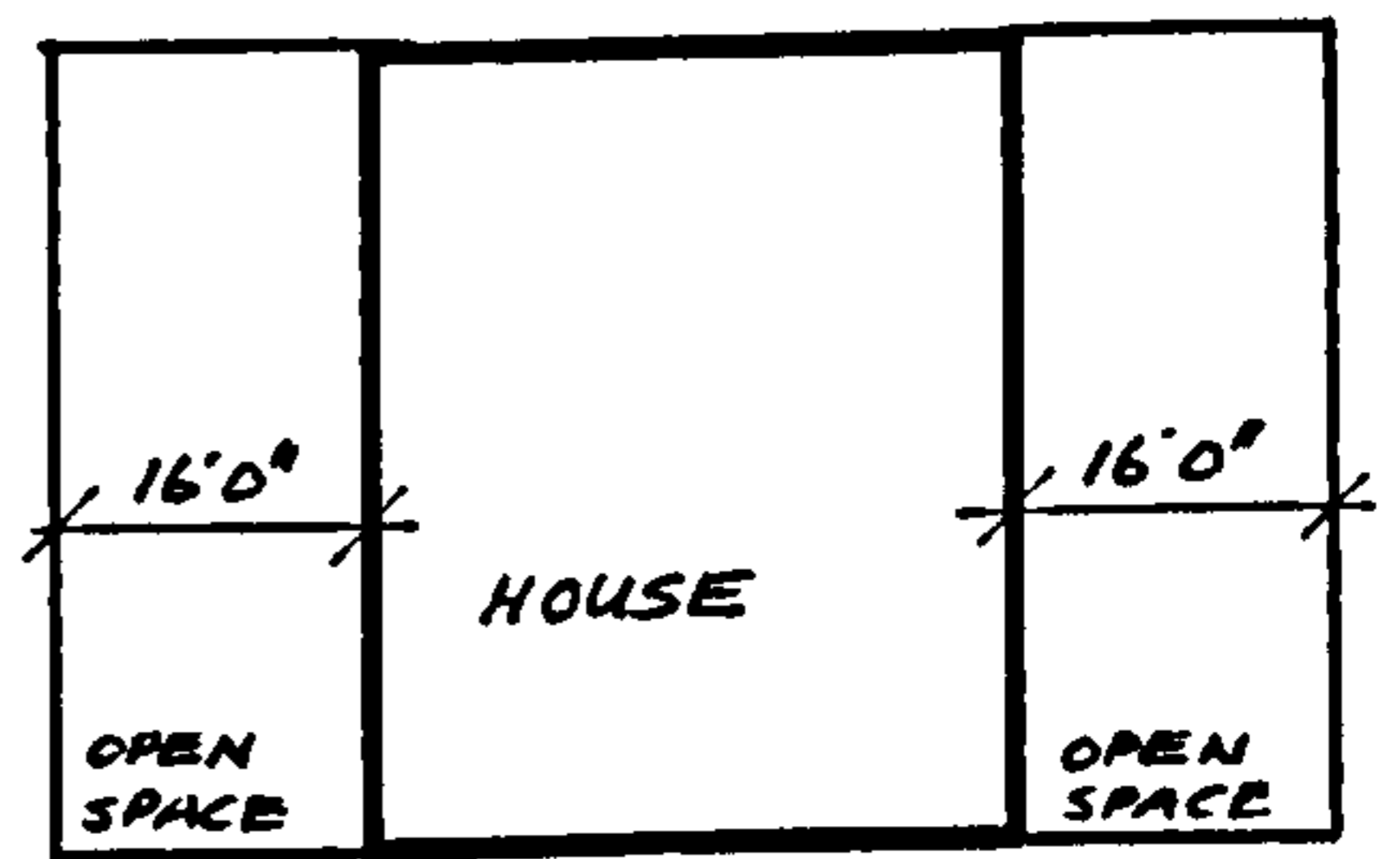
STREET

HOUSE, under 15'0" high.



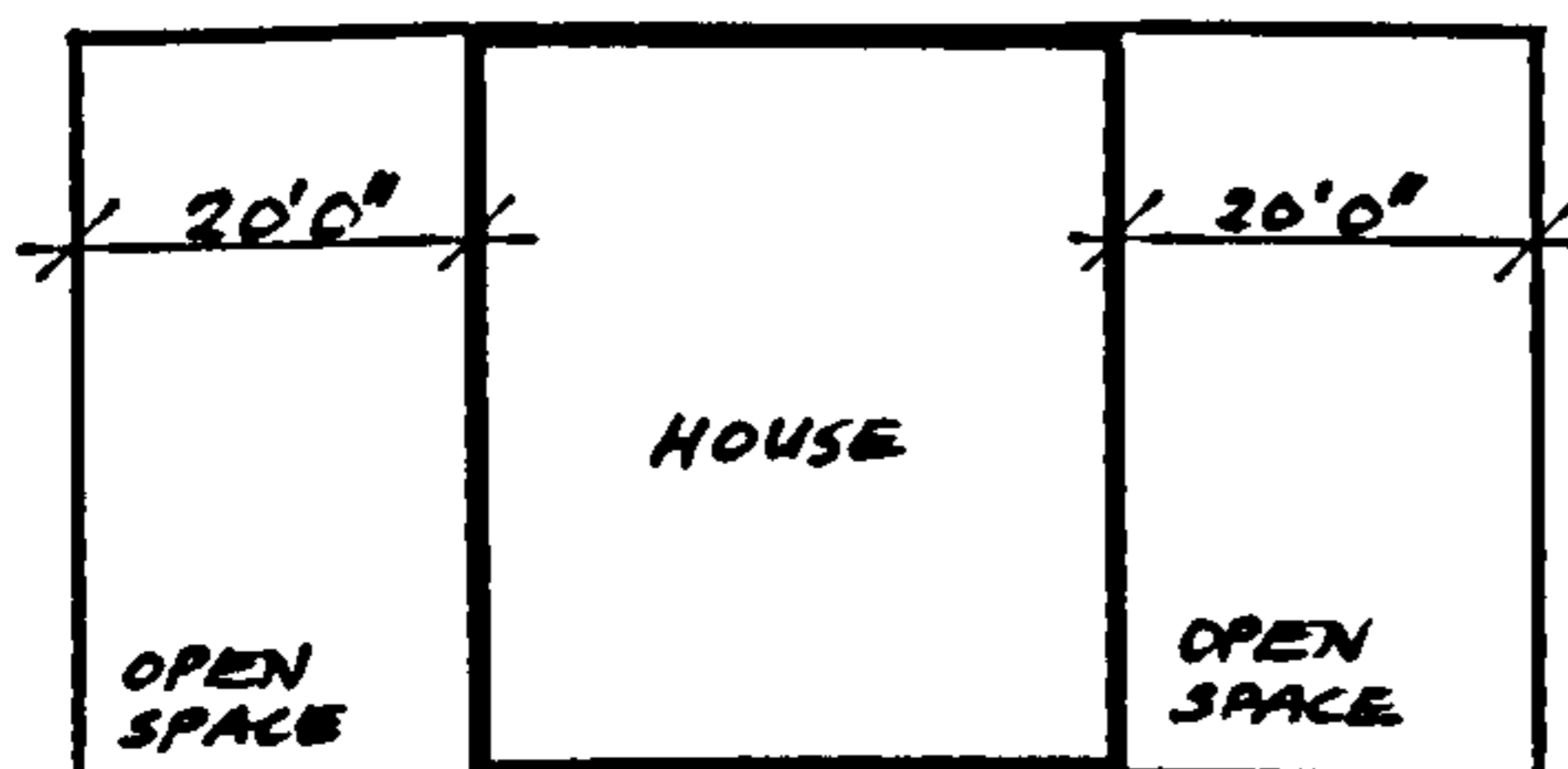
STREET

HOUSE, 15'0" and under 25'0" high.



STREET

HOUSE, 25'0" and under 35'0" high.

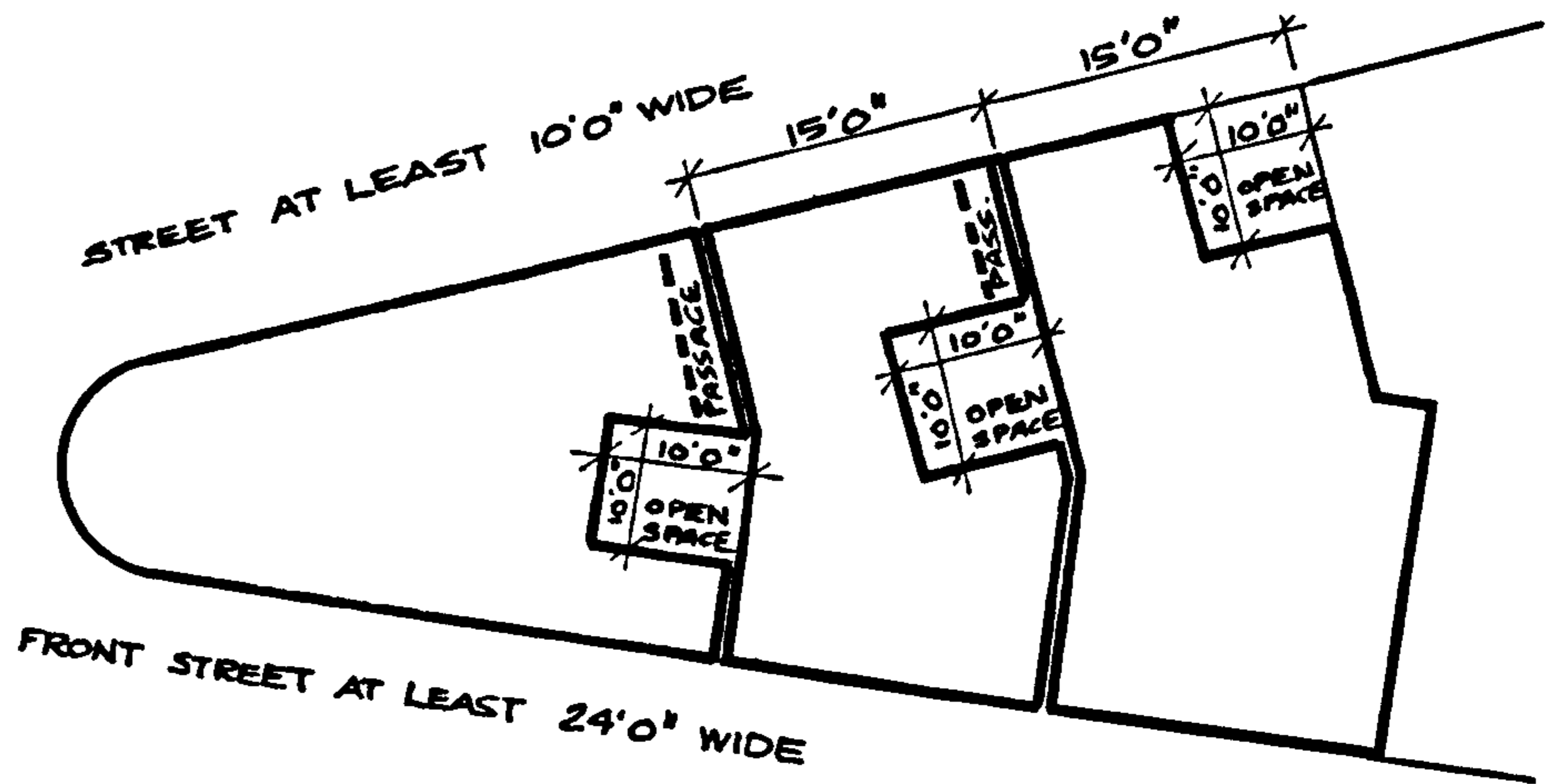


STREET

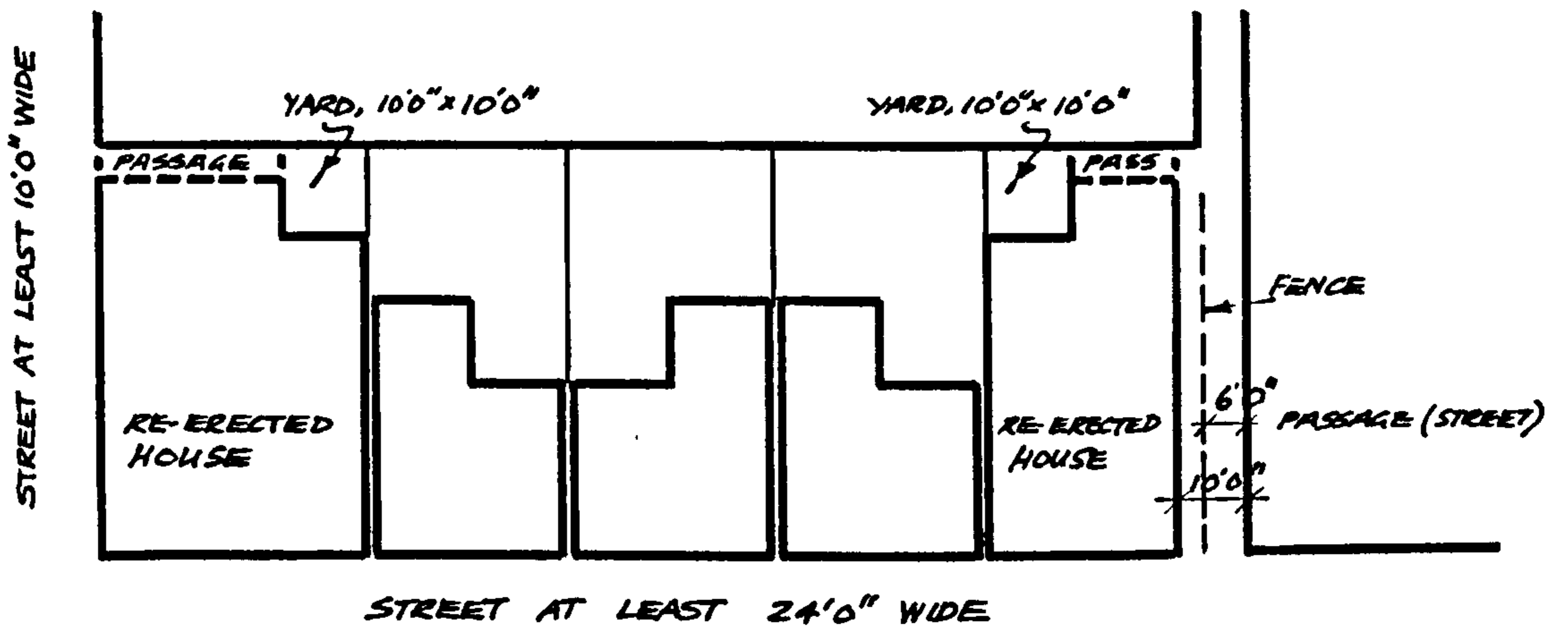
HOUSE, 35'0" high and upwards.

Variations for situations where plots adjacent to pre by-law streets have insufficient depth from front to back to accommodate the standard condition. Open space may be provided on two opposite sides of the house, as shown here.

SOURCE: Knight's Annotated Model By-laws, Third Edition, 1890, p.118 and 121.

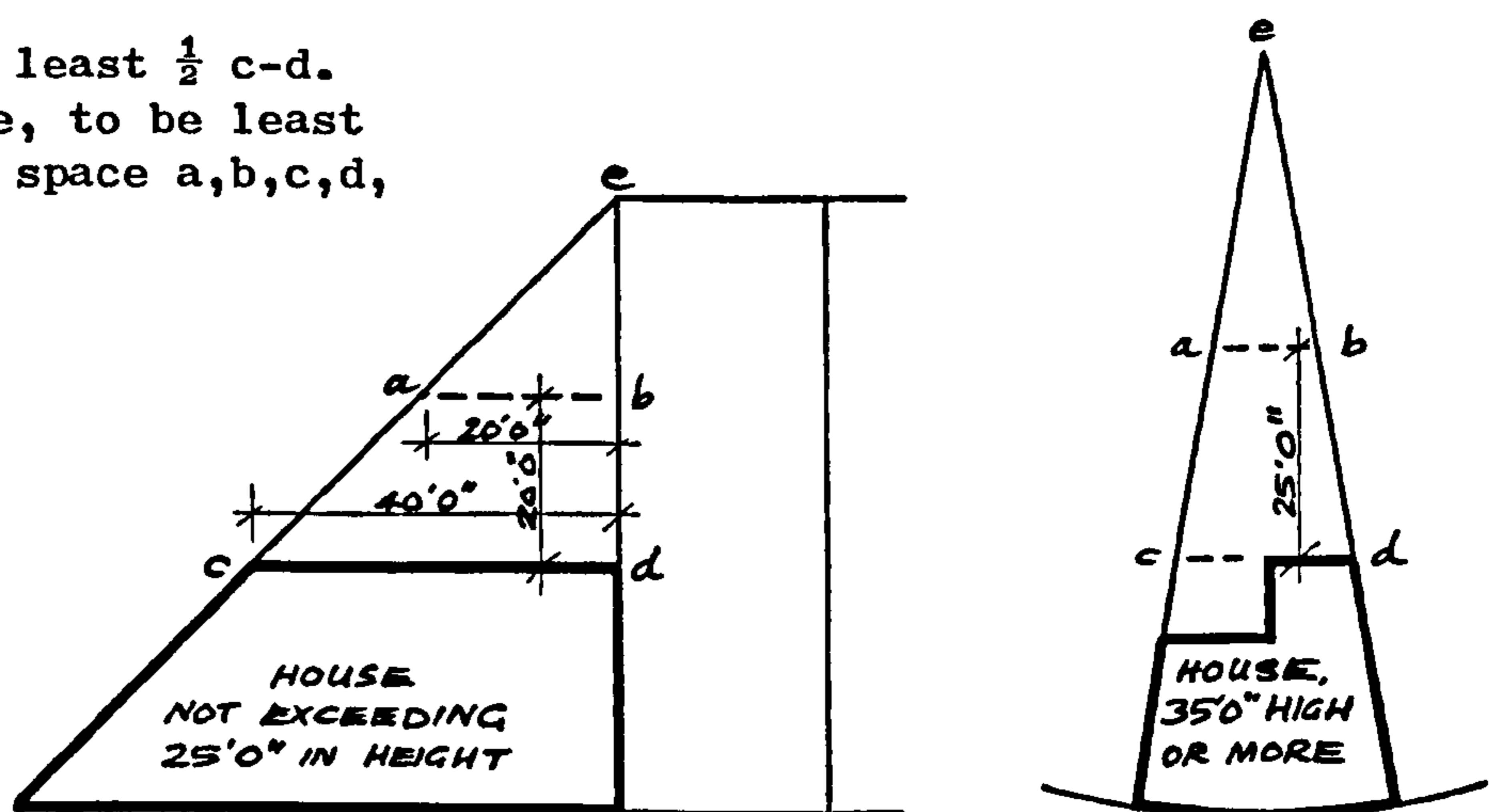


Variations for sites adjoining two streets meeting at an acute angle



Variations for sites where two streets meet at right angles

a-b to be at least $\frac{1}{2}$ c-d.
area of a,b,e, to be least
one third of space a,b,c,d,



Variations for sites which taper to the rear

SOURCE : Knight's Annotated Model By-laws, Third Edition, 1890 pp.
120, 123 and 125

CHAPTER VII

LONDON : THE PRESSURES FOR CHANGE 1875-1891

Seen against the peak achieved by the Public Health Act in 1875, and its attendant range of Model By-laws, the lowly situation of London's building regulation made a poor comparison. The Bill of 1874 had, as we have seen in chapter IV, come to naught, largely as a result of the strong pressures various vested interests had brought to bear on the valiant Metropolitan Board of Works. The Act of 1855 was still in operation, leavened slightly by the amendments made in 1862, but its effectiveness was on the decline. One architect, H.H. Collins, praised the scope of the new provincial by-laws which were based on the model set, and at the same time protested that the Metropolitan Acts were now "practically inoperative ... surrounded by ignorance, apathy, official 'red-tapeism' - all in all a dead letter" (1). Nevertheless, he hoped that the Board "would not be deterred from performing its bounden duty ... that of securing an efficient workable Building Act" (2). The securing of such an act was to take another twenty years, and the tribulations of its gestation and birth are the subject of this and the following chapter - the first of which largely parallels the provincial scene described in the previous chapter.

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In spite of the failure of the 1874 amending bill, the pressure for a new measure continued to run on through 1875 and 1876. From the medical world, the old campaigner, Dr. Liddle, was still the spokesman, calling for new rules to prevent the erection of unhealthy houses, houses that were damp, lacking open space and proper sanitation. It is interesting to see that he now also included the need for sunlight - "especially for children" since, as he reported, "recent scientific evidence had established the benefits of sunlight" (3). This appears to be one of the earliest instances of any reference to sunlight in this context. From the architectural world came protests against the effect the current Act was seen to be having on both

design and construction. The effect on 'street architecture' was particularly deplored, the restrictions on projections being singled out (4), and antipathy was felt generally against the dull 'hole in the wall' character of earlier building (5). It was hoped that the removal of this "vexatious legislation" would provide a welcome opportunity for more picturesque design, but to the Board's credit, it was noted at the time that the earlier abortive Bill of 1874 had made concessions towards both oriel and bay windows. Oriel Chambers in Liverpool was held up at the time as an example of what could be achieved in this direction (6). The pressure for taller buildings was also gaining momentum. The current limit in the 1855 Building Act was 100'0", although it was possible to go higher with the permission of the Board of Works. Yet it was a sensitive subject, such as the case of Mr. Butler's plan for Alexandra Mansions in Victoria Street, Westminster, demonstrated, the controversy over which eventually reached the House of Commons (7). Protests over controls, or the lack of them, in matters of construction can be considered under our three categories of fire, stability and health. It was now generally accepted that the earlier belief in the efficiency of stone as a fire proof material for stairs and landings had been incorrect, and it was felt that this should now be recognised in the legislation(8). The demands from the growing world of commerce in the city put more pressure on the limit of 216,000 cu.ft. of building without party walls (9), and the increasing use of the tenement block put more emphasis on the need for proper horizontal fireproof separation by what were strangely referred to as 'horizontal party walls'. A seven storey block of such tenements in Northumberland Avenue was separated horizontally by "flimsy wood" ... then added 'The Builder,' quoting Paris as an example, "surely we can manage horizontal party walls in concrete in London?" (10). The structural use of concrete and iron was still subject to special licence and approval by the Board of Works, and the time was also more than ripe for a change there. Yet in the traditional field of brick walls there were also anomalies. It was possible for example to build up to 25'0" high in 9" brickwork, thereby allowing three storeys, which even in the opinion of the time was considered to be beyond reason, two storeys being the safe maximum (11). The lack of any reasonable definition of good mortar was a constant source of litigation (12), and

in the area of health, allied with structure, was the question of building over bad ground - 'dust shoots', as the Hackney District Board (the first to call for the regulation of this matter) called these refuse tips (13).

The comparison with Paris was frequently made at this time and it served to highlight the shortcomings in London's legislation. In Paris one had to build up to the Building Line for example, whereas in London one could build anywhere behind the line. Parisian room heights were 18" higher than their London counterparts, concrete floors and iron encased in 'plaster concrete' were the order in Paris, and party walls, 18" thick, went higher than those in London, up to a maximum of 65'10" in the public boulevards (14).

The feelings of frustration at the old 1855 Building Act often ran high. At times it could even provoke physical assault. One District Surveyor's clerk, minding his official duty, was hit over the head with a mallet by one irate member of the public who (his handwriting later confirmed) had previously sent the Surveyor an anonymous letter telling him to be careful "as he would be a corpse, and that he ought to be poleaxed and dipped in tar" (15).

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The Amending Act of 1878 and the By-laws of 1879

In March 1877 the Metropolitan Board of Works, through its Building Act Committee, unexpectedly produced a draft Bill to amend the Building Act of 1855. "The Bill ... has taken the architectural and building world by surprise" exclaimed 'The Builder' (16). The ways of the Board were a law unto themselves. The content of the technical clauses were not however very far reaching. A building line 20'0" from the centre of the road had been in the earlier Bill of 1874, but there was now an attempt to control materials and, following the pressure from Hackney, regulations to prevent houses being built on bad sites, made up and filled with rubbish. The main innovation, for London, was a proposal to control certain of these matters by means of by-laws, and this caused some concern in

many circles. The Bill itself meanwhile petered out as the last session of Parliament expired in the summer (17), but by October it was back on the Order Form again (18).

The proposal to control parts of buildings in London by means of by-laws therefore coincides with the publication of the Model By-laws for the rest of the country in the same year, 1877. But whilst it may be said that the use of the by-law was accepted in the provinces as a regulatory device, without a great deal of opposition - since most of the towns which adopted them had had no previous legislation in the form of their own Building Act, the concept was not so readily accepted in London, even though by-laws had been in existence since 1855 to control streets (under section 202 of the Metropolis Management Act, see page 164). The by-law lacked the conviction of the statutory measure. As one architect put it, "we are again asked to substitute 'uncertainty' for 'certainty' (19) and a 'Householder' wrote to 'The Builder':

"By-laws subject the whole case necessarily to a state of chronic uncertainty as to what is law and what is not law. By-laws never had, and never will have, the force of law and place in the hands of those making them an irresponsible power" (20).

The Bill proposed powers for by-laws to be made to cover foundations, materials, wall construction, theatres and music halls, and provocatively, power for the Board of Works to make or alter all the by-laws as only they themselves saw fit (21). This was naturally, and rightly, received with great suspicion. Such absolute power to a faceless authority was not to be contemplated. It would lead to corruption and jobbery, and was therefore vigorously opposed. Furthermore, it was seen as a retrograde step inspired by the short-sighted vestries, setting back severely the then current idea of a general set of building regulations for the whole country (see chapter VI) (22). These fears were partly allayed some three months later when a proviso was inserted in the Bill, limiting the powers of the Board in this respect of making or changing the by-laws. No changes could now be made without proper prior publication to all 'interested parties' - which included the R.I.B.A. - at least two months before any final confirmation by the Secretary of State (23). To dwell a little longer on this point, it is interesting to note that by 1890 the use of by-laws was generally more favourably received. The

London County (General Powers) Bill attempted at first to contain all the technical matters within the statute, a task which 'The Builder' rightly saw as being beyond the capabilities of a House of Commons Committee to devise. This 'blunder' as 'The Builder' called it, could have been avoided if a clause was to be inserted to allow by-laws to be made. It was feared that a non-specialist committee would meddle and unduly restrict the new controls (24). In the event, as we shall see later in this chapter, this did not happen, but it was a close thing. Only the experience in London of the by-laws of 1879 and 1886, backed by the example of the provincial by-laws, could account for this change, though there was the added realisation that building was becoming more complex and changing too fast for the slow unwieldy pace of statute law. That was fine in theory, but in practice, as so often in the history of building regulation, the story was rather less than satisfactory. "Only those who have had experience in administering the existing by-laws under the Amendment Act of 1878 can realise what a hopeless tangle they make, frequently rendering proceedings under them abortive and consequently mischievous in their futile results" bemoaned one District Surveyor in 1890 (25).

A Select Committee of the House of Commons investigated the new Bill in March 1878, and a number of expert witnesses gave indisputable evidence for the need for the proposed controls. Hackney was to the fore, with the unfortunately named Medical Officer of Health, Dr. Tripe, quoting lengthy statistics to prove the need for controls on 'unhealthy' sites. J.D.Mathews, District Surveyor for Stoke Newington, a rather reactionary spokesman on Building Act matters, whom we have met before in the discussions on a general building act (see Chapter VI), described the common practice of selling the excavated sand from a site and replacing it with inferior material, and also the equally widespread practice of using garden mould and road scrapings for mortar. Mr. Selway of the Board explained the proposed theatre regulations, which were principally concerned with means of escape in case of fire - a need identified in 1877 by Sir H.Selwin-Ibbetson's Committee. All these proposals received the authoritative support of Edward Barry, and John Whichcord who, referring to the fact that many of these rules were already in operation in the provinces,

affirmed that "he saw no reason why by-laws should not be laid down for the Metropolis also" (26). A District Surveyor contributed one further item which he felt it imperative to include, namely the prevention of three storey walls in 9" brickwork (27). The R.I.B.A. considered the Bill "somewhat short and summary" but for some inexplicable reason interpreted the Board's proposals as being intended to be a set of regulations "which would eventually apply to the whole kingdom, to reconcile differences in local by-laws" (28).

The Bill, after its third reading in the Commons survived its passage through the Lords, a Select Committee there concerning itself principally with the theatre regulations (29), and it was finally passed on 22 July 1878 (30).

The new by-laws appeared in October 1878 and were duly sent to the R.I.B.A. and the Institute of Surveyors for their comments (31). Site concrete at 9" was obviously too thick, 5" was suggested, but in the end 6" won the day. On the other hand footings proposed at 12" thick and projecting 6" from the side of the wall above, were felt to be insubstantial. This reflected the general uncertainty about the nature of concrete, yet even so, a tentative proposal was made at this time to actually relate the thickness of the concrete to the height of the wall (32). The quality of stone was set at 110 lb. per cubic foot - an over-precise requirement which did not survive, but a damp proof course at 1'0" above the base of the wall, first mooted in 1870, was now to remain. A vertical damp proof course was not included (as it had also failed to find a place in the Model By-laws), but the tops of parapet walls were again blessed with a clause requiring their protection by a waterproof and fire-resisting material - the first time the word waterproof had been applied to a building material (33). Rules for furnace chimneys were proposed, as were by-laws for concrete walls - but these failed to pass and had to wait, the concrete until 1886 and the furnace chimneys until 1894 (34). More seriously was the omission once again of controls on timber and iron construction - "some day laws may enact that floors and roofs shall be strong enough to stand, but that time has not yet come" (35).

Although the professional bodies tended to support the proposed by-laws,

the builders, not surprisingly, took a contrary view. Over one hundred of them met at the Guildhall Tavern in Gresham Street in March 1879 to vent their feelings. The by-laws, they said, were too stringent; they would add to the cost of building and therefore the rents paid by the middle and working classes. They could see no hardship in building on land made up of rubbish tips, they saw no reason for a slab of concrete on every site, the 12" deep foundations below the footings were surely quite arbitrary, and who knew better than they how to make mortar? It was even rumoured that the interests of the Portland cement manufacturers were being suspiciously over emphasised. The proposed by-laws were:

"impractical, inexpedient, paternal, espionage ... a cross between the Weights and Measures Act and the Adulteration Act ... the Board did not understand what it was doing ... costs would go up by 15-20% ... children would go shoeless and a man half starve in order to live in a new house" (36).

From 'A Victim' however, came the other side of the story. The builders on the 'rubbish shoots' were in league with the rubbish contractors, removing sand from the sites and replacing it with the rubbish, "and are they not members also of the Vestries, District Boards and Guardian Boards, as well as energetic jerry builders" (37).

In their deputation to the Home Secretary, the Metropolitan and Suburban Builders Association objected to the concrete under all walls, the use of brick as fill, square sound bricks for internal as well as external walls, and the composition of mortar. Only on the matter of bricks were they to be successful, for the by-law in its final form called for sound well burnt bricks in party and cross walls only below ground level and above the roof - so poorer quality older or softer bricks and bats could still be used for the main part of these walls. The builders deputation also emphasised the economic argument - costs, they said, would rise by 15%, houses would be in short supply, and there would be an increase in foreign competition in the building trade (38).

The new by-laws in their final form were confirmed in October 1879 (39) (Table 11 sheets 1 and 2). They had been pruned - concrete walls were omitted and the sizes for the concrete site slab and foundations under walls reduced. The site concrete tallied with the Model By-laws of 1877, as did the removal of unsuitable material

from the site, and the coping of a parapet wall. More specifically defined in London were the mix for mortar and the sizes of concrete under the footings. The damp proof course was more devious and stringent in the London by-laws. Set at 12" above ground in external walls and 6" below the lowest floor level in party or internal walls, it would prove difficult to comply with, and difficult to form in a continuous course around the building. Altogether it was a muddled performance, suffering from external pressures from the 'vested interests' and compromised in a rather discreditable way by the Board of Works. It did little to stave off the pressure for a complete revision of the Metropolitan Building Act.

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The Amending Act of 1882 and the By-laws of 1886

Towards the end of 1881 the Metropolitan Board of Works approved the resolution of its Building Act Committee that "in their opinion, it is desirable that fresh legislation be sought" (40). The Board kept a book in which suggestions for alterations could be entered. One suggestion, coming from the Lambeth Vestry in October 1881, had called for an alteration to the legislation in order "to prevent the backs of houses being built so close together" (41). When the Board's own list of amendments was published in December 1881, it included therefore a provision for further space to be left at the rear or side of a house, as well as an open space to be left between houses built back to back (42). The list went on to suggest an increase in the limit to the cubic content of buildings without party walls, controls on the layout and, more significantly, the direction of streets, and procedural changes in the interpretation of the building line, relaxation of the controls on hot water pipes when near combustible materials, further controls on theatres and the regulation of timber stacks within a certain distance of the road (43). Once again, this last proposal was greeted with a storm of protest and was hastily withdrawn within a month of its re-appearance (44).

Further suggestions for matters requiring reform came from the architect Thomas Harris. Cavity walls should be allowed. It was strange, he

felt, to see a party wall so riddled with flues as to be virtually a cavity wall, yet legally, in an external wall, the cavity and the outer leaf had to be taken as additional to the basic wall thickness laid down in the Building Act. The merits of the cavity wall were obvious even then - it was impervious and stronger than a solid wall using the same amount of material. Secondly, the setting back of the window frame by $4\frac{1}{2}$ " did not, in Harris' opinion, afford any security against the spread of fire. It was, he said,

"no doubt originated in the classical tendency of the period when the act was framed ... but ... it cripples freedom of design in these enlightened days of art" (45).

But on the matter of the cubic content of buildings, Harris questioned the need for alteration and proposed instead the oft-repeated alternative of recognising the "horizontal party structure" in concrete and iron, with stairs and (note) lifts in a "continuous cavity walled enclosure and with iron doors". Harris had in a sense achieved this himself by using a brick vaulted basement, which thereby reduced the measurable volume and therefore the number of party walls in the building above. Harris suggested that flats could be built in the same way, and with a fireproof enclosed stair (46).

Now although mortar had been included under by-law control in 1879, the one other important area that was missing was plaster. Paddington Vestry sent a belated memorandum to the Board of Works, requesting some form of legislation to prevent 'road sweepings and slop' from being used, but they were too late, the notices had already been sent out and it could not be included in that Bill (47). It had to wait - and it came eventually in 1891.

In its final form the Bill (48) included controls on obstructions (bars, gates, etc) which might impede street traffic, a curious clause at first sight, and one which would appear to have its roots in the street controls of the 18th century Improvement Acts, but which was in fact inserted here in order to prevent private estate roads being too readily formed as a device to circumvent the general controls on public thoroughfares (49). The Bill also gave the Board powers to prevent the formation of culs-de-sac, to provide for open space in the forecourts of shops, the approval of temporary iron buildings (a matter then being paralleled in the Model By-laws), and the relaxation

of hot water pipes near combustible materials - but no definition was given for 'low pressure'. Open space at the rear of buildings now went up to 150 sq.ft.min with increases according to the length of frontage (see Table 12, sheet 1). Some confusion arose later as to how this was to be read in conjunction with the 1855 Building Act, T.Roger Smith and Banister Fletcher interpreted the two Acts together (50), whereas 'The Builder' thought that the one superseded the other, so that even if the rooms could be lit from a street or alley, they must still have the space at the rear (51). (See also the Henniken Mews case p.373).

Two matters dropped out of the Bill. The theatre regulations were transferred to the Metropolitan Board of Works (Various Powers) Act of the same year, 1882 (52), and the clause relating to the increase in the cubic content of warehouses was deleted in March 1882. One member of the Board of Works thought it should stay, despite the opposition of the Insurance Companies, the opinions of the House of Commons Select Committee and the evidence given to them in 1874 by Captain Shaw of the Fire Brigade. But, as other members of the Board were quick to point out, the retention of this one clause might endanger the passing of the whole Bill. "One must stoop to conquer" as they so poetically described their compromising attitude (53).

At the Committee stage in the Lords there was only one slight hitch as the Earl of Milltown took up the point about gates across streets, suggesting the bars to such streets as Gordon Street and Euston Square, on the Duke of Bedford's land, which had had gates and closure notices since 1835, were now an anachronism in the latter half of the nineteenth century. But his call to remove this 'anachronism' was unsuccessful. Their Lordships were loathe to sacrifice such traditional privileges (54), and the Bill became law on 19 June 1882 (55).

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Two matters which had been considered in 1878, namely building on bad ground and the construction of walls, produced new legislative measures in 1884 and 1886 respectively.

The unsuitable ground was in Peel Grove, Bethnal Green. This contained the remains of some 20,000 cholera victims, but the by-laws of 1879 were powerless to stop one enterprising builder from starting to build houses on it. A case was brought to court, but the Magistrate dismissed it, saying that the words 'site and foundation' could not be extended beyond the meaning in the Act, and the site had in fact been properly prepared with the requisite layer of concrete - even though they overlaid coffins stacked in graves 25'0" deep, with the top coffins only two or three feet below the surface. The 1879 by-law could not be applied - but the Magistrate pointed out that the remedy lay in the Board seeking a prosecution for a 'misdemeanour', on the lines of a previous case of a builder at Whitefields Chapel, Tottenham Court Road, who had been tried and successfully convicted at the Old Bailey (56). An appeal in the Peel Grove case was lodged, and dismissed (57). But by then the scandal had taken the matter to Parliament and a special Act just to cover this matter was hastily passed in August 1884 (58).

The legislation relating to the material and construction of walls was the belated recognition of concrete - originally scheduled, it will be remembered for the by-laws of 1879. Concrete walling, monolithic as opposed to blocks, was up to this time only allowed under special licence from the Board of Works, and a number of patentees had been operating within the limits of this system, such as Joseph Tall and Henry Goodwin. It was Goodwin who brought the matter to a head in September 1885, when he built a five storey block of artizan dwellings in Zoar Street, Southwark, without first obtaining the necessary sanction from the Board. When the case came to Court, the Magistrate dismissed the summons, saying that in his opinion, concrete was a good material - "the Admiralty Pier at Dover having been built from it" (59) and he thought the Board should have sanctioned it. 'The Builder' agreed, seeing the Magistrate's decision as being only common sense and thought that it was high time the Board of Works "reconsidered its conservative and obstructive position regarding concrete ... an official ban cannot be reasonably allowed any longer" (60). At first the Board's Solicitor intended to help the District Surveyor involved to appeal, but "on consideration" he thought it inexpedient to appeal, and the Building Act Committee reluctantly

accepted that concrete would now have to be properly recognised. They therefore proceeded to draft new by-laws, which went as required to the R.I.B.A. and the Institute of Surveyors before reaching the Home Secretary for confirmation (61). The details of the new by-laws are given on Table 12 sheet 2.

Not everyone was satisfied with the new by-laws. Goodwin protested that they now virtually stopped his concrete building because of the increase in the amount of cement which was specified - now 1:5 as compared with 1:8 allowed in his earlier licences. And why was concrete not more generally adopted, asked Goodwin?

"Because it is against the interests of the building trade, who want to stamp out that which is cheap and inexpensive, plus the ordeal of red tape for the poor builder. When at last, after fifteen years, I break through the bonds at Southwark Police Court on September 9 1885, the Board attack me with new laws which, if passed, will stop concrete building in the Metropolis and the solving of the problem of housing the London Poor" (62).

The Peabody Dwelling in Bermondsey, for example, had been built entirely of concrete (63), but it is true that after this time there was a decline in concrete work in London. Less emotional, more rational and authoritative was the architect John Slater, expert on London's legislation. He agreed that the proportion of the mix was incorrect and that the thickness of concrete walls, set at the same as for brick walls, was excessive. In his view the main test should have been related to the actual quality of the cement (64).

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London County (General Powers) Act 1890 and the By-laws of 1891

Not specifically related to building, but a further recognition of how far behind London was from the rest of the country in the area of Public Health, was the introduction by the Marquis of Salisbury in August 1885 of the Public Health (Metropolis) Bill. This was an effort to consolidate and amend all the acts relating to public health in London, and to virtually complete the work left undone by the major Public Health Act of 1875. It did not proceed further at this time (65), but we shall return to it when it resumed its course a little later (see page 365).

Meanwhile, the Metropolitan Board of Works sought further powers in November 1885 to control the structural efficiency, safety and fire provisions in theatres, and once again, the regulation of timber stacks (66). This fell by the wayside, as did a further proposal in December 1886 to control the subsoil of streets and the laying of service mains (67). Other amendments being considered by the Board at this time included ways of improving the administration of the Building line, which had occasionally caused difficulty in interpretation (see page 374), but it was felt that Parliament would not agree to this since the law had, in the majority of cases, worked reasonably well since 1862. Furthermore, the Board had previously suffered a defeat over this matter in its proposals for the abortive amending Bill of 1874 (68).

The most provocative suggestion emanating from the Board's office in Spring Gardens at this time was a requirement that owners of land, when laying out large estates "should be required so as to arrange that a suitable proportion of the land be left open and unbuilt upon in the interest of public health and comfort" (69). This clause, an early town planning measure, when taken together with proposals to increase the size of the open space at the rear of dwellings in suburban districts and to form streets wider than 40'0" in these districts, caused a tremendous outcry when they all appeared in the Metropolitan Board of Works (Local Management, etc) Bill in March 1888. Here was the Board of Works, already ailing within itself, actually dictating how owners should use their land, interfering with the provision of dwellings for the working classes, being given the right to take land and, if a jury saw fit, buildings also in connection with street improvements. It also proposed to remove the provisions of the 1855 Building Act which allowed the open space at the rear of a domestic dwelling (which could be a shop) to be built over at first floor level (70). And as if that wasn't enough, the Board was now to have control over the design of all accesses to more than one dwelling house - "out of the hands of the architect" - an idea that was considered to be quite preposterous. It also intended to apply its open space clause to the entire width of the rear of every building - "thereby diminishing at a blow every corner building in the city or West end that may be built " (71), and finally it was to control all the material in the site around the building, up to a distance of 3'0" from

its external walls; a peculiar provision but one which was intended as a natural extension of the controls on the quality of material used as backfill, and it was to be the one clause to survive (72).

But other events were now overtaking the unfortunate Metropolitan Board of Works. Rumours and revelations of unethical conduct abounded and a full scale Government enquiry was established in June 1888 to enquire into its workings. The Board's Theatre Bill had been rejected by the Commons in April, by 144 to 18 - "no doubt due to feeling that it is futile to pass legislation to give powers to a Board whose course is probably nearly run" (73). The fate of the Board was no longer in doubt by August 1888, and it became clear that it would disappear, a victim of circumstances not entirely of its own making, and a new body, the London County Council, would emerge as a result of the Local Government Act of that year, to take over all the former powers of the Board and to administer the Building Act, all as from the 1st April 1889.

Two points relating to Building Act matters came out of the Royal Commission Enquiry into the Metropolitan Board of Works. One concerned the building line and here the professional world were surprised to hear Lord Herschell, a member of the Commission, and formerly Lord Chancellor when the De Vere Gardens case (see p.374) was before the Courts, explain that "a house might be in more than one street for the fixing of the building line" (74), and that until a line of fronts had been defined by the Superintending Architect, no offence could be committed "because there is nothing to project beyond". Furthermore he expressed the view, quite contrary to the practice of the previous thirty two years, "that the term 'buildings for trade or manufacture' could be applied to retail shops" (75). Although he was speaking 'ex cathedra', these learned pronouncements, so much at variance with what was assumed to be the accepted practice, caused more than a minor ripple throughout the building world, but seem hardly to have troubled the judge. They only served to confirm the great distance that lay between the law and the world of building. The second point came from the Commission's disclosures on the fire at Whiteley's Store in 1887, where four people had died. The jury noted that the serious danger which resulted from the unscientific construction where iron work was largely used, "calls for immediate action with a view to

such amendment of the Building Act as will secure the requisite supervisions" (76). Almost to prove the point about the uncertainty of ironwork, a new building with an iron frame in Great Titchfield Street fell on 9 November 1888, killing six workmen.

At the very end of 1888 there was one further attempt to amend the Building Act, but it got no further than its first reading in April 1889, largely due again to the impending demise of the Metropolitan Board (77). The initiative passed to the new L.C.C. and one of their first moves was to establish a Building Act Committee (continuing the Board's precedent) and its first commitment, apart from matters of administration, was to look at the problem of preventing 'jerry building' (78). This was later referred to a sub-committee, who in turn made representation to the Parliamentary Committee with a call for the amendment of the existing law in certain respects (79).

Whilst the new L.C.C. was finding its feet, there was no shortage of advice being offered. The example of France was again brought to the fore, when Francis Hooper, the holder of the Godwin Bursary, delivered his paper on 'Building Control in Paris' to the R.I.B.A. in December 1888. Rights of light and effective street alignments were singled out by Woodward in the discussion following Hooper's very detailed and technical paper, as being worthy of consideration by the new County Council. The scale of French streets was, he remarked, sadly lacking in London - there was the new street (Rosebery Avenue) from Holborn Town Hall to the Angel at Islington, a mere 50'0" wide - why, he protested, even the neighbouring and older Grays Inn Road was 60'0" wide. The other important and associated topic was the height of buildings. Charles Fowler, in the same discussion, referred to this, noting that there was in fact a short Bill currently before Parliament to regulate this matter, but "it was crudely and negligently drawn". Yet the matter was of current concern, for in June 1889 a Bill appeared under Mr. Whitmore's instigation, to restrict the height of buildings in London. In this, no building, except a church or chapel, in a street less than 60'0" wide could be more than 60'0" high, nor in a street over 60'0" wide could it be higher than 60'0" without the sanction of the L.C.C. (80).

The comparisons with France were enlightening, even though their

fundamental premises were not so palatable in England. It was said that the main difference was that in Paris the architect should govern, unlike in England, and that in France the public governed the individual, an attitude unknown in England. The liberty of the individual was sacred, or so it was still popularly assumed. The Board of Works, typically, had never referred architectural matters to architects - indeed, it did not have any architects amongst its members (81).

Also significant were the views of Thomas Blashill, now the first Superintending Architect for the new L.C.C. (a transfer from the Board of Works who had appointed him in 1887). He was quite adamant that the Building Act required a good deal of amendment, and he was all in favour of relaxations to allow more picturesque elevations and to allow projections, and he thought the $4\frac{1}{2}$ " recess for window frames to be absurd, except in narrow streets, reflecting a move for the return to the style of Queen Anne (82). That was in March 1889. Later in the same year he gave a more detailed criticism in a paper to the Art Congress in Edinburgh. The constraints of no combustible materials in walls, the limit of openings in external walls to one half the wall area, the restriction on building height in streets less than 50'0" wide and the limits to projections - all these severely restricted the possibilities of design for architects:

"They close to him whole chapters of the most charming and interesting architecture in Europe. That the old timber buildings, or parts of them, are often imitated in cement and in iron, shows how impatient he is of such limits" (83).

(Norman Shaw would coat a window frame in cement, a device he tried on a number of occasions, although he was refused leave to do this on Albert Hall Mansions in 1881 (84).) Blashill went on to confirm that there was constant pressure on the public authority to give permission in order to produce more 'picturesque irregularity'. Building height was more lax in London than elsewhere on the Continent - Paris had 65'0" as a maximum, Vienna 77'0" - but London had virtually no limit - 100'0" was allowed, or higher if the authority permitted. On the other hand, balconies could project as far as four feet on the continent. The Swedish regulation for the painting of the front of a house in any colour other than white (which was considered offensive), raised the interesting possibility of a control on 'taste'. Blashill had considered a regulation "to repress or prohibit the commonplace, the ugly and incongruous", but had rejected it, fearing that such

control might unwittingly reject "the germ of the architecture of the future" and he did not wish to be responsible for "slaughtering, ere its birth, the new style" (85).

Captain Shaw of the Fire Brigade had also put forward the topics he felt needed urgent attention. These included the control on underpinning, the ban on stone for stairs - "everyone knows an oak stair is more fire resistant than stone", but Shaw's concern over stone projections was not likely to appeal to the architects, and some doubt was also expressed at the time at Shaw's apparent lack of concern over iron hoop-bond in walls, since it was obviously prone to expand in heat and fracture the walls (86). The fact that ironwork itself was still not properly controlled, except superficially by the District Surveyor, seemed strange to many even in 1889. The subject was very much alive - there was the example of America, and papers were given on the subject, such as F.T.Reade's paper on 'The application of Iron and Steel in Building Purposes' given in November that year. Reade simply, and rather resignedly, suggested that the recognition of the need to control this material would come - "in time" (87).

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At the end of 1889, the L.C.C's proposals for amending the Building Act were published, hidden away in a rather unfortunate manner in a General Powers Bill which apparently was devoted primarily to a new bridge over Bow Creek. Regrettably, there was, once again, no attempt to consolidate all the acts relating to building in London. The amendments included a Tribunal of Appeal to determine controversial cases, most of which would be about the building line; an increase in the volume of buildings without party wall divisions from 216,000 to 450,000 cu.ft.; by-law powers for the control of plaster, the control of backfill material in the space up to 3'0" from the perimeter of a building, controls on corner sites, and the fixing of the building height at 70'0" (88). The Tribunal of Appeal, comprising originally a member from the R.I.B.A, from the Institute of Surveyors and the Superintending Architect himself (curious, because he would be sitting in as a judge on his own decisions) had been suggested by the Commission's enquiry into the Board of Works in 1888 (89). One matter which just

failed to be included, and one which was causing concern at the time, was the question of open space at the rear of working class tenements. It failed because the Parliamentary Committee could not accept it as it stood in the draft clause, there being no clear definition in the Bill of 'tenement houses in the occupation of the working classes'. It was therefore referred back to the L.C. Building Act Committee for clarification (90) and it reappeared in 1894.

How were these proposals and amendments received? Manufacturers welcomed the increase in the size of business premises, even though, as expected, the Insurance companies did not. The 70'0" building height limit "will strike a blow at the erection of houses in flats and other developments in building, and which probably will be fiercely opposed" (91). Why some matters should be covered by by-laws was still viewed with caution, even though a precedent had been set by the 1878 Amending Act. 'The Builder' felt it was unwise to use by-laws at all - "these sections do not so fully safeguard the public against surprise or hasty enactments" (92). But more fundamental was the omission of a means to "render the Building Act a little more favourable to architectural design", of a "scientific definition of materials in fireproof stairs and passages" and the recognition of the need to protect iron columns in a fire (93).

The prospect of a "monstrous" horizontal line terminating the height of buildings at 70'0" above the street, was viewed with horror. "We are but now escaping from the dreary and monstrous horrors of Belgravia or Bloomsbury, flanked by long lines of level topped ugliness, each house front no better than a rectangular box with holes in it" wrote Somers Clarke of the Georgian tradition (94). His solution was a height proportional to the width of the street, with gable fronts being allowed, the height of the gable being set at an average of, say, 70'0". A District Surveyor replied to Clarke suggesting that the new clause was but a step in the right direction, an increase by 10'0" over the limit proposed in Mr Whitmore's Bill. He did concede however, that some limit might have to be placed on the heights of roofs. It would not, he said, be beyond some "ingenious persons" to have over four storeys in a roof 40'0" high, a curbed roof, sloping at a rate of 1" in 12" to finish 3'4" out of vertical at the top. Furthermore, the number of rooms in a roof might have to be limited - "public

opinion seems ready" - but unless there was some fearful fire he did not advocate the situation in Vienna, where they were totally excluded. On balance, he felt that the 70'0" was reasonable, it gave six storeys and who could want more? - except in certain public buildings for which special dispensation could be obtained. As for flats he considered their future to be uncertain (95). To assist its readers, and, as it said, "if such a clause as that proposed by the L.C.C. is made law, it will doubtless serve as a precedent for other parts of the country", 'The Builder' published in March 1890, a set of diagrams which compared the building height regulation in Paris, Sweden, Hamburg, Berlin and other German towns (96). The towns selected were only on the basis of the material gathered by architects, who had recently studied these places and had delivered papers on them at the R.I.B.A. The summary is shown, simplified, on Table 14, sheet 22.

In February 1890 the architect John Slater gave an important and very timely paper to the R.I.B.A. on the subject of building legislation, which in fact was very largely centred on the London situation. He gave a useful summary and history of London's legislation, but noted that the then current 1855 Building act was out of date, a long way behind the legislation in many provincial cities, concluding that the time was ripe for a new act, which was expected to be a model of its kind (97). With the benefit of historical hindsight, he now recognised that the Building Act of 1844 was in many ways superior to that of 1855, particularly since it had had a special Court of Appeal and rules for the settlement of party wall disputes; and in its constructional terms it had included street widths, drainage and more closely defined rules for footings (98). The fragmentation of these areas into by-laws or into other acts was deplored, and Slater called for a single act to unify all these areas. Provincial rules were often ahead of London. Manchester controlled the construction of streets, unlike London; had a wider minimum street width at 48'0" as compared with London's 40'0"; and in its proposed by-laws was considering a control over the gradient of streets. Another ideal, and one which still eludes us today, was the need for a common 'subway' in every street, to carry the gas, water and 'electric light wires'. It is interesting also to see Portland Place now being praised for its attractive width (but see also note 29 to chapter VIII), a reversal of Professor Hosking's views

of 1847 (see p.100) when Portland Place was described as being "overwide, leading to random driving". Not everyone agreed with wider streets - Edwin T.Hall for example thought that 40'0" was quite reasonable.

Lessons could also be learnt from New York. There, no public building could front onto one street only - there had to be open side exits - and once again, Manchester, this time in the person of its Society of Architects, was moving ahead of London in its proposals for stairs, corridors and exit doors (99). New York also set the example for fire escapes in building over a certain height - whilst in London it was still legally possible, although acknowledged generally to be 'absolutely criminal', to have stone stairs carried on unprotected iron supports, for access to flats or tenements. Slater considered that the limitation on the cubic contents of buildings should be lifted and each case should be determined on its own merits - Henry Dawson adding that this should only be allowed to happen if buildings could be made more fireproof. One new building type, the electric lighting companies' stations, had a special clause in their own act to relieve them of compliance with this particular restriction. This building type did however, encounter some restrictions from the Building Act. The 47° angle for the roof of a warehouse or trade building still applied to them. Whilst the ground and first floors were usually occupied by the engines, dynamos and batteries, the natural place for the small flat for the resident engineer was on the roof, set ideally in a mansard or curbed roof - but now impossible to achieve within the 47° angle. The existing controls on foundations were considered illogical, being made irrespective of the height of the wall or the loading on it. E.T.Hall added that the thickness of the walls themselves should be regulated by the actual loads on them. Slater's list of areas requiring amendment continued with powers to control lead and zinc work, floor boards and joists, all ironwork (again as done in New York) and the control of the construction of the splayed shop corner. Then drainage should, he considered, come back within the scope of the Building Act, and controls to prevent damp basement walls were needed - Manchester, again on the Model By-law principle, had a 2" cavity (100), although E.T.Hall countered this with his preference for a vertical layer of asphalte or a vertical lining of two courses of slate.

Control of the space at the rear of dwellings, as under the Amending

Act of 1882, was "practically a dead letter" maintained Slater. Only the area was specified, so a building with a 50'0" frontage, 50'0" high, requiring officially only 450 sq.ft. of open space, could legally have a rear yard only 9'0" deep. On the question of building height, Slater agreed that the height should be related to the street width, as in Paris, Sweden and most German cities, and there should be a restriction on the number of rooms in the roof. (The District Surveyors' Association also favoured a height control related to the street width, when a building directly abutted a street. Elsewhere the limit would be extended by the distance the building was set back from the street, up to a maximum of 100'0", but excluding important architectural features such as towers, gables and dormers (101).) Slater also considered the possibility of controls on the rights of light and prospect, but there were difficulties here in the legal sense, and it was difficult to see beyond the enactments on 'ancient lights' embodied in the Prescription Act of William IV (102). To conclude the amendments suggested, there was the need to recognise the problem of lifts penetrating floors, to control advertisements on walls, and finally to accept the principle that no building at all should be exempt from the operation of these regulations. It should be noted that in this call for what were in effect more detailed regulations, Slater was returning to the trend first established by the Act of Charles II in 1667 (103), which had regulated the formation and width of streets, the heights (i.e. the rates) in accordance with street widths, the sizes for timber scantlings in joists, roof timbers and even laths for plastering - much of which had survived until the Building Act of 1844.

The Model By-laws were held up as an example. To Professor T. Roger Smith they were a "carefully considered emendation of the Building Act, containing many improvements on that Act". Lacy Ridge confirmed that the Model By-laws were an improvement on the Building Act, principally because they included drainage (104), and Slater himself, concluding "that the time had come for a good solid act" insisted that the Model By-laws "should certainly be embodied in any new Building Act" (105). Professor Banister Fletcher however pointed out that in fact "the Model By-laws which had been so praised, were founded on the Building Act (of 1855) which had been much abused, but which he considered to be a good Act" (106). It was left to Professor Kerr

to re-iterate the fundamental factor involved:

"In framing any Bill, the first point to consider was whether the House of Commons would pass it; and it was very doubtful whether the statutory English principle - that every man might do as he wished with his own, provided he did not positively injure his neighbour, would be interfered with.... a French magistrate would take it for granted that the official was right... and an English magistrate would think it quite as likely that the individual was being needlessly molested, and that it was the sacredness of property, however small, which was at stake" (107).

Following this important meeting, the R.I.B.A. published, in March 1890, a list of points for the consideration of the L.C.C. These included the problem of the penetration of lifts through floors, the exemption of small buildings, problems of definition, access to the roof for fire escape, cornices and pilasters for shop fronts, and a new form of direct control by the District Surveyor over the quality of materials and construction. (108). To its discredit the R.I.B.A. became very divided internally over these matters, and in the end thought it unwise to send its views through to the L.C.C. 'The Builder' proposed that many of the improvements could be made separately, initially through subsidiary acts, and then "when the whole is good, but dispersed through various acts, then suggest a codification of all into one Act" (109). As it happened, this was a remarkably shrewd forecast of the events as they transpired up to 1894.

Even while the London County (General Powers) Bill was being read for the third time, the L.C.C. Building Act Committee were already recommending an urgent review of the Building Act. It would, however, require extra expert assistance, since, as they said, the Architect's department was already fully occupied. Meanwhile, in the Commons, a Mr. Webster vainly tried to move the building regulation clauses out of the L.C.C. Bill and into an amended Metropolis Management and Building Act - but he was outvoted (110). The Lords Select Committee decided to raise the maximum building height to 90'0", with two storeys in the roof, no doubt as a result of commercial pressures, although the Surveyors' Institution was also in favour of 90'0" (111). Lord Stanley of Alderley had originally proposed 70'0" with one storey in the roof, and Lord Wemyss had rightly enquired why there was no relationship set to the width of the street - Northumberland Avenue could already be seen to be a disastrous case. The Committee considered that it was now too late to object to high buildings in London - the

value of land made them necessary, lifts made them habitable and the top storey was, as they said, no doubt healthy (112).

The London County (General Powers) Act was passed on 18 August 1890. With it came the important Tribunal of Appeal - a topic concerned with administration and not strictly within the terms of this work (113) and, as a result of section 31, a new set of by-laws. Reviewing the new Act in his Presidential address to the R.I.B.A. in November 1890, Alfred Waterhouse dwelt on the failure of the 1855 Act, its lack of devices necessary to allow new methods of fireproof construction, which could allow buildings to be of a greater cubic content without party walls; its restrictions on the area of glazing, now called for by "the ever increasing pollution of the atmosphere" as he put it; its omission of lifts and the dangers of fire associated both with them and with the materials, stone and iron. The new building height, at 90'0", with two storeys in the roof, should, Waterhouse felt "satisfy the most aspiring architects". All in all, he felt it was a great credit to the R.I.B.A., particularly the work of Arthur Cates and Edwin T. Hall. (The prevarications of earlier that year seem to have been forgotten). But behind all this technical control, Waterhouse was now pressing for some form of artistic or aesthetic control - the establishment of some responsible 'Architectural Council', who would advise and control the artistic side of new proposals and ensure that they were seen by the public before any final approvals were given (114). Unlike Blashill therefore, Waterhouse was prepared, such was his confidence, to move further into this delicate area of legislating for aesthetic control.

1891 saw three quite separate pieces of new legislation - the by-laws made under the Act we have just been discussing and the amending Act of 1878; the London Sky Signs Act; and the Public Health (London) Act.

The draft by-laws, covering plaster and back-fill to excavations and damp proof courses, appeared in February 1891 (115). Alterations were made by the R.I.B.A., the Surveyors' Institution and the District Surveyors' Institution, and a revised form appeared in July 1891 (116) (See Table 13 sheet 1). Concrete could now be used for fill, every house was to have a 6" concrete site cover, the material for the damp proof course was no longer specified by name, its position in

the wall was amended, and basement walls were to have a vertical damp proof course. The key point here was the avoidance of any specific material being mentioned by name, so long as it was impervious to moisture. It was left to the District Surveyor to interpret this, and it marked the move towards a form of functional specification and one which could allow new materials to develop and be considered. The mention of 'slab plastering' appears to be the first mention of plasterboard lining. The extension of the fill of the site up to 3'0" from the external wall was a natural if somewhat extreme extension of the concern over the use of unhealthy materials for the fill (117). This change to a more functional requirement did, of course, throw more responsibility onto the poor District Surveyor (118) - indeed one Surveyor, T.E.Knightley, lost a case over this in 1891, when he decided that asphalt and hemp were not completely impervious over a length of time as a damp proof course - but there was no prescription for durability or for a minimum thickness for damp proof courses within the by-laws (119).

The second new item of legislation concerned the phenomena of 'sky-signs', the ever increasing number of advertisement hoardings which were now appearing on the outside of buildings. It was hoped by some that they might be prevented by section 14 of the 1855 Building Act, since there appeared to be nothing else to stop the whole building being covered by match-boarding (120). Then a gigantic letter 'B' appeared over a street - the initial of "Bovril" apparently, and this apparition started a series of test cases (121), draft by-laws and special licenses, all of which culminated finally in the introduction of a new bill by the L.C.C. in December 1890 to control these offensive creations (122). It was duly passed as the London Sky Sign Act on 3 July 1891 and it was later incorporated in the London Building Act of 1894.

The third new measure of 1891 was the Public Health (London) Act. It will be recalled that this had first been mooted in 1885 (see p. 353), but it had taken six years for the measure to finally reach the statute books. The Public Health (London) Law Consolidation Bill was designed to bring some twenty nine health statutes then current in London into line as one new measure, rather on the lines that the successful 1875 great Public Health Act had done for the rest of the

country. The details of certain parts of the Act passed in October 1891 which related directly to building design i.e. in particular, underground rooms, are outlined in Table 13, sheet 2. The dimension of 3'0" for part of a room to be above ground level was altered from 2'0" by the Commons standing Committee (123) but more significant was the increase in the size of the 'area' outside to a width of 4'0" (124), and the requirement for a provision against damp in the basement wall - an obvious requirement, but one which in fact duplicated by-law 3, made at the same time under the 1878 Amending Act (see Table 13 sheet 1).

More important was section 39(1) of the Public Health (London) Act of 1891, which gave the L.C.C. powers to make by-laws for w.c.'s, earth closets, privies, ashpits, cesspools, receptacles for dung and all 'proper accessories thereof in connection with buildings whether constructed before or after the passing of this Act'. These by-laws, with these retrospective powers, came into force on 28 June 1893. They are summarised on Table 13, sheet 2.

Concerned principally with drainage above ground, they were to have a significant effect on the location of the w.c. within a building. The requirement for the w.c. to have one external wall made the planning of deep plan buildings extremely difficult. Furthermore, the soil pipes had to be on the outside of the building. This requirement, one architect reflected, would lead to little open areas in the centre of buildings - areas described as little more than "large flues, which would contain the pipes, regardless of frost. The design of an important building ought not to hinge on the position of the soil pipe" (125). The by-laws also caused some further debate, as they banned the use of the long established intercepting trap on the main drain before it entered the sewer. Many experts considered that 'isolation', as ensured by this type of trap, was the best form of protection against infection (126). The use of the trap was, however, to return again later (see page 512), and so serious was the issue that a full scale Government Departmental enquiry was set up in 1912 to investigate the merits or otherwise of the intercepting trap.

The introduction of these drainage by-laws only added more confusion to an already confused picture, since the forty vestries already had their own rules, some dating from 1862, and then the Commissioners of

Sewers had their own regulations as well. This fragmented drainage legislation, together with the lack of more detailed regulations for drainage below ground, was obviously altogether unsatisfactory. As we shall see later, further attempts were to be made between 1897 and 1900 to improve this unfortunate situation. (see chapter X, page 511)

These measures complete the relevant legislation of 1891, but already moves were afoot to bring in a totally new measure which would consolidate the majority of this legislation and would form the new London Building Act of 1894. This important development is resumed in Chapter VIII. Meanwhile it is necessary at this point to look outside the regulations themselves and consider the areas which had been causing the most concern in the Courts and elsewhere between 1875 and 1891.

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The Acts and By-laws in Practice in London 1875-1891

Fire

The areas of confrontation with the building regulations ranged in scale from the materials used, through to the actual building types - for example from asphalte on roofs to the problems posed by the development of flats.

Asphalte was still a cause for concern. The architect Cubit Nichols was using Claridge's Patent Asphalte on a flat roof at No 4, Half Moon Street, Piccadilly, and the District Surveyor objected, claiming that it would melt and set fire to objects below. Only the evidence of a distinguished Professor of Chemistry, Professor Attfield F.R.S., turned the case in the defendant's favour. The Professor explained that the asphalte was incombustible since it contained 90% mineral asphalte (127). Another example, this time of a new material being used for roofing, involved 'Duroline', a patent wire wove with a close mesh covered with a patent oleaginous substance which was semi-transparent. It was used on the Royal Aquarium and Winter Gardens at Westminster in 1888, but was objected to by the District Surveyor. A sample was 'burnt' in Court but only the edges were affected. Evidence in support of the worth of this material came from the architect Emden and a number of engineers, and it was also learnt that

the material had been used not only on pavilions at the Colonial, American and Irish Exhibitions but also on the roof of a powder magazine! (128) A second case three years later, involving the same material, was dismissed when the Magistrate tested a four year old sample and found it would not ignite at all (129). Such was the perversity of the legal mind, however, that when the case went on appeal to the Queen's Bench Division, Mr. Justice Mathew concluded that part was combustible - not the wire - and that therefore the Magistrate had been wrong and should have convicted. Mr. Justice Smith concurred, but with regret, since the material had been then in use at Olympia, Doulton's and Pickford's for the previous six years with no apparent harm (130).

Constructional aspects involving fire were obviously common in relation to chimney construction, particularly the lack of proper pargetting of flues where they passed between the ceiling and roof timbers (131), or the chimney opening not being properly tied together with an iron bar (132). Attempts at half timber walling, increasing in popularity in the wake of the lead set by men such as Norman Shaw, frequently fell foul of the regulations. Mr. Taylor, building a covered wooden external staircase in Acton in 1881, quoted Bedford Park to the Magistrate, but Bedford Park was outside the range of the London regulations, and Mr. Taylor was duly convicted (133). The rules for chimneys and hearths had not been designed to meet improved heating stoves. The Kitchener Stove and Cooking Range, for example, when inserted at No 39, Drury Lane, in 1878, produced such heat through the party wall that "the thermometer burnt at 200°F and a match ignited in the same place without friction." Here, as the Magistrate noted, was a clear case of an invention outstripping legislation (134). No immediate change was made in the regulations, but it was eventually amended in the London Building Act of 1894.

Timber stacks, or more precisely, the timber staging erected to support the stacks, were frequently seen as a fire risk, but the problem here was also one of definition. Could Mr. Cobbett's staging, consisting of nine uprights and six cross pieces, built in Drummond Street in 1883, be classed as a building, and thereby be made to comply with the Building Act? The Magistrate decided it did not, yet the protesting District Surveyor quoted Mr. Justice Byles who had said

that a building was "some structure or erection of considerable size, intended to be permanent, or at least for some time, whether let into the ground or not" (135). Three years later another case involving a timber stage 72'0" high, with two storeys, a boarded first floor and a zinc roof, was brought to Court by none other than Thomas Blashill (then still a District Surveyor, but only one year away from being appointed Superintending Architect to the Board of Works). Blashill heard his case dismissed on the "commonsense view" rather than the strict wording of the Act, by the Magistrate (136).

Moving up the scale, the most critical of the new building types was the flat. In 1884 F.E.Eales gave a paper on the subject to the Architectural Association and described the restriction imposed on the design by the Building Act in London. The Amending Act of 1862 had, of course, set no limit to the height of buildings in old streets, nor in new streets over 50'0" wide, but now, as he said, the use of taller buildings was increasing and causing concern. The 'elevator', which he considered not one person in twelve cared much about in England, was becoming essential, but the control of the area at 3,600 sq. ft. before party walls were required was, he felt, not to be regretted, although fireproof floors were preferable even though not fully controlled by the Acts. Two other regulations affected flats - fireproof stairs to buildings over 125,000 cu. ft. used as dwelling houses for separate families, as at Hyde Park Mansions, and the provision of 450 sq. ft. of open space behind buildings with the longer frontage (137). (The open space matter is referred to again below under Health). One District Surveyor tried to maintain that flats in model dwellings were 'separate dwellings' and therefore would legally require party walls. He would, incidentally, have been entitled to a fee for each flat if they had been held to be separate dwellings (but see also p.370 below). But the Magistrate did not accept this interpretation. The block in question was in Theydon Road, Hackney, but each block was only 1,200 sq. ft., well within the 3,600 sq. ft. allowed by the Act before party walls were needed. As the Magistrate said, if they were separate dwellings "no person could let a portion of a house to a lodger without putting up a party wall from basement to roof" (138). This was a fundamental attitude, reflecting the concept of the privately owned block, sublet to separate families - an attitude which was to change when more local authority flats on a larger scale came to be built, the blocks then

being seen as an anonymous accretion of separate dwellings, each quite independent from its owner by its party wall. On the fire aspect, buildings over 3,600 sq.ft.were therefore deemed to have sets of chambers classed as separate buildings, but if the building was less, no matter how much less, the tenants then had no protection from fire. Flats that were separately rated also conferred the franchise by the 1890's. As their use grew, so it was feared by some that fires and epidemics would be sure to occur. The District Surveyor for Hammersmith brought a test case on this problem in 1889 - and lost (139). His fears were allayed by James Moore, secretary of Sir Sydney Waterlow's Industrial Dwellings Society, who explained that there was no record of fire spread from one tenement to another, and there was less risk of epidemics in flats than in ordinary houses. They had housed 30,000 people in 5,000 small flats, with only 28 fire claims in 26 years, and no record of disease. Yet ceilings were lath and plaster on timber joists, although he conceded that they did use a 'fireproof' construction at second and third floor level (140).

The problem with lifts was, of course, their penetration through floors, giving an easy route for the spread of fire. Tavistock Residential Chambers in Hart Street and Museum Street, Bloomsbury, were held by the District Surveyor in 1889 not to be 'wholly divided horizontally by fireproof floors' because there were small lifts in the sculleries on each floor, contrary to Part 1 of Section 27, subsection 2 of the 1855 Building Act. The building was properly divided by party walls and the Magistrate decided, reasonably, that lifts positioned at each end of the building helped to reduce the fire risk and also, less reasonably, that lifts were not either 'chambers or rooms' within the meaning of the Act, and dismissed the summons (141). The surveyor in this particular case did however later receive the benefit of a magistrate's decision that he should be paid fees for each flat, rather than one fee for the complete tenement block (142).

Structural Stability

Sheer bad building was the main source of litigation. Bad materials for mortar (143) was the most common, but there was also the lack of controls on concrete work (144) and more particularly the lack of controls on iron construction. The collapse of a building in the

Haymarket in 1878 was essentially due to faulty construction with cast iron pillars and wrought iron girders (145). The District Surveyor had very little control over this form of construction, as the protracted debate with the builders, Kirk and Randell, proved when the Surveyor demanded to check the calculations for the new Civil Service Stores in the Haymarket in 1880 (146). Foundations were frequently built directly on top of the natural soil, banked up by concrete formwork, rather than below ground level - only the old Building Act of 1844 had called for the top of the footings to be 3" below the surface of the ground (147). In addition, there were no precise rules for building walls over 100'0" high. Pilkington, architect of the Army and Navy Stores in Victoria Street, in 1882 claimed that it was the height of the wall head which determined the height of the building, and there by the thickness of the wall, which in this case brought him within the 100'0" limit of the wall thickness schedule. The District Surveyor took the height correctly to the height of the top of the ceiling, which in this case was in a mansard roof 118'0" above ground level. No sanction had been obtained from the Board of Works, but as the wall thickness in fact was in this case over the thickness prescribed for 100'0" walls in the schedule, no further action was taken (148). As with timber stages there were other problems of definition - whether or not for example, the tobogganing slide at the Crystal Palace was a building. It was 456'0" long, had an engine house and hoist, and was held to be a building by Mr. Justice Grantham (a gentleman whom we are to encounter in a more severe confrontation with building legislation in the next chapter, see p.472). It was held to be not exempt, as were most of the Crystal Palace buildings by reason of the special Crystal Palace Act (149), since it was leased and not owned by the Crystal Palace Company. A similar case arose in 1887 over Thompson's Patent Gravity Switchback Railway, erected at the Crystal Palace without the approval of the Board of Works (150).

Health

To one District Surveyor in 1877, the speculative builder was "a creation unknown or organism unknown to science or art, the outcome of the growth of London and of the compulsory removal of the working classes in large numbers to the suburbs", and a person to whom a 12" space under a floor "filled with sewage matter" and with dummy drains

which only ran as far as the street, were acceptable characteristics of their work (151). Building on 'dust-shoots' we have already mentioned and the cases on this subject proliferated (152). Frequent attempts were made to avoid the expense of laying the required 6" of site concrete necessary, as one District Surveyor put it, "to prevent the fires pumping up the unwholesome emanations into the houses" (153). Houses in Vespan Road, built on a former cabbage patch, received only 1" of concrete cover before six houses were started on the site in 1883 (154).

The relationship of open space to buildings was a constant source of problems in the courts, and with this may be linked the problem of building height in relation to street width. Lawrence and Sons, builder of some Artizan Dwellings at Chatham Gardens, Nile Street, Hoxton in 1885, evaded the by-laws which had been made in 1856 under the Metropolis Local Management Act of 1855. His block, 35'0" high in a street only 24'0" wide, clearly contravened the law - but his ruse was to put up a pair of gates at the entrance of the street, with a gatekeeper, thereby claiming exemption, and with this he succeeded in convincing the magistrate (155). Torwood Gardens, on the North side of Bayswater Road, built by Daw and Son in 1888-9, failed to have the two necessary entrances 40'0" wide, since the width was reduced by 'entrance lodges'. The myopic magistrate considered these to be temporary sheds for the workmens' tools, but as the case dragged on for nearly 18 months, these 'lodges' transformed themselves into substantial brick piers for gates. The land remained in private hands however, and as a result the defendant won his case (156). John Barker built a building 53'0" high in Ball Street Kensington, a new street only 42'0" wide. Therefore the building should, as the District Surveyor rightly protested, have been no higher than the width of the street. But Barker pointed out that there had been an earlier building on the site, 48'6" high. The Magistrate therefore had no alternative but to compel Barker to reduce his building to the same height of 48'6" (157).

The poor quality of light, and therefore health, in the lower rooms in tall blocks of model lodging houses in narrow streets was often condemned. Quinn's Square was one example, and there were many similar ones in the East End. "It is odd" said 'The Builder' "that the very authorities who object to overcrowding in a horizontal

area cannot see that overcrowding vertically comes in the end to the same thing, and that the provision for a width of street which is adequate for houses 30'0" high cannot be adequate for houses 60'0" or 80'0" high"(158).

Both the complaints here - the width of street in relation to building height, and the implied lack of light and ventilation to the lower rooms which faced dark internal courts only, were to be duly rectified in the forthcoming legislation of 1894. E.T.Hall was later (in 1901) to claim some responsibility for the requirement for an air inlet at the bottom of the internal court in a block of flats. Speaking at the A.A. on 'Flats', he said "14 or 15 years ago [ie. 1886] I realised the evil and practised the remedy and we obtained its insertion in the London Building Act of 1894" (159).

The problem of interpreting the relevant amount of open space to the rear of a dwelling, on the basis of the provisions of either the 1855 Building Act or the 1882 Amending Act, has been mentioned earlier. The test case which was to decide this issue came in November 1886. Rooms over stables were classed as habitable dwellings under the 1882 Amending Act. At No 5, Henniken Mews, Callow Street, Elm Park Estate, such buildings were 17'0" deep, with a 32'0" frontage, thereby requiring 450 sq. ft. of open space at the rear. It was argued however that these wide frontage dwellings, arranged in line over the stables, coach house and harness rooms, all only 17'0" deep, could all be lit from the street and this was acceptable under section 29 of the 1855 Building Act. It was therefore possible to build such dwellings in a long line, without any open space at the rear, i.e. arranged back-to-back against a similar line of dwellings, with only the narrow space of the mews street left between them. Mr. Thorn, the builder, hastily arranged to alter his upper rooms so as to be 'non-inhabitable', when the Magistrate declared that section 14 of the 1882 Amending Act did in fact supersede the old clauses covering the same topic in the 1855 Building Act. "A good reading of a good law" declared the vindicated 'Builder' (160).

Questions of definition arose again over the term 'storey'. In the case of Foot v. Hodgson, the Bench decided that a storey was not necessarily a space within four vertical walls. One of them could be sloping as in a roof. The Judge at the City of London Court over-ruled this, claiming it was the attic, a part of the roof, and could not be a storey.

The Queen's Bench Division rightly reversed this decision, and 'The Builder' added the proviso that 'storey' should also mean a space capable of being used as a room, not just as a cupboard in the roof (161).

Finally, there was the 'building line', and in particular its operation on corner sites. It was generally agreed that the line could only apply to the principal street, "otherwise the corner plot would be virtually useless" (162), but it was not always interpreted in this way. Bermondsey Vestry, for example, compelled the Prince Imperial Public House built in Rotherhithe New Road in 1879 to be set back 5'0" on the side of Rolls Road (163). At the corner of Kensington High Road and De Vere Gardens, a building was ordered to be demolished in 1883 since it infringed the line in De Vere Gardens - but this was over-ruled by a higher judge, who considered that the front was still towards Kensington High Road, even though the front door of the building was in Vere Street in De Vere Gardens (164). Many magistrates assumed themselves the power of fixing the building line, even though after 1862 it was legally the prerogative of the Superintending Architect. One magistrate in Plumstead certainly thought so in 1886, but his decision was reversed on appeal to the Queen's Bench Division, a decision later upheld by the Court of Appeal in the House of Lords (165).

This chapter has seen the first part of the long struggle made by London's building regulation to raise itself from the low position to which it had fallen by 1875. Whilst many other towns could introduce comprehensive and up to date building by-laws, and whilst Liverpool could secure its own reforms in 1882, London continued to trail behind. Its own equivalent of the Public Health Act of 1875 was not in fact to be secured until 1891. In its efforts to gain ground and reform its controls, it suffered by having to receive a succession of short amending acts with their associated by-laws, but they were nearly all sadly truncated versions of more ambitious proposals - proposals which even then would only have put London on a level with the rest of the country, not ahead of it. The picture was therefore, at the end of this period covered by this chapter, of a random collection of by-laws and amending acts still set within the 1855 Building Act - all scattered and unco-ordinated, as the dense and detailed nature of this particular

chapter has revealed.

Yet in spite of this almost indigestible mass of legislation, there are a number of points which deserve to be drawn out and emphasised here for their significance in terms of the broader context of this work.

Firstly, in terms of actual regulatory devices we have noted the use of the by-law in London - not strictly for the first time since it was used for streets in 1857 - but now for building matters. Despite some initial reluctance they were accepted in 1879, and this must be because of the evidence of the Model By-laws, and the recognition that the by-law was a more suitable device with which to control the vagaries of building. Yet these by-laws could of course only be made as a result of the powers granted under the Amending Acts of 1878 and 1882, not the original Act of 1855, so their range was consequently somewhat limited. It is interesting to reflect that whilst the 1855 Metropolitan Building Act had formed the basis of the Model By-laws without much difficulty, the reverse procedure, with the 1877 Model By-laws influencing the London by-laws, was much more restricted. Whilst on this subject of by-laws it is worth noting again the novelty of not actually specifying a particular material for a regulation, but only its expected performance. This was the case, it will be recalled, with the damp proof course clause. It allowed the actual choice of material to be made by the architect or builder, and left the way open for the introduction of new materials or techniques.

Secondly, the scientific analysis of the content and nature of the regulations continues in this period, particularly as they come under closer scrutiny in more complex buildings. From the health aspect the question of open space in relation to houses is again reassessed and the standard adjusted, though it is still very minimal. Drainage becomes much more detailed, and this parallels an equal obsession in the Model By-laws, and the condition of the site is at last recognised as important and is controlled accordingly. Consideration of fire leads to reforms - at one end of the scale, the use of stone and the problem of hot water pipes receives a long overdue alteration; at the other end, there are problems raised by new building types, particularly flats in terms of fire-proof separation, and the introduction of lifts.

Structurally there is much discussion on the role of iron and timber, and the cavity wall and concrete walls at last receive recognition.

Thirdly, the architect's voice is now heard more constantly and more effectively. The profession is becoming more co-ordinated and more self-confident. There are signs that the architect is concerning himself more with a wider range of building - at the same time the regulations are affecting more areas of building, and the gap between the two is starting to diminish. The regulations are beginning to pinch more sharply and the architect is beginning to protest more vociferously. There are demands being made by architectural design which become more persistent - an interest in a more picturesque silhouette and a varied street architecture, as a reaction to the severity of the Gothic and to the plainness of the Georgian tradition which still would have characterised much of London - and it is marked by a return to a form of Queen Anne style. Thomas Blashill emerges as an interesting figure in this. As Architect to the L.C.C. he tends to bridge the gap between architecture and legislation in London, and his refusal to accept legislation for aesthetic control, since, as he said, it might prejudice a new style of architecture, is in marked contrast to, say, that of Waterhouse, whose security in the older but disintegrating Gothic camp enabled him to pontificate and confidently support the idea of aesthetic control. Discussion of this matter also brings along the question of the emerging evidence for what we would now call town planning. There were signs of an awareness that there was something more beyond the actual buildings themselves, and that there might be something to be gained by controlling the disposition of the buildings, not just for convenience and welfare, but for the visual consequences as well. The heights of buildings, encouraged by commercial pressures, needed some form of control if the quality of the street was not to suffer. At the same time the width of the street needed to be considered, as did the building line, the amount of open space for public use, the benefits of sunlight and a respect for the nature of the terrain. But above all it was the appearance of London as a whole which was being seen afresh. The handsome and well proportioned streets of some continental cities held an attraction, but despite well intentioned efforts, the character of London was to be set by the higher buildings and the still relatively narrow streets. Commercial pressures seem to have again won the day.

Finally, we should note the increasing attention being paid to the examples of overseas. Not only was it in connection with building height but also with regard to fireproof construction. Paris was studied for its flat construction and its use of fireproof floors; New York for its fire escape provisions. This is a healthy sign of a broadening of the horizons, and it is a trend which is to continue in the following years. One might also just mention here that the same tended to happen in reverse, and that a number of overseas cities, particularly those of course in the colonies, would base their own building regulations on the examples set in England.

With the following chapter, chapter VIII, we continue the development in London up to the major piece of legislation, the London Building Act of 1894.

NOTES TO CHAPTER VII

- 1 B.Vol.33 No.1706 16 Oct. 1875 p.926.
- 2 Ibid.
- 3 B.Vol.34 No.1740 10 June 1876 p.570. Liddle referred to N.B. Ward (who had invented the "Wardean Cases" for rearing plants in towns and conveying them to distant places) and it was Ward who in turn had quoted Sir James Wylie who had established that disease on the dark side of St Petersburg barracks was three times greater than on the light side.
- 4 B.Vol.34 No.1758 14 Oct 1876 p.993.
- 5 B.Vol.34 No.1764 25 Nov.1876 p.1134. As S.Knight described it in his paper to the R.I.B.A. entitled "Influences of business requirements on street architecture."
- 6 B.Vol.34 No.1765 2 Dec.1876 p.1175 Waterhouse referred to this building in his vote of thanks following Knight's paper (see 5 above).
- 7 B.Vol.35 No.1800 4 Aug.1877 p.797.
- 8 B.Vol.34 No.1730 1 Apr.1876 p.317.
- 9 B.Vol.35 No.1774 3 Feb.1877 p.111. T.Chatfield Clarke; "Modern Building in the City".
- 10 B.Vol.34 No.1738 27 May 1876 p.501.
- 11 B.Vol.34 No.1730 1 Apr.1876 p.319.
- 12 B.Vol.33 No.1680 17 Apr.1875 p.354.
- 13 B.Vol.34 No.1725 26 Feb.1876 p.197. In its report to the Home Secretary, Hackney District Board suggested that no building should take place on foundations of house refuse until either two years had passed or until the Surveyor to the Board of Works was satisfied. This was taken up by the Works and General Purposes Committee of the Board, who agreed to bring it to the Government's attention when a new Act was being framed. See also
B.Vol.34 No.1739 3 June 1876 p.543.
- 14 B.Vol.34 No.1730 1 Apr.1876 p.319 Paris also forbid the hiding of gas pipes behind plaster or between the floor spaces.
- 15 B.Vol.33 No.1711 20 Nov.1875 p.1046.
- 16 B.Vol.35 No.1783 7 Apr.1877 p.359.
- 17 B.Vol.35 No.1810 13 Oct.1877 p.1035.
- 18 B.Vol.35 No.1812 27 Oct.1877 p.1084.
- 19 B.Vol.35 No.1816 24 Nov.1877 p.1183.
- 20 B.Vol.36 No.1837 20 Apr.1878 p.416.
- 21 B.Vol.35 No.1816 24 Nov.1877 p.1184.
- 22 B.Vol.36 No.1827 9 Feb.1878 p.135.
- 23 B.Vol.36 No.1839 4 May 1878 p.456.
- 24 B.Vol.58 No.2459 22 Mar.1890 p.206.
- 25 B.Vol.58 No.2467 17 May 1890 p.351-2.
- 26 B.Vol.36 No.1833 23 May 1878 p.303.
- 27 B.Vol.36 No.1827 9 Feb.1878 p.147.
- 28 Ibid. p.142.
- 29 B.Vol.36 No.1837 20 Apr 1878 p.416 and No.1843 1 June 1878 p.577.
- 30 Metropolis Management and Building Acts (Amendment) Act, 41 and 42 Vic.cap.32. For the theatre regulations see B.Vol.37 No.1880 15 Feb 1879 p.185 and No.1892 10 May 1879 p.524-5 for full details.
- 31 B.Vol.36 No.1863 19 Oct 1878 p.1099.
- 32 B.Vol.36 No.1868 23 Nov.1878 p.1231.
- 33 B.Vol.36 No.1870 7 Dec.1878 p.1285.
- 34 B.Vol.36 No.1871 14 Dec.1878 p.1311.
- 35 Ibid. p.1310.

- 36 B.Vol.37 No.1886 29 Mar 1879 p.351-2.
37 B.Vol.37 No.1887 5 Apr.1879 p.380.
38 B.Vol.37 No.1888 12 Apr.1879 p.410.
39 B.Vol.37 No.1915 18 Oct 1879 p.1160.
40 B.Vol.41 No.2021 29 Oct 1881 p.557.
41 B.Vol.41 No.2017 1 Oct. 1881 p.439.
42 B.Vol.41 No.2026 3 Dec. 1881 p.709.
43 Ibid.
44 B.Vol.42 No.2033 21 Jan 1882 p.84.
45 B.Vol.41 No.2026 3 Dec 1881 p.710.
46 B.Vol.41 No.2029 24 Dec 1881 p.803.
47 B.Vol.42 No.2037 18 Feb 1882 p.209.
48 Metropolis Management, Building and Floods Prevention Acts (Amendment) Bill 1882. As for example, Mr. Hampton was to attempt in 1884 with a street 16'0" wide to six blocks of 'combined dwellings' behind Chiswick Street Camberwell, by placing a gate at the entrance to the street and claiming that it was private and not covered by the Act of 1882. B.Vol.47 No.2162 12 July 1884 p.70.
50 B.Vol.48 No.2201 11 Apr 1885 p.530 and No.2202 18 Apr 1885 p.567.
51 B.Vol.48 No.2199 28 Mar 1885 p.464.
52 45 Vic.cap.56.
53 B.Vol.42 No.2040 11 Mar 1882 p.279.
54 B.Vol.42 No.2054 17 June 1882 p.752.
55 Metropolis Management and Building Act (Amendment) Act. 45 Vic. cap.14.
56 B.Vol.47 No.2161 5 July 1884 p.4.
57 B.Vol.47 No.2185 20 Dec 1884 p.841.
58 An Act for Preventing the Erection of Buildings on Disused Burial Grounds 47 and 48 Vic.cap.72. 14 Aug 1884.
59 B.Vol.49 No.2224 19 Sept 1885 p.408.
60 Ibid. p.385.
61 B.Vol.50 No.2243 30 Jan 1886 p.216 and No.2244 6 Feb 1886 p.229.
62 B.Vol.50 No.2245 13 Feb 1886 p.287.
See also R.H.Harper, "Concrete's Battle for London 1867-1886", 'Concrete' Vol 10, No 10, Oct 1976 p.28.
63 B.Vol.50 No.2245 13 Feb 1886 p.287.
64 B.Vol.50 No.2251 27 Mar 1886 p.467.
65 B.Vol.49 No.2220 22 Aug 1885 p.273 and William Woodward: 'London as it is and as it might be' R.I.B.A. November 1885. R.I.B.A. Transactions Vol II, New Series, 1886 p.31.
66 B.Vol.49 No.2234 28 Nov 1885 p.745.
67 B.Vol.51 No.2290 25 Dec 1886 p.907.
68 B.Vol.52 No.2301 12 Mar 1887 p.377.
69 B.Vol.53 No.2335 5 Nov 1887 p.626.
70 B.Vol.54 No.2354 17 Mar 1888 p.198.
71 B.Vol.54 No.2355 24 Mar 1888 p.214.
72 B.Vol.54 No.2356 31 Mar 1888 p.233.
73 B.Vol.54 No.2359 21 Apr 1888 p.279.
74 B.Vol.54 No.2368 23 June 1888 p.446 and No.2369 30 June 1888 p.461.
75 B.Vol.55 No.2373 28 July 1888 p.68.
76 B.Vol.55 No.2379 8 Sept 1888 p.179.
77 B.Vol.56 No.2415 18 May 1889 p.376.
78 B.Vol.56 No.2411 20 Apr 1889 p.300.
79 B.Vol.57 No.2443 30 Nov 1889 p.387.
80 B.Vol.56 No.2418 8 June 1889 p.432.
81 B.Vol.55 No.2392 8 Dec 1888 p.409-411.

- 82 In the discussion following J. J. Stevenson, "Planning of streets for convenience and architectural effect" R.I.B.A. March, 1889. B.Vol.56 No.2408 30 Mar 1889 p.240.
- 83 T. Blashill, "The influence of the public authority on street architecture" Art congress at Edinburgh. October, 1889. B.Vol.57 No.2439 2 Nov 1889 p.312-3.
- 84 A. Saint, 'Richard Norman Shaw' Yale and London, 1976, p.233.
- 85 B.Vol.57 No.2439 2 Nov 1889 p.313.
- 86 B.Vol.57 No.2437 19 Oct 1889 p.269.
- 87 B.Vol.57 No.2442 23 Nov 1889 p.365.
- 88 B.Vol.57 No.2445 14 Dec 1889 p.421-2.
- 89 B.Vol.55 No.2389 17 Nov 1888 p.353.
- 90 B.Vol.57 No.2445 14 Dec 1889 p.427.
- 91 B.Vol.57 No.2446 21 Dec 1889 p.433.
- 92 Ibid. p.434.
- 93 Ibid.
- 94 B.Vol.57 No.2447 28 Dec 1889 p.463.
- 95 B.Vol.58 No.2448 4 Jan 1890 p.12-13.
- 96 B.Vol.58 No.2454 15 Feb 1890 p.112 and No.2459 22 Mar 1890 p.211.
- 97 R.I.B.A. Transactions, Vol VI, New Series, 1890 p.116.
- 98 Ibid. p.119.
- 99 Ibid. p.123.
- 100 Ibid. p.128.
- 101 B.Vol.58 No.2461 5 Apr 1890 p.245.
- 102 2 and 3 Will.IV cap.71.
- 103 19 Chas.II cap.3 (1667).
- 104 R.I.B.A. Transactions, Vol.VI, New Series, 1890, p.139.
- 105 Ibid. p.140.
- 106 Ibid. p.139.
- 107 Ibid. p.138.
- 108 B.Vol.58 No.2456 1 Mar 1890 p.149.
- 109 B.Vol.58 No.2458 15 Mar 1890 p.188.
- 110 B.Vol.59 No.2475 12 July 1890 p.31.
- 111 B.Vol.59 No.2494 22 Nov 1890 p.403.
- 112 B.Vol.59 No.2480 16 Aug 1890 p.127.
- 113 See C.C.Knowles and P.H.Pitt, 'The History of Building Regulation in London 1189-1972' London, 1973 p.89 for further discussion of the Tribunal of Appeal.
- 114 R.I.B.A. Transactions, Vol VII, New Series, 1891, p.11-15. Presidential Address of 3 Nov 1890. also B.Vol.59 No.2492 8 Nov 1890 p.360.
- 115 B.Vol.60 No 2505 7 Feb 1891 p.107
- 116 B.Vol.61 No.2527 11 July 1891 p.32.
- 117 Ibid.
- 118 Ibid.
- 119 B.Vol.60 No.2521 30 May 1891 p.436.
- 120 B.Vol.59 No.2487 4 Oct 1890 p.272.
- 121 B.Vol.59 No.2488 11 Oct 1890 p.282, 291, 296.
- 122 B.Vol.59 No.2489 18 Oct 1890 p.311, 313 and No.2495 29 Nov 1890 p.430 and No.2497 13 Dec 1890 p.463.
- 123 B.Vol.60 No.2519 16 May 1891 p.391-2.
- 124 B.Vol.60 No.2520 23 May 1891 p.406.
- 125 B.Vol.64 No.2611 18 Feb 1893 p.134-5.
- 126 B.Vol.69 No.2757 7 Dec 1895 p.424.
- 127 B.Vol.45 No.2112 28 July 1883 p.130.
- 128 B.Vol.55 No.2387 3 Nov 1888 p.326.
- 129 B.Vol.60 No.2523 12 June 1891 p.478.
- 130 B.Vol.61 No.2546 21 No 1891 p.394.

- 131 B.Vol.33 No.1699 28 Aug 1875 p.783.
 B.Vol.35 No.1790 26 May 1877 p.542.
 B.Vol.36 No.1834 30 Mar 1878 p.333.
 B.Vol.37 No.1900 5 July 1879 p.757, No.1902 19 July 1879
 p.815; and No.1904 2 Aug 1879 p.870.
- 132 B.Vol.40 No.1991 2 Apr 1881 p.420.
- 133 B.Vol.41 No.2029 24 Dec 1881 p.804.
- 134 B.Vol.36 No.1858 14 Sept 1878 p.972.
- 135 B.Vol.44 No.2104 2 June 759, No.2105 9 June 1888 p.772,
 No.2106 16 June 1888 p.830.
- 136 B.Vol.50 No.2243 30 Jan 1886 p.217.
- 137 B.Vol.46 No.2144 8 Mar 1884 p.351.
- 138 B.Vol.50 No.2259 22 May 1886 p.761.
- 139 B.Vol.57 No.2423 13 July 1889 p.31.
- 140 B.Vol.57 No.2425 27 July 1889 p.67.
- 141 B.Vol.56 No.2408 20 Mar 1889 p.247.
- 142 B.Vol.57 No.2436 12 Oct 1889 p.263.
- 143 B.Vol.33 No.1680 17 Apr 1875 p.354, No.1697 14 Aug 1875 p.737.
 B.Vol.36 No.1870 7 Dec 1878 p.1287, Vol.37 No.1879 8 Feb 1879
 p.162.
- 144 B.Vol.35 No.1796 7 July 1877 p.695.
- 145 B.Vol.36 No.1830 2 Mar 1878 p.227.
- 146 B.Vol.38 No.1945 17 May 1880 p.617 and No.1946 22 May 1880 p.648.
- 147 B.Vol.39 No.1966 9 Oct 1880 p.456.
- 148 B.Vol.42 No.2036 11 Feb 1882 p.178.
- 149 44 Vic.cap.36 sec.21.
- 150 B.Vol.53 No.2314 11 June 1887 p.884, No.2341 17 Dec 1887 p.861
 and B.Vol.55 No.2378 1 Sept 1888 p.182.
- 151 B.Vol.35 No.1771 13 Jan 1877 p.42.
- 152 B.Vol.34 No.1739 3 June 1876 p.543 and Vol.37 No.1887 5 Apr
 1879 p.380.
- 153 B.Vol.38 No.1934 28 Feb 1880 p.265.
- 154 B.Vol.44 No.2084 13 Jan 1883 p.62.
- 155 B.Vol.49 No.2226 3 Oct 1885 p.478 and No.2230 31 Oct 1885
 p.625.
- 156 B.Vol.55 No.2392 8 Dec 1888 p.420; Vol.56 No.2417 1 June
 1889 p.413 and B.Vol.58 No.2467 17 May 1890 p.361.
- 157 B.Vol.56 No.2400 2 Feb 1889 p.93.
- 158 B.Vol.55 No.2382 29 Sept 1888 p.225.
- 159 B.Vol.80 No.3025 26 Jan 1901 p.81.
- 160 B.Vol.51 No.2286 27 Nov.1886 p.789.
- 161 B.Vol.59 No.2475 12 July 1890 p.24.
- 162 B.Vol.41 No.2027 10 Dec 1881 p.724.
- 163 B.Vol.41 No.2028 17 Dec 1881 p.774.
- 164 B.Vol.44 No.2094 24 Mar 1883 p.374.
- 165 B.Vol.50 No.2248 6 Mar 1886 p.363.

(An Act to amend the Metropolis Management Act 1855, the Metropolitan Building Act 1855 and the Acts amending the same respectively)

41 and 42 Vic.cap.32

DATE 22 July 1878

Reference in text : page 344.

CLAUSE	SELECTED CLAUSES relating to building design and construction Summary of contents	LINKS	
		ANTE	POST
4 &6	STREETS Term 'roadway' now means for all traffic, whether for carriages or foot traffic. Prescribed distances for all new buildings in old streets to be 20'0" from centre of road when a carriageway, and 10'0" when for foot traffic. These distances may be less at discretion of Board.	T6.S1 - and Metropolis Local Management Act Amendment Act - 1862	T14.c12 - c13 and T12.c6 - c9 inc.
11	STRUCTURE (Powers given to Metropolitan Board of works to require theatre and music hall proprietors to remedy structural defects).	new	T14.c11 and Met.Board of Works (Various Powers) Act 1882
12	('Power to Board to make regulations for theatre and music halls for protection from fire).		
14	Foundations : means 'the space immediately beneath footings of wall' Site: means 'whole space between level of bottom of foundations and level of the base of the walls.	T8.c16	see below
16	Powers to make by-laws for sites and foundations, wall construction. District Surveyor's fees and duties in connection with above.		
15	MISCELLANEOUS This act to be construed together with Metropolitan Building Act 1855.		
20	This act not to apply to City of London.		

BY-LAWS MADE IN 1879 UNDER THE PROVISIONS OF SECTION 16 OF THE ABOVE ACT

1	STRUCTURE <u>Foundations and site of buildings</u> No building on sites of refuse, vegetable matter, etc. Site of building to have 6" concrete layer, unless site is gravel, sand or virgin soil*. Foundations to be of concrete 9" thick and projecting	T8.c9	* T13.c2 otherwise all still valid in 1914
		T8.c10	

2	<p>4" min. from sides of footings, unless site has natural bed of gravel. Concrete: 1 lime to 6 aggregate (brick, gravel) or 1 cement to 8 aggregate. Above not applied to stable or shed.</p> <p><u>Description & Quality of substance of walls</u></p> <p>Walls good, hard, sound, well external: burnt bricks with good mortar or cement. (except concrete buildings).</p> <p>Similar bricks to be used below ground for party and cross walls and above roof and for chimney stacks. Cutters or malms may be used in arches over recesses and openings on faces of external walls.</p> <p>Stone to be free from cracks, etc and to be laid in its natural bed.</p> <p>Mortar: 1 of lime to 3 of sand or grit.</p> <p>Cement: Portland or equal quality, 1 of cement to 4 of clean sand or grit.</p> <p>Burnt ballast or broken brick may be used instead of sand or grit, if properly mixed with lime in a mortar mill.</p> <p>Every wall to have a Damp Course, whole thickness of wall, of asphalt or similar, in external wall at height of 12" above ground level, in party or internal wall at 6" min below level of lowest floor.</p> <p>Top of party wall and parapet wall to be finished with one course of hard bricks on edge or coping or other waterproof and fire resisting material.</p>		still valid in 1914
		new	
		T8.c11	T14.c1
		new	still valid in 1914
		new	still valid in 1914
		T8.c17 T9.c17	T13.c3
T8.c27	still valid in 1914		

See also Table 12, sheet 2, upper half, for further by-laws made in 1886 under this act.

(An Act to confer further powers upon the Metropolitan Board of Works with respect to streets and buildings in the Metropolis)

DATE 19 June 1882

45 Vic.cap.14

Reference in text : page 349.

CLAUSE NO.	SELECTED CLAUSES relating to building design and construction Summary of contents	LINKS	
		ANTE	POST
6	STREETS Prevents obstructions in streets.	T11.c4 and by-laws of 1 May 1857 see T6.s1	T14.c7 - c13 inc
7	Board to control new streets which do not connect between two streets i.e. to prevent cul-de-sac formation.		
9	Board may annex and enforce conditions as to the space to be left open when a building is erected beyond the general or regular line of building.		
12	STRUCTURE Board may impose conditions requiring the removal of iron or other buildings of a temporary character within a certain period.	see also T10.c2A	T14. Part VII
13	Temporary or movable wooden structures or erections not to be erected without a licence from the Board.		
16	Exclusion of heating pipes with hot water or steam at <u>low</u> pressure.	T6.c21	T14.c66
14	SPACE ABOUT BUILDINGS AND VENTILATION Open spaces to rear of dwellings on new sites: Frontage up to 15'0": open space = 150 sq.ft.min. Frontage over 15'0": open space = 200 sq.ft.min. Frontage over 20'0": open space = 300 sq.ft.min. Frontage over 30'0": open space = 450 sq.ft.min. Open space in all cases to be free from any erection on it above the level of the ceiling of the ground floor storey and to extend the entire width between party walls.	T8.c54	T14.c41

2a	<p>STRUCTURE</p> <p>Concrete walls : Portland cement and clean ballast, gravel, broken brick, furnace clinker and clean sand. 1 part cement : 2 parts sand : 3 parts of coarse material, broken up to pass through a 2" ring. Clean water - careful mixing. Walls to be carried up regularly, in parallel frames of equal height. Frame to be left rough and uneven to form a key for next frame. Thickness of walls as for brickwork as per Section 12 of Metropolitan Building Act 1855. Portions of concrete above roofs to be rendered externally with Portland cement.</p>	new	<p>see also T26 for L.C.C. Reinforced concrete Regulations</p> <p>still valid in 1914</p> <p>(see also T19.s1)</p>
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See also Table 13, sheet 1, lower half, for further by-laws made in 1891 under the Act of 1878

DATE : 13 October 1891

CLAUSE	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
1	<p>STRUCTURE PLASTER Laths - free from sap. Iron and wire netting may also be used. COARSE STUFF - 1 part lime to 3 parts sand, with water and hair. (Portland cement, Keen's cement, Parian cement, Martin's cement, Selenitic cement, or other approved plaster of Paris may be used). Lime - freshly burnt. Sand - clean, sharp, free from loam or earthy matter. Hair - good, sound. 1lb hair to every 3 cu ft of coarse stuff. Fibrous material may be used instead of hair, and ground brick or furnace slag instead of sand, to D.S. approval. SETTING COAT - lime or cement, with clean sand or cement only. Portland cement = 90 lbs per imperial bushel. Fibrous slab or other slab plastering of sufficient thickness, and securely fixed, may be used on ceilings, partitions and walls, to D.S. approval.</p>	new	still valid in 1914
2	<p>EXCAVATION up to 3'0" outside external walls of building - to be filled only with natural soil, brick or dry rubbish, approved by D.S. (no faecal, animal or vegetable matter) All to be properly rammed.</p>	new	still valid in 1914

BY-LAWS MADE IN 1891 UNDER THE PROVISIONS OF SECTION 16 OF THE METROPOLIS MANAGEMENT AND BUILDING ACTS AMENDMENT ACT 1878 (see Table 11, sheet 1 and Table 12, sheet 2)

2	<p>STRUCTURE (The earlier concession for gravel, sand or virgin soil for sites - now omitted)</p>	T11.c1	—
3	<p>DAMP PROOF COURSE now to be of material impervious to moisture, and approved by D.S. Position at level not less than 6" below level of lowest floor. Every external wall of habitable room, against earth, to be protected by impervious materials, to D.S. approval.</p>	T11.c2	still valid in 1914

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS			
		ANTE	POST		
39(1)	<p>DRAINAGE (Applies to both new and existing buildings). Drainage by-laws made by the L.C.C. June 1893 :</p> <p>1) w.c., one side at least to be on external wall, not to open off any habitable room or room used for manufacture.</p> <p>2) w.c. etc to have window area 2 sq.ft. open to external air, plus air brick or air shaft for constant ventilation.</p> <p>3) water supply to cistern to be separate from supply to drinking.</p> <p>4) soil pipe-outside building-sizes given - to be 3'0" min. above window top and not within 20'0" of window. Not to connect to bath or rainwater pipe - no trap in soil pipe or between soil pipe and drain.</p> <p>6-7) earth closets.</p> <p>8) privy - 20'0" min. from house or public building.</p> <p>9) privy - 100'0" min. from well or spring.</p> <p>10- privy - construction - cleansing.</p> <p>13)</p> <p>16) ashpit - to hold one week's refuse.</p> <p>20- cesspool - 100'0" min. from house</p> <p>21) or well, etc.</p> <p>22- cesspool construction.</p> <p>23)</p> <p>24-</p> <p>25) receptacles for dung.</p>	T8.c67	All still valid in 1914 but see also:- T21.c67		
		T8.c68	T21.c68		
		T8.c69	T18.c69		
		T8.c66	T21.c66 and T23.c3		
		T10.c71	T21.c71		
		T8.c73	T21.c75		
		T8.c80	T17.c31		
		T8.c86	T17.c39		
		96	<p>HABITABLE UNDERGROUND ROOMS 7'0" min. height, 3'0" of which to be above street level at least. Provision for prevention of damp in walls. Provision of open area, 6" below room floor level, to be 4'0" min. wide, running across entire width of house frontage. Steps down to area allowed, and access over area to front door, but not to obstruct front window of underground room.</p>	T6.c103	still valid in 1914

96	cont... Provision of proper drainage, w.c. ashpit, ventilation, fireplace, and window(s). Window area to be 1/10th of floor area of underground room. Top half of window to be openable.	T6.c103	still valid in 1914
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CHAPTER VIII

THE LONDON BUILDING ACT 1894

The Prelude : 1891 - 1894

The progress towards the long expected revision of London's building legislation is now resumed from the point at which it was left in 1891 (see chapter VII, page 367). The pace of change now begins to quicken and a considerable amount of activity is to occupy the next three years.

In May 1891 the L.C.C. agreed that it would have no objection to the suggestion made by the Statute Law Committee that parts of the Metropolitan Management and Building Acts should be repealed (1). A draft of the revisions came through a year later, prepared by the Local Government Board Office, and went to the Building Act Committee of the L.C.C. for its consideration (2). The Local Government Board therefore can be seen to be the common source for the Model By-laws and these proposals for London. The L.C.C., even though it had been toying with its own amending measures since the time of the abortive Bill prepared by the former Board of Works in 1874, now switched its attention to the Government's proposals, and by December 1891 was in a position to announce that it generally approved them (3).

We can take Thomas Blashill's views of what needed changing in the London legislation, from his conveniently timed talk given to the Seventh International Congress of Hygiene and Demography in August 1891 (4). As the Superintending Architect to the L.C.C. he was obviously in an ideal position to identify the relevant architectural factors. First, there was no provision in the London legislation, as there was in the Model By-laws, for ventilation under wooden floors in the lowest storey. Manchester's by-laws of 1890, upheld by Blashill as being "the best and most modern form" did so, but Blashill himself preferred a solid timber floor laid directly on fillets to a concrete sub-floor, the timbers being 'Burnettised' or 'Ryanised' against damp. E.T. Hall also supported this view, as he considered the exclusion of "ground air", being "charged with carbonic acid gas" to be deadly to persons

inhabiting rooms. More sensibly, Hall recommended a protective layer of asphalt to the lowest floor, but so unsavoury were those voids below the floor spaces that Hall also felt that a solid floor to the upstairs rooms was equally important. Blashill's concern at the gravel, sand or natural virgin soil on the site, without the 6" concrete cover, and also to the damp proof course levels, was rather strange, since he must have known that both these matters were to be corrected under the imminent new by-laws, which were to appear officially later that year (Table 13, sheet 1). Nevertheless, Manchester was again to the fore. Lead was specified in its by-laws, at 4 lbs per inch, asphalt was given a specified minimum thickness of one inch, this being required (though slates could be an alternative) at the level of the surface of the ground, a rather precarious position as later experience showed. Basement walls with a 2" cavity were the order in Manchester, but again, on the precedent of the Model By-laws, there was no vertical damp proof course. Blashill thought this unwise, and recommended "an outer covering or rendering of the wall with asphalt ... carried down from the damp proof course which is above ground to a damp proof course which is below the floor". (compare this with the situation in the Model By-laws in chapter VI p. 29).

Blashill then referred to the L.C.C.'s own regulations for the design of artizan dwellings. These are not strictly part of the main evolution of the building regulations, since they are particular and local, not directly controlled by statute or by-law, and relating only to the L.C.C. housing schemes built under the powers of Part 1 of the Housing of the Working Classes Act 1890 - schemes for which had to be approved by the Secretary of State. They are summarized on Table 15, sheet 1, as they have an indirect bearing on the emergent pattern of London's legislation at this point. The L.C.C. room height, at 9'0" was 2'0" higher than the current Building Act minimum, although, in the face of rising costs, the height was reduced in 1893 to 8'6". Space between buildings was set at $1\frac{1}{2}$ times the height of the block, but other topics, such as room sizes, stair position and lavatory accommodation, do not enter the mainstream of building regulation generally at this point. Finally, Blashill noted that the L.C.C. was currently considering new drainage regulations. Drainage by-laws were in fact virtually non-existent, and those issuing from the Vestries were, according to Dicksee, quite illegal (5), but the L.C.C. had been

trying to overcome this deficiency since 1889 (6). New drainage by-laws did eventually appear in February 1893, under the powers of the Public Health (London) Act 1891, and came into force on 28 June 1893. These have been mentioned already in Chapter VII, page 366.

Early in 1892, the R.I.B.A. published its own draft Bill for a new Building Act, a product which was the result of considerable detailed work, and which was based on the suggestions made by its Practice and Standing Committee in 1890-1 and approved by the Council in November 1891 (7). Its most important proposal was that all details of construction, which were subject to variations as new techniques and materials were developed, should be omitted from the main body of the Act and placed in schedules to the by-laws. These could then be altered from time to time without the necessity of fresh legislation. Secondly, the R.I.B.A. bravely attempted a definition of a 'building', but with no more success than the attempts of others, since it was discovered that in their Bill was a contradiction in this very definition. With reference to a building in one place it stated "whether such erection is wholly enclosed or not" whilst a little later it was stated that "every building shall be enclosed with walls constructed of brick, stone, etc". In fact the majority of the R.I.B.A.'s amendments were to do with definitions, but the following technical matters also received their attention: the need for party walls to project where eaves were not of fire resisting material; ^{and} the specification that floors of corridors, halls and stairs in buildings over 3,600 sq. ft. or over 50,000 cu. ft. were to be of fire resisting material, although they were prepared to allow a wooden floor on a fire resistant substructure, provided that there was no air space in between. On the provision of escape from flats and warehouses, the R.I.B.A. suggested that when a corridor was further than 60'0" away from a stair, the stairs should go up to the roof, part of which would be flat and protected by a handrail and which would give access to another staircase that lead back down again to the street (8).

Further points emerged in E.T.Hall's paper to the R.I.B.A. on 'London Building Legislation', given on 8 February 1892 (9). Amongst the proposals from the Practice Standing Committee was the idea of a solid 'backbone' of brickwork in the centre of a party wall, which could not be reduced by either owner, and the control on the extent of recesses

in a party wall being determined by their culminative width, and not by their total area. In external walls they proposed that recesses and openings be modified to be not more than half the wall area in any storey, nor to apply at all to the area between the base and a line 30'0" above the footpath, thereby clearing the way legally at last for more shop fenestration on the ground storey. The height of habitable rooms now went up to 8'0" from 7'0" and a minimum area for dormers and windows was fixed; cornices of shops could overhang the public way and bay windows could project over the owner's own land, though not within 2'0" of the party wall, or beyond a line drawn at 30'0" from the point in front of the building where it touched the centre line of the division between the properties. Turrets and oriel windows, as the L.C.C. now acknowledged, could project 12" over the public way.

These were all longstanding areas which needed amendment. More significant were four new suggestions. First, that underground rooms should now be transferred back into the Building Act from the Public Health Act, an eminently sensible reversal to the practice of the 1840's, but one which was not adopted. Secondly, a new section to deal with the alteration in purposes or character of a building and for the restoration of buildings of architectural, archaeological or historic interest. This was an important clause, acknowledging this legacy and the need to control it legally, and as such was a matter beyond the basic concern for health and safety which had until now formed the substance of the building regulations. Thirdly, there was more scientific awareness of building construction in the proposal to vary the thickness of concrete foundations in accordance with the height and class of building. Finally, regulations for the construction of lifts. It was proposed that in flats and offices they should be encased in brick walls with iron doors; where lifts were outside the external wall the shaft should be enclosed around the gear machinery; and where lifts were inside warehouses and not enclosed in shafts but passed through fire resisting floors, the openings in the floor were to have horizontal fire resisting doors. Edmund Woodthorpe emphasised the need to regulate lift construction, particularly since there was the example of ^arecent disastrous fire in New York still fresh in their minds. There was also, he added, the problem which had yet to be acknowledged, of providing a separate staircase up to a caretaker's flat over a warehouse.

The height of buildings was now proposed to be set at the limit of 75'0", with two storeys in the roof, totalling not more than 20'0" together. The L.C.C.'s suggestions for the open space controls were still not satisfactory in Hall's opinion. They would apply to all buildings, not just domestic, and would mean that the space between the opposite backs of two buildings would be practically double the width required between the opposite fronts of buildings (10). There would then be confusion in deciding which was the front and which was the back of a building.

The discussion following Hall's paper highlighted a number of other topics. Arthur Baker and H.H. Statham were both concerned that there was so little on fireproof construction - Baker had seen a building then being built in Kensington in brick and stone "but standing entirely upon iron legs" and he hoped that a new Act would make such structure impossible. On the other hand, Arthur Cawston could see no reason why the fronts of warehouses should not be built entirely of iron and glass, nor could he see why the Act should not now sanction the rebuilding of half timbered buildings, provided that they were not too near other buildings. Bernard Dicksee suggested an easier rule for projections : if they were not more than 10'0" from other property or not projecting more than 4'0", and Ralph Nevill approved the new rules for thicker flues for 'Kitcheners' (see p.368). John Slater was naturally pleased to see so many of the suggestions he had made two years ago (see p.360) now incorporated, but J.D. Mathews, with the caution of old age, was still afraid that by-laws would embody various whims or fancies which would not at all be in the interests of the public (11). The one matter which the R.I.B.A. did manage to take further was the problem of fire resistant construction. In May 1892, the Annual Report noted that recommendations had been made to the Local Government Board to make fire resisting materials compulsory in the construction of large and important buildings in London (12). It was left to the Surveyors' Institution to recommend that the building line controls and all house drainage should come within the scope of the Building Act (13).

Meanwhile the L.C.C. in April 1892, was giving more attention to the difficult question of limiting the height of dwellings according to the open space about them, the concept that had been initially high-

lighted by the Royal Commission on the Housing of the Working Classes in 1884-5. The 45° angle at the rear, based, it was admitted, on the Liverpool precedent, did not go far enough since the L.C.C. now accepted that it did not also cover the space at the front of the building. Furthermore, the law at this time allowed a building built on 'old foundations' to be of any height, i.e., one built on the site of a previous building. The L.C.C. Public Health and Housing Committee wanted to change this, but it was ruled out of order on a trivial technical matter which determined that it was not within their terms of reference (14). In spite of this, on 26 July 1892 the L.C.C. instructed the Parliamentary Committee to recommend to the Government the introduction of the new Bill (15).

The subject of London's building regulation again appeared at the R.I.B.A. in December 1892, when William C. Street gave a paper on "Some problems of Town and City Development", a paper primarily devoted, as its title implied, to planning problems, but overlapping into the regulation field. The definition between the two areas was not yet clear (16). Street preferred a building height lower than 75'0" and also recommended the Model By-law requirement of a 25'0" minimum width of open space for all houses over 35'0" high and, not for the first time, the idea of street 'subways' for all services. William Woodward called for the need to repeal the clauses on open space around buildings altogether since it could not be enforced on sites previously occupied by buildings - which of course meant the majority of London. Here was the L.C.C. "compelled by statute to clear away slum property at immense cost to the ratepayers but at the same time is without adequate means to prevent the creation of slums under its very eyes" (17). (In fact new clauses designed to overcome this appeared in April 1893 - all new parts of buildings, over and beyond the former or existing buildings if it was to be extended, were to come under the Building Act; and the height was not to be greater than the width to the opposite side of the street (18).) Woodward had no objection to high buildings if the street was also wide - the Foreign Office in Whitehall was 90'0" high and he found it none too high for the width of the street. Lewis Angell was more concerned at Street's "dreams of fair cities" - of Paris, Berlin and Vienna. But, as Angell pointed out, continental methods did not fit British notions. Had not the Bishop of Peterborough wisely said "England would rather be free than

beautiful"? After thirty years as a municipal architect, Angell was satisfied that nothing short of a fire on an American scale or an earthquake on a Japanese scale would bring about any great new departure in English street improvements (19).

*

A major change of course occurred in June 1893. After spending nearly four years on a new Bill, the efforts of the L.C.C. were thwarted by the changes in Government resulting from the return of Gladstone and the Liberals to power. In view of the delays which this change made to the progress of the Government's business, which included their amending Bill, the L.C.C. decided to draft its own private bill - the London Streets and Buildings Bill. Into it they now brought the clauses on streets and building lines from the Metropolis Management Act, and also the controls embodied in the Sky Signs Act. New proposals also came from the Building Act Committee for the control of open space at the front and rear of buildings (20). The Committee had looked at the Model By-laws, as well as those in operation in Liverpool, Birmingham, Bristol, Manchester, Glasgow and Edinburgh which covered this matter. They finally prepared a new clause to bring all new parts of buildings, over and beyond the former or existing buildings, within the Acts' controls, with an amendment by Beachcroft to prohibit all houses, on all sites whether built before or after 1878, to be not less than 20'0" from the centre of the road (this was an extension of section 6 of the 1878 Amending Act) (21). By November 1893 the L.C.C. were cautiously finding their way through the precise wording of the amendments covering this matter, not wanting, as they said, to contravene the spirit of the Bill and yet at the same time not wanting to cause hardship to individual owners. They included in their controls artizan dwellings which did not front onto any street but only a courtyard, a loophole which needed blocking, since up to this point, the Council had had virtually no control over these blocks of dwellings. Buildings on 'old' foundations could now be made to set back to give sufficient open space, and another new control was to set the size of internal courts, what were in effect ventilation shafts in the centre of blocks, to provide a modicum of light and air. Street controls were extended to control gas lamp brackets over streets (22), and another innovation was the lighting of common access staircases in

tenement blocks at night. At the same time, December 1893, when the new Bill was sent to Parliament (23) there was Alderman Beachcroft then addressing the Sanitary Inspectors' Association and recommending the extension of the Model By-laws to London (24). There was still no adequate proposal to amend and consolidate any drainage regulations for London.

The new Bill was generally favourably received. 'The Builder' thought it was good, particularly welcoming the requirement for means of escape from buildings over 60'0" high, the allowance of buildings over 216,000 cu.ft. by the Council, and the controls for habitable rooms over stables, although it thought that 3" of concrete between the joists in this latter requirement was not adequate and it would have preferred a solid concrete infilling. But there were still some shortcomings. What harm was there, asked 'The Builder' in a street being closed at one end by gates, a semi-private street, that was often preferred by wealthy residents? Why limit a street width at 60'0" - was not Paris still a relevant example? And how did this relate to building height, since it was universally agreed, said 'The Builder', that the height should not be greater than the width, yet the maximum height was given as 75'0"? It was unclear how the 45° angle clause should be interpreted; it was difficult to understand the clause regarding courts or shafts within buildings, and, with houses on low lying ground, no details were given of how the site under the lowest floor was to be treated (25).

At the Surveyors' Institution, Henry Blackburn analysed the new Bill on 5 February 1894 (26). He approved particularly of the controls on dwellings under railway arches, and of the controls for floor joists - but why were the controls on the sizes of girders and columns used for carrying whole buildings still omitted? It was a pity that there were no controls over stairs and gangways (to avoid, as he said, the sort of catastrophe which had occurred at Hampstead on Bank Holiday in 1892). Why was the road width limited to 60'0"? The other criticisms reflected the Surveyor and his attitude to finance. The setting back of a building, whilst providing a forecourt, did not allow for any compensation for any depreciation which might occur. The small suburban house property market would be affected by the alteration to the wall thickness schedule, for now 9" walls were to be no higher than 25'0" or

longer than 30'0" if only two storeys high. 9" was strong enough for three storeys, maintained Blackburn; the main problem was really the penetration of damp (see also the Friern Road case p.415) (27). Open space at the ground floor rule now prevented shops from extending at the rear - a restriction on trade, protested Blackburn. The room height set at 8'6" was too high for over half the area in the roof - 8'0" or 7'6" would have been quite adequate and much cheaper, and the size of window openings could have been reduced - all these new regulations would in Blackburn's view, increase the cost of houses by some 10 to 12%.

At the R.I.B.A. it was Arthur Cates who reviewed the Bill on 12 March 1894, with a discussion following a week later (28). Generally the R.I.B.A. was in favour of the Bill - after all it was now largely based on their suggestions. There were however still a number of areas which the members felt to be unsatisfactory. Streets still lacked any broader planning controls, for their direction and for an open space to be left for public recreation. One good feature was the requirement for a space 5'0" wide between the footpath and the external wall of a house, a requirement which Cates thought should be applied generally throughout the country. Statham still pressed the example of Parisian streets, the only comparable one to his mind was Portland Place (29). Cates saw no need for the space at the rear of a building to be altered so as to prevent the ground floor being covered in (as for shops) and J.J. Stevenson thought it better to keep the space at the rear narrower "to force the wind down and clear out the stagnant air below" (30). Cates attacked the 45° angle as being "destructive, oppressive and without beneficial results" but he now mentioned, and it was the first mention of this, that the angle of 63° 20' had been suggested, starting at a level 12'0" above the street level. Cates' view was shared by the Institute of Builders and the Central Association of Master Builders of London. It was "simply nonsense to pretend that either light or air is regulated or controlled by an angle of 45° or any other angle..." (31). This 'shaving clause' as J.T.Perry dubbed it, would, he claimed, at 45°, harshly affect hotels and large retail drapery establishments; and Professor Kerr considered that the clause was badly worded, the draftsman not being able to tell the difference between a 'line' and a 'plane'. Building height at 75'0" was considered reasonable by Cates, though he preferred the Parisian rules for relating

street width and building height (32). The two storeys in the roof, plus the roof itself should, he felt, be fire resisting and the height of the storeys should be limited. The R.I.B.A. draft Bill had suggested 20'0" as the limit to the two storeys in the roof, and also a limit to the number of storeys in the roof of buildings less than 75'0" high, otherwise it would have been possible to build five storeys in the roof of a building 74'0" high. There was now a need for ground floor external walls to be allowed to be quite open, as any limit to the height of shop fronts would make magnificent shop fronts, such as in the Leipsigerstrasse in Berlin, impossible in London - a point made by Stevenson. Cawston added that as the height of buildings was now limited, speculators might wish to increase the number of storeys by reducing their height, with the ground floor becoming relatively insignificant (a distasteful prospect to those used to the traditional emphasis attached to the important ground floor), and he therefore suggested that a ground floor storey should be controlled at a minimum height of 10'0". On this matter of openings in walls, Bernard Dicksee considered that the rule to have openings only up to half the length, rather than the area, in a storey would lessen the amount of window space. In a house 15'0" wide overall, with a door 3'0" wide, one could only have one window 3'0" wide, even though the room behind might have been 11'0" wide. Matters of fire protection were still not fully considered. Whilst windows had to be still 4" back from the face of the wall ("which had spoiled the development of Queen Anne architecture"), there was, as Kerr noted, no control on 'iron skeletons' and some of the terms used in the clauses dealing with chimneys and low pressure hot water pipes were very vague. Edmund Woodward then pointed out that the Bill took no account of a new building type then springing up, one with trade premises on the ground floor and dwelling rooms for employees up above - as in Wood Street and Fore Street - and these needed separate fireproof stairs. There were also now 'separate sets of offices', built on an open plan and not divided by party walls, since it was not known at the outset who would occupy them. These points had been raised by the R.I.B.A. at the draft Bill stage, but not inserted by them. Flats also, if not over 3,600 sq.ft. could go as high as they pleased without needing any fireproof floors. W.D. Caroe, referring to the thorny earlier regulation for party walls to project above the roof, thought it unfortunate that so much notice had been taken of the recommendations of the Insurance

Companies. In Leeds, Bradford, Huddersfield, Sheffield, Liverpool, Manchester and other Northern towns, this rule had been dispensed with. Would it not be possible, he argued, to adopt the principle followed in Hull where party wall parapets were not required to buildings over a certain height? To counter the claim of northern sanity in this matter, it was pointed out that party walls above roofs had been required by the recent (1892) Act for Towns and Populous Places in Scotland.

There was some concern over the proposal to make by-laws under the Act. To have them for open space, the setting back of buildings, and the height of buildings was considered to be undesirable, since they would lack conviction, and furthermore the L.C.C. wanted to make them without the approval of any higher controlling body. By-laws might however be just suitable for controlling the scantlings and timber joists (not in the statute as then proposed)(33), and for the protection of iron in relation to fire. There was also, in connection with by-laws, a possibility that the existing ones would be annulled by the repeal of the old acts and that as no new by-laws could be made for three months, builders would make good use of this opportunity to avoid all such controls. (In the event however, this possibility was foreseen by the legislature and successfully avoided, see Table 14, sheet 10, clause 216).

On the artistic aspects of the proposed regulations, Statham made great play of the restrictions placed by the controls on monumental cornices. 2'6" would be the maximum projection, yet since there had been, as he said, "lately a revival of interest in Classical and Renaissance architecture", the example of the Riccardi Palace at 9'0", the Strozzi at 8'0" and the Guadagni at 7'0" would be hard to emulate. Longstaff, the Chairman of the L.C.C. Building Act Committee, reported that the L.C.C. had been very concerned about the effects or influence of the legislation on art. But they had received no guidance from the R.I.B.A. His Committee had now allowed oriel windows, wooden bargeboards, mouldings and decorations to dormer windows, and had introduced controls over advertisements (sky signs) which often spoiled buildings, but they had retained the limit on projections in the interests of public safety. No guidance had come from the Art Committee of the R.I.B.A. on the best proportions to relate street width and building height, nor on the matter of the projecting party walls above the roof. To all this

criticism E.T.Hall replied that "no suggestions were offered because architects wished to be unrestricted, and if regulations were suggested in regard to the art of their buildings they would find themselves under restrictions which would destroy the artistic value of London" (34). Arthur Cawston wanted to avoid bad designs, such as the example he quoted of Shaftsbury Avenue, but wondered how they could get good design, as in Mount Street, and proposed that there should be established some form of "Committee of Taste".

Longstaff explained the reason for the speed at which the Bill was being conducted. It was primarily due, he said, to the impending election of the following year. W.Wallace Bruce, Chairman of the L.C.C Housing Sub Committee identified another potential fault in the legislation - the probable clash between the new Act, the Public Health (London) Act of 1891 and the Housing of the Working Classes Act of 1890. One Act would allow buildings to be put up - but other acts might later class the same buildings as insanitary and bring about their demolition.

At the Architectural Association only 25 members appeared to discuss the new Bill on 30 March 1894 (35), yet the L.C.C had, for the first time, taken the initiative to seek the views of this Association. T.W.Goldsmith insisted however that the A.A. was very concerned at the effects the legislation would have on aesthetics - indeed, it had already petitioned against the carrying up of the party walls above the roof. It was pointed out that the same insurance rate was charged in towns where the party wall did not come through the roof as was charged in London. The A.A.'s opposition was to be effectively countered by the evidence of Captain Simmons of the Fire Brigade in June (36). The main battle ground was over Part IV - the open space and height of buildings. The 'shaving clause' had been invented by the Local Government Board and used in Liverpool since 1890, but there it was only for domestic buildings. Even then, Liverpool was proposing to modify it in the case of shops on the ground floor with a dwelling over, where shops covered the whole of the site allowing the angle to be measured from the level of the first floor. Now the L.C.C. were following Liverpool, the rule was now to apply to dwellings in new streets. The effects on town development would be obvious. "The decrease in habitable space proposed ... means ... the increase of the

borders of the City" (37). The A.A. was concerned at the special controls and consents vested in the L.C.C., ^{and} any clauses which perpetuated old or outworn buildings, clauses which would raise the cost of building, or clauses which would interfere with freedom in design or which would make architecture "stereotyped", as they described it. They objected to the cornice rules, preferred a room height of 7'6", and asked for window frames to be allowed to be flush with the outer face of the wall: "We might thus be able to emulate some of the charming facades which are special features of the City of Bath ... the present Building Act was regulated to suit the exigencies of the stucco Victorian era of Classical or Renaissance architecture, in which the detestable window reveal was desired" (38).

The limitation on the mansard roof to an angle of 75° would also be a "serious injury to design", 83° at least should be possible, and the rules for the internal light wells and for lifts also caused the A.A. some concern.

More redrafting was undertaken by the L.C.C. in April 1894. It was, they said, all much more difficult than had been originally thought, since there were so many variations to cope with, particularly with regard to the space about buildings and their height, covered by Section IV (39):

We admit the force of the argument, confirmed as it is by the experience of provincial towns, that building regulations, if too stringent, may defeat their own object".

Proposals were now made to deal less stringently with business premises, yet more stringently with artizan and labourers' dwellings - the argument here being that the houses of the other classes were not so crowded, and that they could afford to look after themselves. The Bill was generally rationalised and made rather simpler by reducing the number of 'exceptions'. The clause relating to the storage of timber which had always provoked so much opposition, was almost withdrawn in April. But it too was amended quite dramatically, and still retained. The clause on non-combustible signboards, that is, advertisements on sheet metal, was however removed (40). There had been only four fires a year on average in timber yards over the previous 13 years and it was felt that the retention of the detailed regulations for timber stacks could "wreck an otherwise good bill" - a view that was supported by 52 votes to 32 (41). It was also noted that there was no provision in the new Bill corresponding with section 3 of clause 27 (part 1) of the 1855 Metropolitan Building Act - that is, a building with independent

stairs, deemed to be a separate building, being divided vertically or horizontally into 216,000 cu.ft, maximum (42).

Concern over 'vested interests' was the reason put forward by 'The Builder' to explain its criticisms of the revised Bill as it was in July 1894 (43). The Bill had survived twenty sittings of a Commons Select Committee, had passed its third reading and was on its way through a Select Committee in the Lords when the maximum height of buildings was now set at 80'0", (44) for the same reason that the Lords had raised the building height to 90'0" when the L.C.C. (General Powers) Bill came their way in 1890 (see p.363). One clause, no.44, now allowed 80'0" high buildings, but they could be in streets that were only 40'0" wide; yet another clause, no.46, said that no building in a street laid out after 7 August 1862, which was narrower than 50'0", could be higher than the width of the street. Exactly what the precise date had to do with it was beyond reasonable explanation - at least to 'The Builder'. Streets were going to be too narrow - there could be no more like Portland Place, Regent Street (86'0") or St James' Street (80'0"). It was all "propuppy, propuppy, propuppy" (45). The 'shaving clause' angle was now $63\frac{1}{2}^{\circ}$, not 45° - another concession to the 'vested interests', certainly not for the benefit of the inhabitants of the poorer parts of London. It was felt that the new angle would now suit the speculative builder and his influential friends, but not the poor, living in the parts of London identified in Robert William's 'London Rookeries' and 'More Light and Air for Londoners'. Shops could now extend back again over the rear ground floor space, and compensation was now allowed for setting back - again, both the result of the pressure of 'vested interests'. The restrictions on cornices, so vehemently attacked by Statham at the R.I.B.A. remained the same, except that they could now project 2'6" over the public way - but for Statham they would always be "starved and deformed".

'The Builder' also put forward the view that the Bill was making "bids for the working class votes" in its separate treatment of the open space regulations at the rear of working class homes. Longstaff objected to this, and recalled that earlier bills had treated all domestic buildings alike, but open space at the rear of dwellings had been objected to by "gentlemen connected with large London estates" and it had not been possible to carry the Bill in that form. The L.C.C

claimed that the Housing of the Working Classes Act 1890 compelled them to clear slums, but there was nothing to prevent an owner from replacing cottages with tall buildings, and the L.C.C. had pleaded for protection on behalf of the ratepayers. The opposition agreed that it was true, but that it did not apply to the better class of house - hence the attempt to define houses by terms of measurement, an idea which had its origins outside the Council, in Lord Shaftsbury's and then Mr. Torrens and Mr. Cross's legislation (46).

Back in the technical world, Banister Fletcher addressed the British Institute of Public Health Annual Congress in July 1894. He was pleased to see that asphalt could now be used as a damp proof course instead of the more fragile slate, but objected still to the 9" wall, to the old 9" x 14" flue (why not an unglazed drain pipe instead?) and the vermin prone spaces within the floor and ceiling construction and in timber partitioning. Solid concrete floors, with a wood block finish, and 3" concrete or breeze block for partitions, with cement skirtings, were his answer (47).

By August the Bill was again modified and improved. Gone was the clause preventing building within 20'0" of the centre of a road, gone was the 45° angle at the rear of all buildings - it was now 63½° at the rear of houses only, and gone too was the provision of the 45° angle of light to be obtained outside the window of every habitable room (48).

The London Building Act received the Royal Assent on 25 August 1894 (49).

*

The London Building Act 1894

The London Building Act of 1894 was an extraordinary measure in three respects. First, it was a private Bill, subject therefore to greater tribulations in its promotion and passage through Parliament than any Government sponsored measure, even though it had expert guidance from the legislative draftsmen in the L.C.C. Secondly, it succeeded in repealing the majority of all building legislation which had been generated since 1844 - totally repealing seven public acts and partially

repealing seven others. Thirdly, although it did not greatly enlarge the range of areas falling within its controls - and drainage was still left out - it nevertheless enlarged its detailed coverage of its technical clauses, so that it was possible to anticipate more variations and permutations and to resolve them more easily. Permissive clauses were introduced to try and meet such variations, a characteristic of a more complex and changing building world. This development was to be one of the beneficial aspects of the new act in the long run.

In an effort to meet these varying conditions, the L.C.C. had proposed to have the power to relax its by-laws if and when the situation demanded it. The Home Office were most unhappy about this, and sent a memorandum to Lord Cross on the House of Commons Committee objecting to this power of relaxation, stressing that a by-law should be universal and equal in its operation on all. Longstaff, Chairman of the L.C.C. Building Act Committee, insisted however that there was no point in producing a by-law in London if there was no power for relaxation. The experience of the provinces, where the by-laws were based on the Model, and where there were no powers of relaxation, had clearly shown the difficulties that could arise in practice (50).

Elaborate as the Act was, it was clear that it was moving more towards the use of theoretical concepts and further away from simple and direct controls. The mechanism was becoming increasingly elaborate. The complicated rule involving the $63\frac{1}{2}^{\circ}$ angle was a geometrician's delight, but hardly likely to inspire respect and comprehension on the building site or drawing board, assuming he had one, of the small speculative builder, whose products were largely the cause of this very legislative measure. No doubt it was better than the 45° angle rule in Liverpool, which Longstaff had himself seen in operation on his visit to that city, and which he considered resulted in very closely packed buildings (51) - but even so its direct relationship to the quantity and quality of light and air were difficult to accept. To Charles Fowler it was clear:

"that the old act was drafted by practical men, and that the new act was drafted by able men, doubtless who had many very good ideas, but not structural ideas, and that they were not perhaps therefore, quite the men to draft a building act which essentially must be a practical act and appeal to practical men" (52).

The most extreme example of this, to Fowler's mind, was the $63\frac{1}{2}^{\circ}$ angle - the 'shaving clause' as it had been called.

To analyse all 218 clauses and 4 schedules at length would not be practical here. The principal clauses relating to design and construction are outlined in Table 14, and many of them have already been discussed in their evolutionary stages in the preceding pages. This section now therefore selects certain of the more significant innovations of the new Act and, as in previous analyses of Acts, groups the matters under broad topic headings, but with an extra preliminary paragraph on definitions.

The new Act bravely attempted to expand and clarify the range of definitions, an inevitable requirement now that the Act was attempting to meet a wider range of possible situations. Yet the definition of a 'building' was again evaded, in what was after all a Building Act.

Foundations and fire resisting materials were more specific in their definition, (see below) but the other definitions were made with respect to the meaning of terms, rather than the materials or elements of a building. For example, the topmost storey was now to be either wholly or partly in the roof, where there was a room in the roof, but there was no definition of a 'storey', except that it was now to be measured from the underside of the floor to the underside of the floor above. Previously, the thickness of the floor itself had been excluded from the storey in any calculations. A 'habitable room' was now defined as a living room or one used to pass the night, although it was not entirely clear whether a scullery or pantry were to be classed as habitable rooms - a dilemma which has remained until more recent years, with a kitchen being non-habitable but a dining-kitchen being habitable. Hotels over 250,000 cu.ft. were now to be classed as public buildings, acknowledging their special case as a complicated new and large building type, but curiously in the section on open space about buildings, a domestic building was not to include offices or counting houses, as they were in the rest of the Act. Commercial pressures were being brought to bear here again - the land and space which would have to be sacrificed, and the loss in rentable office floor area as a result of the 'shaving clause' would have been very costly on valuable central city sites. On the other hand, the working classes were, as we have seen, singled out for special treatment with respect to buildings housing them, in relation to their height and the width of the street - but no definition was given in this act of 'Working Class'. Finally,

it was now accepted that the Superintending Architect should determine the front and rear of a building - a requirement made necessary by the fact that on many estates in London, buildings had managed to evade the regulations by having in effect two 'fronts'.

Streets (Table 14, sheet 1)

The controls for streets were very similar in those in the earlier regulations in the Metropolis Management Act, from where they had been transferred to the new Building Act. Mews were however now classed officially as streets, and there was now an implied control on the gradient of all streets. The precise 'centre' of the road was a little obscure, as there was doubt over how the 'legal' or 'geometric' centres were to be defined (53). The implied prevention of circular or crescent roads by the clause requiring a street to connect at both ends with two separate streets was unfortunate, though Longstaff pointed out that the condition was permissive and not imperative, the word was 'might' and not 'should' (54), but it was naturally going to be hard to implement that in practice. The restrictions on street widths still remained, which was also very unfortunate. Blashill could still be heard plaintively pleading for something approaching the 150'0" standards of certain streets in Berlin (55).

Structure (Table 14, Sheet 2 & 7)

Foundations were now extended in their definition to include an 'artificially formed support on which the footings of the wall rest', and therefore now permitted the foundation to be a bressummer or bearing beam under a wall.(56) It was now legal for a wall to stand on an iron girder (57). Whilst referring to iron work, it is interesting to note here the inclusion of a clause requiring metallic beams to have $\frac{1}{4}$ " per 10'0" of length, left at the ends for expansion - in effect, the first of the steel work regulations (58).

For walls, all the modifications were generally in the direction of increased solidity. Innovations were rules for walls in the 100' to 120'0" height category, for hollow walls (but see below), for underpinning, and for walls to overhang by 6" - a concession towards contemporary architectural taste. As examples of the increased solidity,

the following may be cited. First, walls not over 25'0" high and under 30'0" long, when there were more than two storeys, had now to be 13" thick below the top storey - not the two topmost storeys as in the 1855 Building Act. If the topmost storey was in the roof, this meant that all the wall, except about 4'6" of the upper part of its height, would have to be 13" thick ... "a bugbear to the jerry builder" (59). Secondly, taken out of the new Act was the old clause of the 1855 Building Act (see Table 6, sheet 8), which allowed a reduction in wall thickness if any external or party wall was not more than 25'0" centre to centre from another external or party wall, and was tied to it by floor beams. Thirdly, the clause relating to cross walls was now modified to operate up to the floor of the topmost storey, as opposed to two thirds the height of the external or party wall, as in the previous Building Act. Finally, hollow walls, although permissible, were still subject to the restriction that the thickness of one leaf must be the same as the thickness laid down in the schedule to the Act for a conventional solid wall, and therefore it was seen, even at the time, that the chances of using the hollow wall in London were virtually nullified by this clause (60).

The formation of recesses and openings in external walls was now to be determined by a proportion related to the area of wall above the ground storey only - although this did not of course mean that ground storeys themselves were forbidden to have any openings (61). In the past, this rule, when the ground storey had been taken into account as well, had meant that architects had frequently had to extend unnecessarily the height of a parapet or to sink extra walling below the ground storey, simply in order to obtain the right amount of solid walling to secure the correct 50% balance of solid to void (62). To allow a recess under 5" to be corbelled out in brick or stone was also new. The frames of doors and windows could now be fixed flush with the face of the external wall. "This is a very important concession to the taste for flush window frames which the Queen Anne Revival has brought in" said 'The Builder' (63), but Professor T. Roger Smith had reservations and considered that the flush window would be unlikely to be used (64).

Roof construction over a height of 60'0" from the ground was now to be of fire-resisting materials, with a suitable means of escape over that

height, such as the possibility of access onto the roof via a window. The setting of the roof angle at 75° max. from the horizontal, except for towers and spires "will hamper architects sometimes in a rather vexatious manner" (65). Longstaff's explanation of this was that the District Surveyor had often allowed a 'wall' to slope a little so that it could be called a 'roof' (66).

The perpetration of the clause requiring party wall to project above the roofs was still a source of much controversy. 'The Builder' conceded that it was now probably not necessary in "semi-detached houses of a superior class", but thought it was still wise to retain it on long terraces. A tenuous argument was then put forward by 'The Builder' to defend the aesthetic consequences : the party wall projection serves "to break the long monotonous line of roofs and moreover it affords the chimney stacks a visible structural basis instead of making them appear to stand on the slates" (67). Curiously, the rule which required party walls to project out 4" beyond the eaves, serving the same function as the rule requiring party walls to project above the roof, was not applied to the semi-detached house. Whilst on party wall matters, it should be noted that the requirements for party fence walls were now reinstated.

The change to allow wooden cornices and bargeboards to dormers, not over 12" deep, to be no longer covered with an incombustible material was also seen as "another sign of the influence of changes in architectural taste" (68). The regulation preventing a wooden cornice to be less than 15'0" away from another building was now removed, but outside stairs, landings and steps had now to be of fireproof material. The opportunity to now be able to build oriels, bay windows and projecting turrets springing from corbels was now generally welcomed (69). The 2'6" cornice restriction had, partly as a result of Statham's protests, been modified so that the limiting distance was now only over the public way and not from the face of the wall. This meant that where a larger cornice was required, the building had to be set back within its own site the necessary distance. (70) The continuation of the excessively detailed rules for shop front projections were now really an anachronism. They were over-complicated and largely out of proportion to the danger they were supposed to prevent. They were, said 'The Builder':

"all because of aiding and abetting the architecturally absurd notion, which belongs to a past age, that shops have some special need for the introduction of gimcrack pilasters and consoles flanking their windows" (71).

It was now possible to build chimneys on iron girders, supported on party or cross walls; $8\frac{1}{2}$ " brickwork was required around the flue, the rendering and marking of flues became more detailed and stricter controls were now operated for hearths. Flue sizes were not given, to Banister Fletcher's relief, and indeed they had not been for a number of years. This was more by accident than design, and Longstaff concluded that there was now no need for sizes to be given. T. Roger Smith, referring to the introduction of factory chimney rules into the Act, explained that they were the consolidation of a series of principles evolved as a result of individual submissions made for approval to the Metropolitan Board of Works in the previous years (72).

Regulations dealing with fire were further elaborated and extended. A list of fire-resisting materials was given in the second schedule, including now oak and teak of a minimum thickness, but there was still some confusion over the terms 'fire-resisting' and 'incombustible'. Stairs which in certain circumstances had to be fire-resisting could still be of stone, an 'incombustible' material, but one generally recognised as not being fire-resisting (73). Fire-resisting material was now required for all floors, landings and stairs in all public buildings and in all buildings over 125,000 cu. ft. used as dwellings for separate families. Further requirements for means of escape in case of fire were also introduced, and the rules for escape from churches and places of public assembly came across from the theatre regulations. The rules for furnace chimney shafts were introduced for the first time, although they had been proposed back in 1878.

The horizontal party wall was now included, separating trade and domestic areas in buildings over 1000 sq. ft. This was largely due to the influence of the District Surveyors, following a bad fire at Lavender Hill in a similar building (74). This particular clause, no. 74, was to cause a number of problems in its interpretation. Office chambers were not considered to be separate buildings, but if over 2,500 sq. ft. (altered from 3,600), then the floors had to be separated by fire-resisting materials. At first sight this seemed less stringent than the earlier rulings, but in fact it was more so because it

required fire-resisting stairs as well as floors (75). The idea of not being able to unite rooms by means of openings penetrating the horizontal fire-resisting floor was a difficult concept for some architects, such as H.H. Collins, to accept, but as Blashill emphasised, it was 'decidedly stressed that they should not be united" (76). Briefly to conclude, we might just note four minor aspects - the appearance at last of some minimal control over the storage of timber, controls on buildings erected under the arches of a railway viaduct, the exemption of small sheds not over 5'0" high (presumably for dogs or bicycles) and, reflecting again a change in fashions, the exemption of glass conservatories (77).

Ventilation, Space about Buildings and Drainage (Table 14, sheets 1 & 6)

Window sizes now applied to all habitable rooms, not just underground rooms, as in the Public Health (London) Act of 1891, at a ratio of 1/10 th the floor area. It was considered that "the area of window space demanded will deprive some very aesthetic architects of the little windows in which they delight" (78), a reflection of the growing vernacular revival; but Banister Fletcher thought the regulations had the "advantage that they will inform the builder what is considered to be smallest window that ought to be made" (79), another example of the conflict between the interference with the artist and the education of the speculative builder, both operating at the extremes of the building world. Fletcher also felt that it was necessary to have some regulations for the windows in the roofs, for indeed, no sizes were given for lantern lights, although an openable area equal to 1/20th. of the floor area was required. Windows were also, he scathingly noted, often now too near the floor, "solely on account of the elevations" (80), another example of the revival of interest in the vernacular style, a matter to which we return in more detail in the next chapter.

The rules for open space produced the most controversy, as we have already seen. The 100 sq. ft. of open space at the rear of habitable basements was new in that it applied specifically to basements only. It was not unreasonable, and there was still the concession to allow the ground floor to extend at the rear over the entire site, to satisfy the shopkeepers. The $63\frac{1}{2}^{\circ}$ angle has already been mentioned, but it should be noted that the clause regulating the interior courts

for light and air to the inside of a block of buildings did not apply to offices - "a serious oversight" (81), but one which can again be explained by the 'vested interests' and commercial pressures. The clause requiring a window to ventilate a common access stair was new, as was the ventilation under the wooden floor of any basement (originally to underground rooms in the Public Health London Act of 1891) and the clause requiring a solid floor to rooms over stables. The height of building controls have already been discussed, but the actual regulations still had anomalies within them. For example, a street less than 50'0" wide, built after 7 August 1862, was to have its flanking buildings no higher than its width. So a street 49'0" wide was to have buildings no higher than 49'0", and yet a street 50'0" wide, such as Long Acre, could have buildings 80'0" high on each side, with two further storeys in the roof above the 80'0" limit (82) (see also Table 14, sheet 19).

There were no drainage regulations in the new Building Act. These were still largely under the control of the local vestries and district boards, though the L.C.C. had made some by-laws in 1893 (see p.366) and their consolidation had to await until 1900. (see Chapter X, page 512.)

In this chapter we have seen the rush of activity which preceded the London Building Act of 1894, and have dwelt on this and the analysis of the technical clauses within the Act itself. It was certainly the major piece of building legislation in London in the nineteenth century, and it placed the Metropolis back on a par with the rest of the country, and in certain respects ahead of it. It reflected the unique character of London at the time, with its increasing density and its relationship to a range of problems more intense than elsewhere in the country. In that respect it acted as a pioneer to a new set of concepts in building regulation - such as the use of the internal court in the deeper plans of commercial and residential buildings. It also consolidated almost all that had gone before in the way of legislation affecting building, stretching back as far as 1844, and it brought some controls, such as streets, back into the framework of building legislation. But substantial as it was, it was by no means complete, for such varied matters as foundations, damp proof courses, concrete walling, cellars, plaster and drainage all remained in a host of

scattered acts and by-laws. In spite of receiving a great deal of attention in its formulation, it still managed to include anomalies - such as that permitting the rebuilding on existing sites of former buildings, up to the new height of 80'0" in the older narrow streets. It was not perfect - no piece of building legislation can apparently achieve that distinction - and it combined a curious mixture of old and new regulations, but it was mandatory and it did have a considerable effect on the future shape of London.

Whilst much of this chapter has therefore been concerned with the interpretation of the ideas and technical content embodied in the Act, there are in contrast two broader issues which may be seen to have some relevance to this part of this history - one concerning the attitude of the L.C.C., the other the attitude of the architects.

The recently formed L.C.C. displayed an enlightened and sympathetic response to the problem of building legislation. It was ready and willing to study and learn from examples in the rest of the country, particularly from Liverpool and Manchester; and it accepted the advice of the Local Government Board, with their experience which they had obtained in formulating and operating the Model By-laws. It took note of the recommendations of the Royal Commission on the Housing of the Working Classes regarding space about dwellings, monitored developments in building technology, and listened to the advice given by the various professional bodies concerned with building.

At the same time it was also displaying an enlightened attitude towards architectural matters and was itself becoming the important force in the architectural world, which it has maintained, now as the G.L.C., to the present day. Its new Architect's Department had a talented staff and received inspiration and encouragement from the redoubtable Thomas Blashill. It was itself now beginning to build council houses - at Brook Street, Limehouse, in 1892, and then it built Rowland Plumbe's competition winning scheme for the Boundary Street Estate, from 1893 onwards. (Rowland Plumbe incidentally had been a District Surveyor). Architecturally, both these schemes reflected the freer, lighter and more domestic style loosely termed Queen Anne, which was largely inspired by Richard Norman Shaw and his school. The practical consequences of designing and building in this more free and imaginative

way in the early 1890's may well have had some beneficial effect on the L.C.C. in the same years that it was formulating the new Building Act.

The R.I.B.A. and the architectural profession generally presented another influence at this time. The R.I.B.A. was now fully alive to the problems of the Building Act, to such an extent that it even produced its own proposals in the form of a comprehensive Bill. It debated and discussed all these matters at great length, and made a number of valuable suggestions which were eventually incorporated in the Act. In that respect the role of the R.I.B.A. was very important. On the other hand it was accused by the L.C.C. of not assisting in giving advice on matters connected with aesthetics. (Only the less conservative Architectural Association would apparently do that). There was a strong element in the profession which refused to accept that rules could be applied to anything affecting the creative art of architecture. Now this may be seen to parallel very closely the concern within the profession over the status of the architect, and the debate over whether one could ever examine and regulate within the profession in the matter of artistic creativity. A number of Registration Bills were proposed at this time, and Norman Shaw and Thomas Jackson's Memorial to the RIBA Council 'Architecture, a Profession or an Art', appeared in 1892. The common link between the style of Norman Shaw and the attitude he supported - an attitude free of regulation - is interesting, but the significance lies also in the timing of these movements, in the formative years of the London Building Act of 1894. The problem of conflict between legislative control and creative freedom is common to both the regulation of architecture and the regulation of buildings.

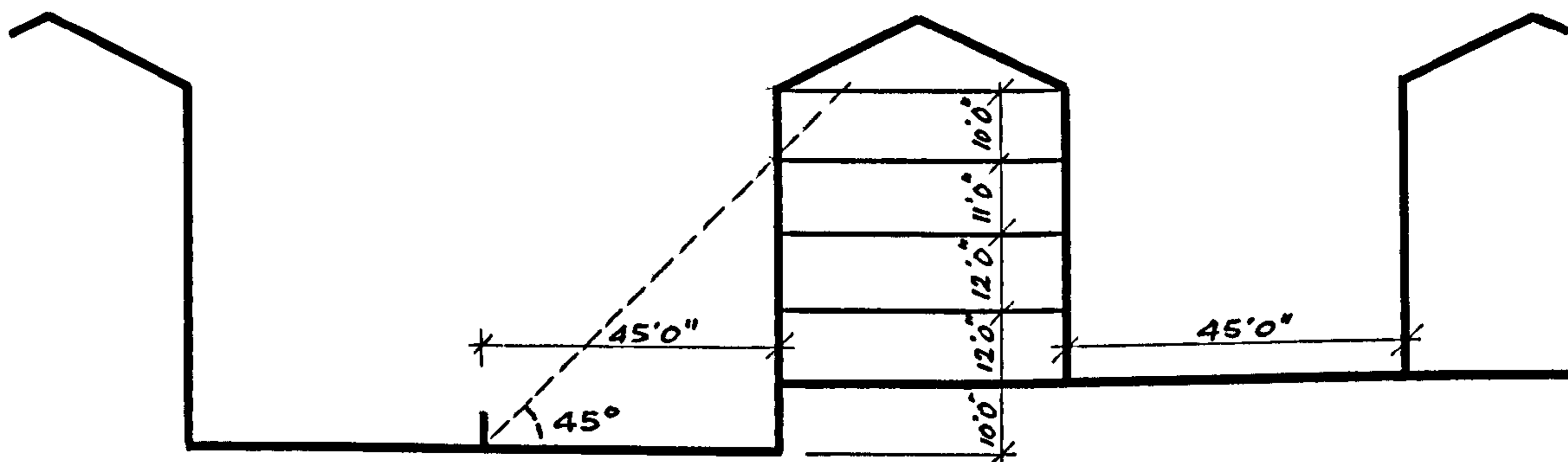
We shall return to conclude the developments in London in Chapter X, the final chapter in the main body of this work. Meanwhile, in the following chapter, we return to the Provinces to analyse the developments which occurred there after 1890.

NOTES TO CHAPTER VIII

- 1 B.Vol.60 No.2517 2 May 1891 p.355.
- 2 B.Vol.61 No.2546 21 Nov 1891 p.389.
- 3 B.Vol.61 No.2551 26 Dec 1891 p.487.
- 4 B.Vol.61 No.2532 15 Aug 1891 p.127. "The construction of dwelling houses".
- 5 B.Vol.63 No.2591 1 Oct 1892 p.265.
- 6 B.Vol.57 No.2446 21 Dec 1889 p.446.
- 7 B.Vol.62 No.2552 2 Jan 1892 p.7 and No.2553 9 Jan 1892 p.21-2.
- 8 B.Vol.62 No.2553 9 Jan 1892 p.21-2.
- 9 B.Vol.62 No.2558 13 Feb 1892 p.120-2.

10 E.T.Hall's example was as follows: assume that there were three buildings which did not have any back additions. Two faced each other, their front walls were 75'0" high and they were separated by a street 70'0" wide; the third was behind and backed onto the second, between the second and third was also a road 70'0" wide. By the operation of this section there must be above the ground floor of the building 90'0" between the backs of the buildings and the external walls forming the backs cannot be more than 45'0" high while the front walls, 70'0" apart may be 75'0" high. B.Vol.62 No.2558 13 Feb 1892 p.121.

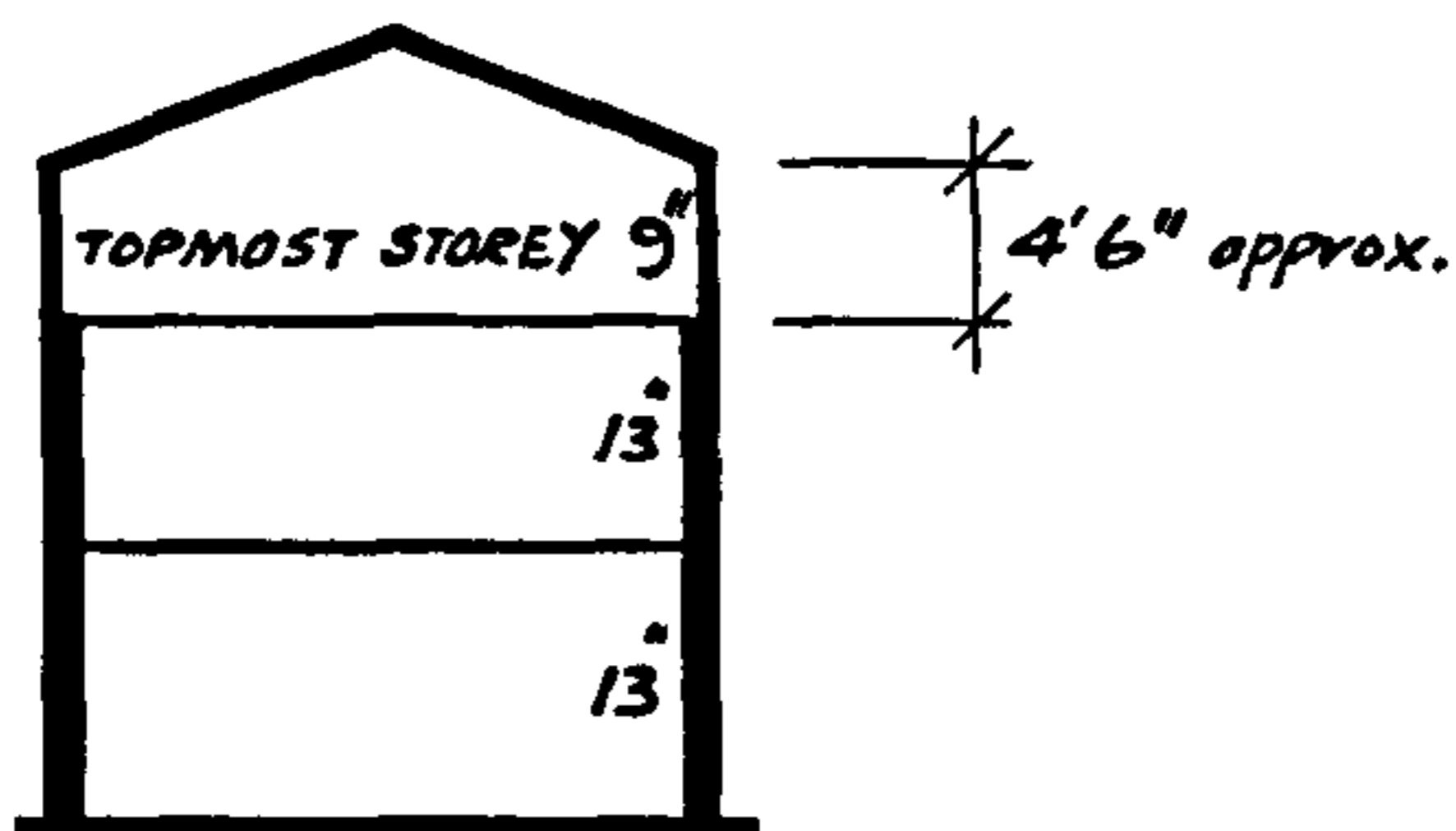
A second example was given by a District Surveyor in 1892: If fronts of houses could be as high as their distance from the opposite building in the street, backs could be twice as far as they were high, assume the blocks to be in parallel rows back to back. Then if a house were 55'0" high at the back, but the available land at the back only 45'0" deep, the top rooms would have to be omitted "yet these would be the best lighted and ventilated in the whole house, but for sanitary reasons they must go!" e.g.: B.Vol.62 No.2553 9 Jan 1892 p.33.



- 11 B.Vol.62 No.2558 13 Feb 1892 p.120-2.
- 12 B.Vol.62 No.2571 14 May 1892 p.378.
- 13 B.Vol.63 No.2598 19 Nov 1892 p.394.
- 14 B.Vol.62 No.2567 16 Apr 1892 p.306. and No.2570 7 May 1892 p.357.
- 15 B.Vol.63 No.2595 29 Oct 1892 p.337.
- 16 B.Vol.63 No.2601 10 Dec 1892 p.455.
- 17 B.Vol.64 No.2621 29 Apr 1893 p.134-5.
- 18 Ibid.
- 19 B.Vol.63 No.2601 10 Dec 1892 p.455.
- 20 B.Vol.64 No.2627 10 June 1893 p.450.
- 21 B.Vol.64 No.2628 17 June 1893 p.467.
- 22 B.Vol.65 No.2648 4 Nov 1893 p.335.
- 23 B.Vol.65 No.2654 16 Dec 1893 p.451.
- 24 B.Vol.65 No.2653 9 Dec 1893 p.429 and 430.
- 25 B.Vol.65 No.2655 23 Dec 1893 p.461-2.

- 26 B.Vol.66 No.2663 17 Feb 1894 p.138-9.
- 27 B.Vol.63 No.2591 1 Oct 1892 p.269. This was the case of Mr. Goldsworthy, builder of houses in Friern Road, East Dulwich, with 9" walls over 25'0" high, when they should have been 13". He tried to escape the penalty by calling the rooms in the roof 'boxrooms', but they were 7'6" and 9'2" high, with windows and fireplaces. He was ordered to amend, but an interesting point in this case was the production of a photograph in court as evidence, an early use of this invention in this circumstance.
- 28 R.I.B.A. Journal Vol.I No 10 1894 p.343-358 and Vol I No 11 390-408.
- 29 Ibid. p.397. Apparently the width of Portland Place was only due to Lord Foley, the owner of the land where the Langham Hotel then stood (in 1894) having a condition inserted in his original lease that no houses should ever be built on the north side of it - so the street had to be made the width of his property.
- 30 Ibid. p.397.
- 31 B.Vol.66 No.2670 7 Apr 1894 p.271.
- 32 R.I.B.A. Transactions Vol XXVII, 1877-8 p.32 'Middle Class Houses in Paris etc (Laws and Restrictions)' and also R.I.B.A. Transactions, New Series, Vol V, 1889, p.20-22, 'Building Control in France'. The relationship between the street width and the height of buildings was more liberal in Paris than in London. e.g. 39'0" high in streets up to 25'0" wide; 49'0" high in streets between 25'0" and 32'0" wide; 59'0" high in streets between 32'0" and 65'6" wide; and 65'6" in streets over 65'6" wide.
- 33 Rules for timber scantlings were later proposed in the Bill, but were removed by an amendment made by the District Surveyor's Association in 1894 (C.C.Knowles and P.H.Pitt, The History of Building Regulation in London 1189-1972, London, 1972, p.91)
- 34 R.I.B.A. Journal, Vol.I, No.11, 1894, p.393.
- 35 B.Vol.66 No.2670 7 Apr 1894 p.267-270.
- 36 B.Vol.66 No.2680 16 June 1894 p.457.
- 37 B.Vol.66 No.2670 7 Apr 1894 p.269.
- 38 Ibid.
- 39 B.Vol.66 No.2671 14 Apr 1894 p.292.
- 40 B.Vol.66 No.2673 28 Apr 1894 p.330.
- 41 B.Vol.66 No.2674 5 May 1894 p.349.
- 42 Ibid. p.353.
- 43 B.Vol.67 No.2685 21 July 1894 p.35-36.
- 44 B.Vol.67 No.2684 14 July 1894 p.22.
- 45 R.I.B.A. Journal, Vol I, No 11, 1894 p.397. Quoted by H.H.Statham, Editor of 'The Builder' at discussion at R.I.B.A. on 19 March 1894. It was taken from Tennyson, whose 'Northern Farmer, New Style' had heard the sound of his horses hoofs going to the words 'propuppy, propuppy, propuppy'.
- 46 B.Vol.67 No.2696 6 Oct 1894 p.245.
- 47 B.Vol.67 No.2686 28 July 1894 p.56.
- 48 B.Vol.67 No.2687 4 Aug 1894 p.83.
- 49 57 and 58 Vic.cap.213.
- 50 B.Vol.67 No.2706 15 Dec 1894 p.435.
- 51 Ibid.
- 52 R.I.B.A. Journal, Vol II, No 4, 20 Dec 1894, p.122.
- 53 R.I.B.A. Journal, Vol II, no.4, 20 Dec 1894, p.110.
- 54 Ibid. p.121.
- 55 B.Vol.67 No.2706 15 Dec 1894 p.435.
- 56 B.Vol.67 No.2695 29 Sept 1894 p.215.

- 57 R.I.B.A. Journal, Vol II, No.4, 20 Dec 1894, p.116.
 58 B.Vol.67 No 2696 6 Oct 1894 p.235.
 59 Ibid. p.234.



- 60 R.I.B.A. Journal, Vol II, No.4, 20 Dec 1894, p.113.
 61 B.Vol.67 No.2696 6 Oct 1894 p.234.
 62 R.I.B.A. Journal, Vol. II, No.4, 20 Dec 1894, p.113.
 63 B.Vol.67 No.2696 6 Oct 1894 p.235.
 64 R.I.B.A. Journal, Vol.II, No.4, 20 Dec 1894, p.117.
 65 B.Vol.67 No.2696 6 Oct 1894 p.235.
 66 R.I.B.A. Journal, Vol II, No.4, 20 Dec 1894, p.119.
 67 B.Vol.67 No.2696 6 Oct 1894 p.235.
 68 Ibid.
 69 R.I.B.A. Journal, Vol II, No.4, 20 Dec 1894, p.117.
 70 Ibid. p.120.
 71 B.Vol.67 No.2697 13 Oct 1894 p.254.
 72 R.I.B.A. Journal, Vol II, No 4, 20 Dec 1894 p.117.
 73 B.Vol.67 No.2695 29 Sept 1894 p.216.
 74 R.I.B.A. Journal, Vol X, No 9, 7 Mar 1903, p.243.
 75 B.Vol.67 No.2697 13 Oct 1894 p.254.
 76 R.I.B.A. Journal, Vol II, No.4, 20 Dec 1894, p.123.
 77 B.Vol.67 No.2699 27 Oct 1894 p.290.
 78 B.Vol.67 No. 2697 13 Oct 1894 p.253.
 79 R.I.B.A. Journal, Vol. II, No 4, 20 Dec 1894, p.114.
 80 Ibid.
 81 B.Vol.67 No.2695 29 Sept 1894 p.218.
 82 Ibid.

DATE: 25 August 1894

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CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
	Part I (Introductory, definitions etc) see discussion in text. STREETS Part II FORMATION AND WIDENING OF STREETS		
7	Sanction required from L.C.C. for making street.	T12.c6- c9 inc.	still valid in 1914
9	Grounds for refusal to sanction plans of street include:- a) if not 40'0" wide, for a carriageway. b) if not 20'0" wide for foot traffic. c) if street over 60'0" long, or under 60'0" where the length is greater than the width, is not open at both ends from ground upwards. d) if not connected to a carriageway at both ends. e) if L.C.C. consider street should not be for foot traffic only. f) if gradient of carriageway is over 1 in 20. g) if it contravenes any L.C.C. by-law.		
12	L.C.C. may require wider streets, up to 60'0".		
13	Position of new buildings with reference to new streets - L.C.C determines prescribed distance. No working class dwelling to be erected within the prescribed distance to a height exceeding distance of front wall from opposite side of street.		T22.c4
14	Notice to set back buildings. Part III LINES OF BUILDING FRONTAGE		T22.c3
22	General line set at 50'0". Part IV NAMING AND NUMBERING OF STREETS		still valid in 1914
	SPACE ABOUT BUILDINGS (for Ventilation see clauses 69 and 70 also) Part V OPEN SPACES ABOUT BUILDINGS AND HEIGHT OF BUILDINGS		still valid in 1914
40	100 sq.ft.area required at rear of habitable basements.	T6.c29	
41	Space at rear of domestic buildings = 150 sq.ft. (This may be at first floor level where ground floor is not inhabited, otherwise it shall be at	T12.c14	

	<p>ground floor and free from obstruction except for privies, w.c. etc. This space to extend entire width of building and be at least 10'0" deep.</p> <p>Height of building determined by angle at rear of $63\frac{1}{2}^{\circ}$ (see diagram on Table 14, sheet 18.)</p> <p>Only chimneys, dormers, gables, turrets can extend beyond that line, and only if they total not more than 1/3rd of width of rear elevation.</p> <p>In streets laid out before 1895 the angle can start at a level 16'0" above the ground.</p>	T12.c14	still valid in 1914
45	<p>Courts within a building.</p> <p>When height of court from ceiling of ground storey to top of parapet or eaves exceeds the length or breadth of the court, ventilation is required at the base to connect with the outside air. No habitable room to have only window looking onto internal court, enclosed on all sides, unless width of court outside window = half the height from the sill to the opposite eaves. (see T14, S21.).</p>	new	
47	<p>Limit to height of buildings (excluding church or chapel) = 80'0" (excluding two storeys in roof and excluding ornamental towers, turrets and other architectural features.)</p> <p>Rebuilding of any building existing in 1894 may be rebuilt to same height as before. Rebuilding in row of buildings may also be to same height as existing adjacent buildings.</p>	T7.c3	still valid in 1914
48	<p>Greater heights may be permitted by L.C.C.</p>		
49	<p>Heights of buildings in streets laid out after 7 August 1862, under 50'0" wide, to be no higher than width across street. (see T14, S 19).</p>		
53	<p>STRUCTURE</p> <p>Part VI CONSTRUCTION OF BUILDINGS</p> <p>Wall thicknesses. See schedule, Table 14, sheet 14).</p>		still valid in 1914
54	<p>Recesses and openings on external walls:</p> <p>a) backs not to be less than $8\frac{1}{2}$" thick.</p> <p>b) area of all recesses and openings taken together, above ground</p>	T8.c29	

	<p>storey, not to exceed half the area of walling above ground storey.</p> <p>Recesses in party walls:</p> <p>a) backs not to be less than 13" thick.</p> <p>b) arch over recess - two rings of brickwork - arched over on every storey (except for lifts.)</p> <p>Where recess not over 5" deep, corbel-ling may be substituted instead of arching.</p> <p>c) area of arches - not to exceed half whole area of wall in that storey.</p> <p>d) no recess within 13½" of inner face of external wall.</p>	T8.c29	
55	<p>All woodwork in external walls (except bressummers and storey posts under, and except frames of doors and windows to shops) to be set back 4" from face of wall. But loophole frames and frames of doors and windows may be flush with external wall. By-laws may except oak and teak from the restrictions of this clause.</p>	T8.c24	still valid in 1914
56	<p>Bressummers. Wood or metal 4" min. bearing at ends, with brick or stone piers, timber or iron storey post - in addition to its bearing on party or external wall.</p> <p>Space for expansion of metallic bressummers to be ¼" for every 10'0" of length.</p> <p>No bond timber or wood plate in party wall.</p> <p>Wood beams or joists - bearing on party walls at least 4" from centre of wall.</p> <p>Bressummer in party wall to be borne on templet of stone or iron.</p> <p>Timber, not permitted in party wall, may be carried on templet of stone, iron or vitrified stone ware, tailed into wall 8½" min.</p>	T8.c34	
	No bond timber or wood plate in party wall.	T8.c31	
	Wood beams or joists - bearing on party walls at least 4" from centre of wall.	T8.c32	
	Bressummer in party wall to be borne on templet of stone or iron.	T8.c33	
57	<p>Combustible gutter, if next to external wall - then wall to carry up as parapet 12" min. above gutter. Thickness of parapet = 8½" min.</p>	T8.c25	
59	<p>Height of party walls above roof:-</p> <p>Warehouses = 3'0"</p> <p>Other buildings = 15"</p> <p>Measured at right angles to slope.</p> <p>For lantern lights see diagram on T14 sheet 18.</p>	T8.c26	

60	Chases in party walls - 14" max. width, 4½" deep 8½" thickness at back to be left, 7'0" apart on same side of wall, 13" from external wall. No chase in any wall under 13" thick.	T8.c30	still valid in 1914	
61	Roofs : External cover - slate, tile, metal or other non combustible material except: wood cornice or bargeboard to dormers not over 12" deep, and except doors, frames etc to dormers, lantern lights.	T8.c52		
	Every house or factory over 30'0" high, with a parapet, to have either a) dormer window opening onto roof, b) trap door with step ladder to roof or c) other means of access to roof. Roof angle: Warehouse = 47° Other building = 75° (except turret, spires, etc, in both cases).	new	T24.c12	
62	Not more than two storeys in roof. If in house where upper floor is over 60'0" from street, then storeys to be of fire-resisting material throughout.	T6.c19	still valid in 1914	
63	Escape at top of high buildings (over 60'0" high) L.C.C. to approve and issue certificate.	T4.Sc.K	T24.c7	
64	Chimneys:	new		
	a) On footings similar to adjacent wall. But may also be on iron girders* or may be corbelled out (if no more than projection than thickness of wall below).	T8.c36	(*T18.c36)	
	b) Can be at any angle, if soot doors of 40 sq.in. provided, otherwise 45° is min. angle. All soot doors min 15" from woodwork.	T6.c20		
	c) Iron arch or bar over opening - to tie abutments.	T8.c39		
	d) boiler flues (stoves, hotel cooking ranges) to have flue 8½" thick brick all round - from floor to level of ceiling of room next above.	T8.c38		still valid in 1914
	e) flue for boiler or hot air engine - 20'0" high.	new		
	f) Inside of flue, and outside where it passes through floor or roof or	T8.c37		

	<p>near woodwork, to be rendered, par- getted or lined with fire resisting piping of stoneware.</p> <p>g) position of flues to be marked on outside, except external walls not being built against.</p> <p>h) jambs = $8\frac{1}{2}$" min.width.</p> <p>j) breast = 4" min.</p> <p>k) back in party wall = $8\frac{1}{2}$" thick, from hearth to 12" above mantel.</p> <p>m) upper side of flue (when at less than 45° to horizontal, to be $8\frac{1}{2}$".</p> <p>n) chimney, 3'0" min above highest part of roof or gutter.</p> <p>o) top six courses in stack to be in cement.</p> <p>p) max height of chimney = six times the least width - unless bonded to another chimney.</p> <p>q) hearth slab, 6" wider than chimney opening and 18" wide at front.</p> <p>r) slab on stone or iron beams, or brick trimmers. On lowest floor, may be bedded on concrete.</p> <p>s) hearth slab = 6" thick.</p> <p>t) flue, when against party wall, to be surrounded by 4" brickwork.</p> <p>u) chimney breast in party wall not to be cut away without D.S. consent.</p> <p>v) openings in shaft only for repair, altering soot doors, ventilating valves etc. No opening nearer than 12" to timber.</p> <p>w) No timber nearer than 12" to inside of flue; within 10" of hearth surface; nearer than 2" to face of brickwork of flue if such brickwork is less than $8\frac{1}{2}$" thick (unless it is rendered).</p> <p>x) No wooden plugs nearer than 6" to inside of flue. No iron holdfast nearer than 2" to inside to flue or chimney.</p>	<p>T3.c41</p> <p>T8.c40- c42</p> <p>T8.c43</p> <p>T8.c45</p> <p>new</p> <p>T8.c46</p> <p>T6.c20 and T16.c5</p> <p>T8.c50</p> <p>T8.c48</p> <p>T8.c47</p>	<p>still valid in 1914</p> <p>*see also (T18.c47)</p>
<p>65</p>	<p>Furnace chimney shafts:</p> <p>a) brick taper = $2\frac{1}{2}$" per 10'0".</p> <p>b) top 20'0" to be $8\frac{1}{2}$" min thick, increases by $1\frac{1}{2}$ bricks for every 20'0" downwards.</p> <p>c) cap, cornices, etc, to be additional to the thickness required for the shaft.</p> <p>d) to have satisfactory foundation.</p> <p>e) footings - to project distance equal to the thickness of brickwork at base.</p>	<p>new</p>	<p>still valid in 1914</p> <p>see also T20.c24</p>

	<p>f) width at base = 1/10th proposed height' if square chimney, 1/12th proposed height' if round chimney.</p> <p>g) firebricks, if any, additional to thickness of these rules.</p>	new	
66	<p>Close fires, etc :</p> <p>a) on incombustible floor 6" thick, for area of 18" all around.</p> <p>b) pipe for steam, etc, not be on face of building adjoining public way.</p> <p>c) no pipe for smoke nearer than 9" to combustible material.</p> <p>d) no pipe for hot air or steam nearer than 6" to combustible material.</p> <p>e) no pipe for hot water to be nearer than 3" to combustible material. This not applied to hot water or steam at low pressure, i.e. when provided with a free blow off.</p>	<p>T6.c21</p> <p>T8.c51</p> <p>T6.c21</p> <p>T6.c21</p> <p>T12.c16</p>	still valid in 1914
67	<p>Floor to furnace room, and any floor within 18" of oven, to be of fire-resisting materials.</p>	new	
68	<p>Every public building, all buildings over 125,000 cu.ft.used for dwelling house for separate families:- floor of lobby, corridor, passage, landing stair, to be of fire-resisting material and carried by supports in fire-resisting material.</p>	T6.c22 and T16.c9	still valid in 1914
69	<p>VENTILATION</p> <p>Common staircases in tenements, to have window or skylight to open air above ground storey. Principal stair in every dwelling house to be vented by window or skylight to external air.</p>	new	(see also) T18.c56B
70	<p>Height of habitable room = 8'6" floor to ceiling. In roof - 8'0", over not less than half the area of the room. Every habitable room to have one or more windows to external air or conservatory - area to equal 1/10th of floor area, half to be openable with opening to 7'0" min.above floor level.</p> <p>Internal room or room in roof may be lit by dormer equal to 1/12th of floor area, half to be openable with opening to 5'0" above floor - or by lantern light, of which a part equals 1/20th of floor area can be opened.</p>	<p>T16.c4</p> <p>T7.c15</p> <p>T8.c57</p> <p>new</p>	still valid in 1914

	<p>Basement in house with wooden floor (except when wood on concrete) to have a ventilated air space beneath, with air bricks.</p> <p>Habitable room over stable - floor to be solid between joists, Stairs to habitable room to be separated from stable by 9" brick wall.</p>	T8.c54	still valid in 1914
		T16.c9	
71	<p>STRUCTURE Continued</p> <p>Party arches over public ways - 8½" brick or stone arch.</p>	T6.c24	still valid in 1914
72	<p>Party arches under public ways - 8½" brick or stone arch if span not over 10'0", 13" if span between 10'0" and 15'0", and to D.S. approval when span over 15'0".</p>	T6.c25	
73	<p>Projections</p> <p>a) copings, cornices, etc, also outside stairs and landings, architectural projections etc (except cornices to shops, and eaves etc to detached or semi-detached houses) to be of brick, tile, stone, artificial stone, slate, cement or other fire-proof material.</p> <p>b) all projections to be tailed into wall and tied down, to D.S. approval.</p> <p>c) in street up to 30'0" wide, shop front can project 5", and the cornice 13". In street over 30'0" wide, shop front can project 10" and the cornice 18".</p> <p>d) no woodwork of shop to be higher than 25'0" above pavement, nor nearer than 4" to centre line of party wall - unless there is a brick corbel etc 4" wide, projecting 1" beyond wood.</p> <p>e) In street not under 40'0" wide, bay windows allowed over own land, provided: they are not over 3 storeys high, do not project more than 3'0", do not project into the prescribed distance, are not nearer to the centre of nearest party wall than the length of their projection, when taken together they are not more than 3/5th of frontage of building, are not over public way and not used for trade.</p> <p>f) In streets not over 40'0" wide, projecting oriel windows and turrets</p>	T6.c26	
		new	

	<p>allowed, provided: they project not more than 3'0" from the face of the wall, not more than 12" over public way, are not less than 10'0" above footpath, are not within 4'0" of centre of party wall and the width per floor, in total, is not more than 3/5th the length of the wall at that floor.</p> <p>g) pipes to take water off roofs, projections or bay windows.</p>	new	still valid in 1914
		T8.c52	
74	<p>Separation of buildings by proper party walls. In buildings over 1,000 sq.ft., used partly for trade and partly domestic, the two parts are to be separated by walls and floors in fire resisting materials - and also the stairs etc used as the approach to dwelling.</p> <p>In offices over 2,500 sq.ft., tenanted by different persons, floors and stairs to be of fire resisting materials.</p>	T6.c27	
		T16.c9	
75	<p>Cubic contents. Warehouses = 250,000 cu.ft. (except buildings within 2 miles of St Paul's used for boiler factory for steamships, or gas retort, or electricity manufacture, if single storey.</p>	T6.c27	REPEALED BY L.C.C. (General Powers) Act, 1908 see page 531.
76	<p>L.C.C. may give consent for larger buildings.</p>	new	
77	<p>United buildings. Openings in party walls, only if:-</p> <p>a) max 7'0" wide x 8'0" high, in not over half the length of the wall.</p> <p>b) floor, jambs, head, of brick, stone, etc. Two wrought iron doors, 1/4" thick, in rebated frames or wrought iron sliding doors.</p> <p>c) If wall not less than 24" thick, or doors distant from each other by not less than 24", then opening may be 9'6" high.</p>	T6.c28	
78	<p>Public buildings - to District Surveyor approval.</p>		still valid in 1914
80	<p>Stairs in churches and chapels and places of public assembly generally:-</p> <p>a) to be enclosed and supported by brick walls 9" thick. Treads to be of uniform width.</p> <p>b) stairs and passages = 4'6" wide</p>	(T16.c9)	

	<p>min (3'6" if only up to 200 persons accommodated).</p> <p>c) every stair, passage, etc - for accommodation over 400, to be increased in width by 6" for every additional persons, up to a max. of 9'0" wide.</p> <p>Stairs over 6'0" wide to have central handrail. Two stairs may be substituted in lieu of one, if each is 2/3 of width required for one.</p> <p>d) Where public are accommodated at a higher level than others, then a separate means of exit required, to connect directly to street.</p> <p>e) All doors to open outwards, no locks or bolts.</p>	<p>new</p>	<p>still valid in 1914</p>
<p>81</p>	<p>This Act to apply to habitable buildings under railway arches.</p> <p>PART VII SPECIAL AND TEMPORARY BUILDINGS AND WOODEN STRUCTURES</p> <p>PART VIII RIGHTS OF BUILDING AND ADJOINING OWNERS.</p> <p>PART IX DANGEROUS AND NEGLECTED STRUCTURES</p> <p>PART X DANGEROUS AND OBNOXIOUS BUSINESSES</p> <p>PART XI DWELLING HOUSES ON LOW LYING LAND</p> <p>PART XII SKY SIGNS</p> <p>PART XIII SUPERINTENDING ARCHITECT AND DISTRICT SURVEYORS</p> <p>PART XIV BY-LAWS</p>	<p>new</p> <p>T12.c12-c13</p>	
<p>164</p>	<p>Powers to L.C.C. to make by-laws for:- plan, level, width, surface, inclination of new streets and site for new buildings; foundations and sites of buildings; materials for foundations; thickness, quality, etc of walls; size of wooden bressummers and floor joists; protection of ironwork against fire; woodwork in external walls; materials for plaster; filling up of excavations within 3'0" of external walls of buildings. lamps, etc, over public ways. means of escape in buildings over 60'0" high.</p> <p>PART XV LEGAL PROCEEDINGS</p> <p>PART XVI MISCELLANEOUS</p>		

191	Buildings of historical interest, may be restored in same material and to same design, with L.C.C. consent.	new	still valid in 1914
197	Storing of wood - not nearer to street than the building line, or 10'0" from furnace, and not over 60'0" high.		
200	OFFENCES AGAINST ACT - unlawfully laying out of street etc.		T22.c3
201	Buildings exempt from Act - generally as for the Metropolitan Building Act 1855, but with gas works buildings, buildings associated with railways, buildings belonging to Thames Conservators. Then also the following:- a) buildings not over 30 sq.ft, not over 5'0" high to eaves, at least 5'0" from other buildings or street, without stove or flue, not beyond building line. b) All buildings, not over 30'0" high, not over 125,000 cu.ft., not public, 8'0" from street, 30'0" from building or land of adjoining owner and not stables. c) All buildings, not over 250,000 cu.ft, not public, 30'0" from street, 60'0" from building or land of adjoining owner, and not stables. d) Party fence walls not over 7'0" high. e) Greenhouses. f) Metal and glass cases for plants, fastened to woodwork of sill - max. projection 12" beyond external face of wall. g) Valve openings in flues, if not over 40 sq.in.	T6.s.5	still valid in 1914
		T8.c2	
		T4.Sc.D	
		T6.c6	
		new	
		T6.c6	
202	Exemption of Government Buildings.		
203	Re: electricity supply buildings.		
205	Re: gas companies.	new	
216	By-laws made under repealed Acts are to remain in force i.e:- 1879 by-laws - see table 11 1886 by-laws - see table 12 1891 by-laws - see table 13 and regulations for theatres made under 1878 Metropolis Management and Building Acts Amendment Act.		still valid in 1914

1	FIRST SCHEDULE	T11.c1			
	Every building to have walls of brick, stone or other hard and incombustible substances.				
	Footings on solid ground, or concrete or other solid substructure, (includes bressumers) (excludes open sheds, not over 16'0" high and not over 40 sq. ft.).	T18.c15-c16			
	2	Walls properly bonded with cement or mortar, no part to overhang a part below, except by 6" and side opposite such corbelling out is to be carried up vertically on inner face.		T8.c13	
	3	Walls not of brick or stone to be $\frac{1}{3}$ greater than thickness in this schedule.		T8.c22	
	4	Walls of other materials to be of thickness in this schedule or as approved by L.C.C.		T6.s7	still valid in 1914
	5	Hollow walls - one side to be full thickness as prescribed in this schedule.		new	but see also T25 and T26
	6	Height of storey = topmost = underside of floor joist to underside of tie, or half vertical height of rafter, if no tie. Other storeys = underside of floor joists to underside of floor joists in the next storey above.		T8.c18	
	7	Height of external walls - measured from base to top of topmost storey, whether such wall is carried to the full height or not. With a gable, measured to half the height of gable.		T8.c18	
	8	Length of walls - divided into distinct length by cross walls.		T8.c12	
	9	Footings - to project half thickness of wall on each side, and to diminish in regular offsets, and height of footing = $\frac{2}{3}$ wall thickness at base of wall. (see T14.S15)		T8.c15	
10	Underpinning - to same thickness as wall above, in brick or stone, on solid foundations, to D.S. satisfaction.	new			
11	Thickening of walls - to D.S. satisfaction. For wall thickness				

	schedule see T14.s14-s17		
	SECOND SCHEDULE		
	List of fire-resisting materials:-		
1	Brickwork, good, well burnt, hard, properly bonded. Mortar - good, lime, sharp clean sand, etc. Good cement, or cement mixed with good sand, clean broken brick, flint, grit or slag.		
2	Granite - or other durable stone.		
3	Iron, steel, copper.		
4	Oak, teack - or other hard timber - when used for bearers or posts, or in combination with iron and then protected by plaster in cement. Doors - oak, teak etc, not less than 2" thick. Stairs - oak, teak etc for treads, strings and risers not less than 2" thick.	new	T24.c1-c7
5	Slate, tile, brick, terra-cotta, when used as coverings or corbels.		
6	Flagstones for floors over arches, and not exposed underneath.		
7	Concrete - brick, stone chippings, ballast, with lime cement or calcined gypsum, when used for filling in between joists of floors.		
8	Any material from time to time approved by the L.C.C., as fire-resisting.		
	THIRD SCHEDULE - DISTRICT SURVEYOR'S FEES		
	FOURTH SCHEDULE - REPEALS		
	The following legislation was not repealed by this Act		
	<u>Metropolis Management Act 1855 18 and 19 Vic.cap.120.</u> The following clauses were still valid:		
71	Gulleyholes to be trapped.	T6.c71	still valid in 1914
72	Sewers to be cleansed.	T6.c72	
73	Vestry may compel owners to construct drains to common sewers.	T6.c73	
74	Provision for combined drainage of block of houses.	T6.c74	
75	No house to be built without drains.	T6.c75	
77	Powers to branch drains into sewers of Met.Bd.	T6.c77	

101	No vaults or cellars under streets without Vestry consent.	T6.c101	still valid in 1914
105	Paving of streets.	T6.c105	
202	Powers to make by-laws.	T6.c202	
	<u>Metropolis Local Management Acts Amendment Act 1862 25 and 26 Vic. cap.102.</u>		
61	Openings into sewers.	(T6.c71-77)	
66	Drainage, where no proper sewers within 200'0".		
68	Interference with sewers.		
	<u>Metropolis Management and Buildings Act Amendment Act 1878 41 and 42 Vic. cap.32.</u>		
11	Powers to require theatres etc to remedy structural defects.	T11.c11	
12	Inspection of theatres.	T11.c12	
	<u>Metropolis Management Amendment Act 1890 53 and 54 Vic.cap.66</u>		
3-5	Powers of Vestry and District Boards in relation to street repairs, sewers etc and penalties therewith.		still valid in 1914
6	No subsoil under street to be removed without the consent of Board or Vestry.		
	<u>Public Health (London) Act 1891 54 & 55 Vic.cap.76 Sections 96 and 39</u>	T13.s2	

HEIGHT	100 - 120		90 - 100		80 - 90 feet	
LENGTH	up to 45'0"	over 45'0"	up to 45'0"	over 45'0"	up to 45'0"	over 45'0"

HEIGHT	70 - 80		60 - 70		50 - 60 feet	
LENGTH	up to 45'0"	over 45'0"	up to 45'0"	over 45'0"	up to 45'0"	over 45'0"

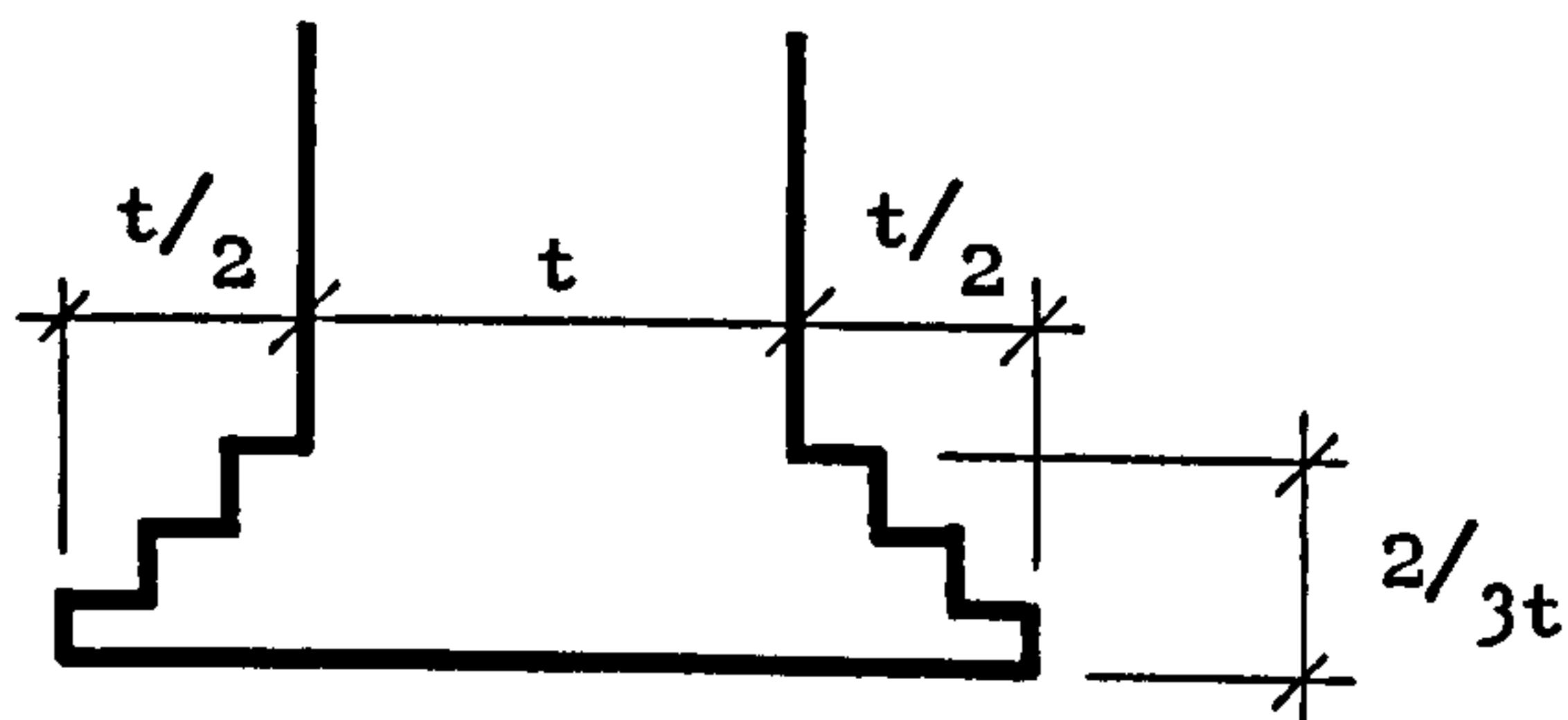
HEIGHT	40 - 50			25 - 40		up to 25 feet	
LENGTH	up to 30'0"	30-45	over 45'0"	up to 35'0"	over 35'0"	up to 30'0"*	over 30'0"***

-
- * and not more than two storeys
 - ** or having more than two storeys

NOTES

1. Party and External walls to be of same thickness.
 2. If any storey is over 16 times the thickness of walls in this schedule (in height), then thickness in that storey to be increased by $1/16$ part of height of the storey (and walls below increased likewise), but the additional thickness may in piers whose collective widths = $\frac{1}{4}$ length of the wall.
 3. No storey enclosed with walls less than 13" thick to be more than 10'0" high between floor and ceiling.
 4. For cross Walls, see Table 14, sheet 16.
 5. According to Definition No 10, a wall may also be carried on a "bressummer".
-

FOOTINGS for all building types (see Table 14, sheet 11.)
First Schedule, clause 9



WALL THICKNESS SCHEDULE

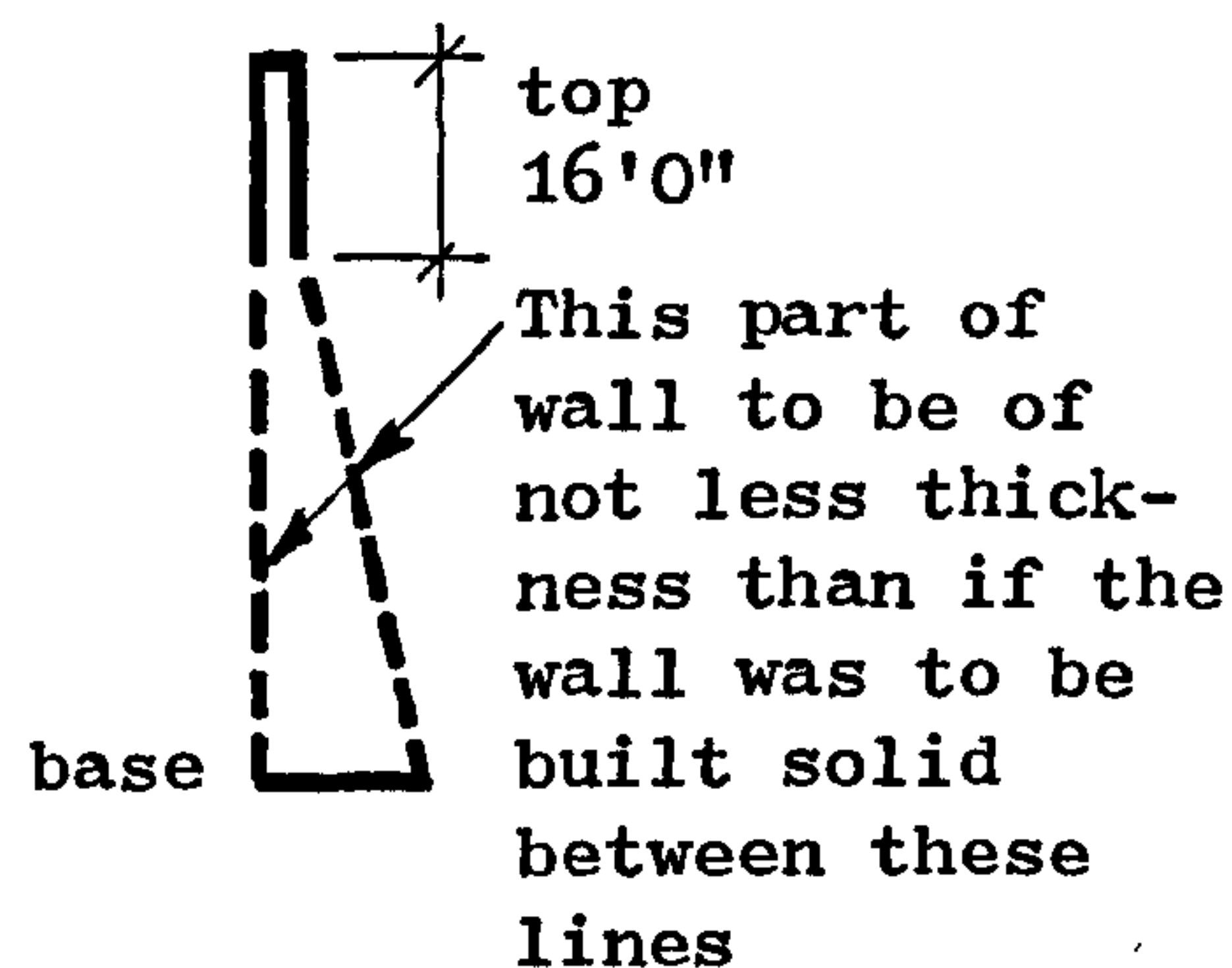
TABLE 14

London Building Act 1894

Buildings of the Warehouse Class

Sheet 16

HEIGHT LENGTH	100-120'		90-100'		80-90'	
	up to 45'	over 45'	up to 45'	over 45'	up to 45'	over 45'
Thickness at base	31"	35½"	26"	30½"	26"	30½"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"	13½"	13½"
HEIGHT LENGTH	70-80'		60-70'		50-60'	
	up to 45'	over 45'	up to 45'	over 45'	up to 45'	over 45'
Thickness at base	21½"	26"	21½"	26"	21½"	26"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"	13½"	13½"
HEIGHT LENGTH	40-50'			30-40'		
	up to 30'	30-45'	over 45'	up to 35'	35-45'	over 45'
Thickness at base	26"	21½"	17½"	21½"	17½"	13½"
Thickness for top 16'0" of wall	13½"	13½"	13½"	13½"	13½"	13½"
HEIGHT LENGTH	25-30'		up to 25' any length			
	up to 45'	over 45'				
Thickness at base	13"	17½"	13"			
Thickness for top 16'0" of wall	13"*	13"*	13"*			



NOTES

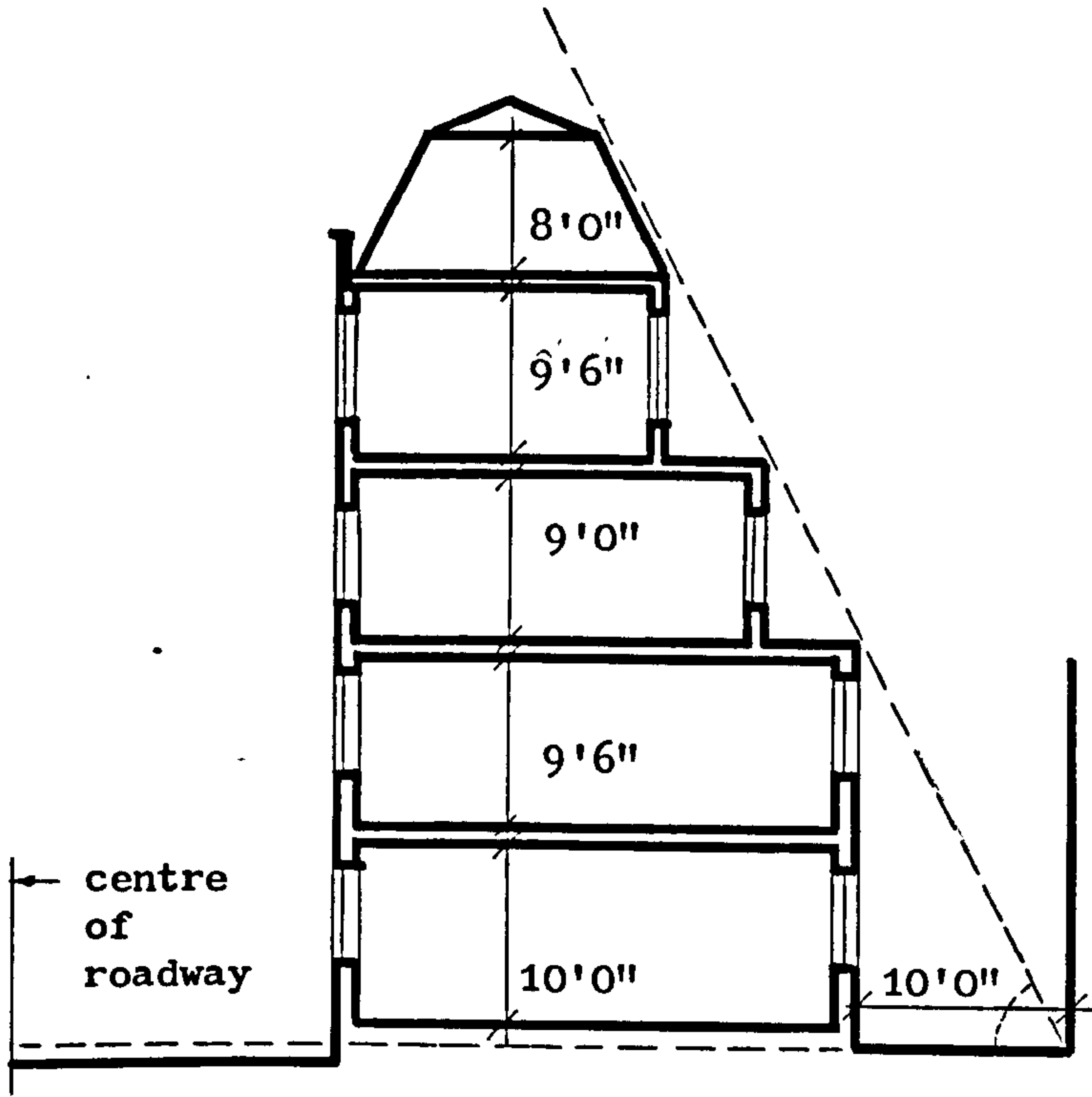
1. Party and external walls to have the same thickness.
2. Asterick* indicates that in walls not over 30' high, the walls of the topmost storey may be 9" thick, if that storey is not over 10'0" high.
3. If in any storey the wall thickness is less than 1/14th of the height of that storey, then the thickness of that wall to be increased to 1/14th of the height of the storey, and the wall below increased accordingly, but such additional thickness may be confined to piers properly distributed, of which the collective widths = 1/4th part of length of wall.

CROSS WALLS - FOR ALL TYPES OF BUILDINGS:-

Thickness to be 2/3rds of thickness required for party and external

walls of the same dimensions and of same class of building, but never less than $8\frac{1}{2}$ ". No wall is a cross wall unless it is carried up to floor of topmost storey and unless in each storey the total of recesses and openings does not exceed half the whole elevation. Where cross wall becomes external wall, to be same thickness as external wall of same dimensions and class of building.

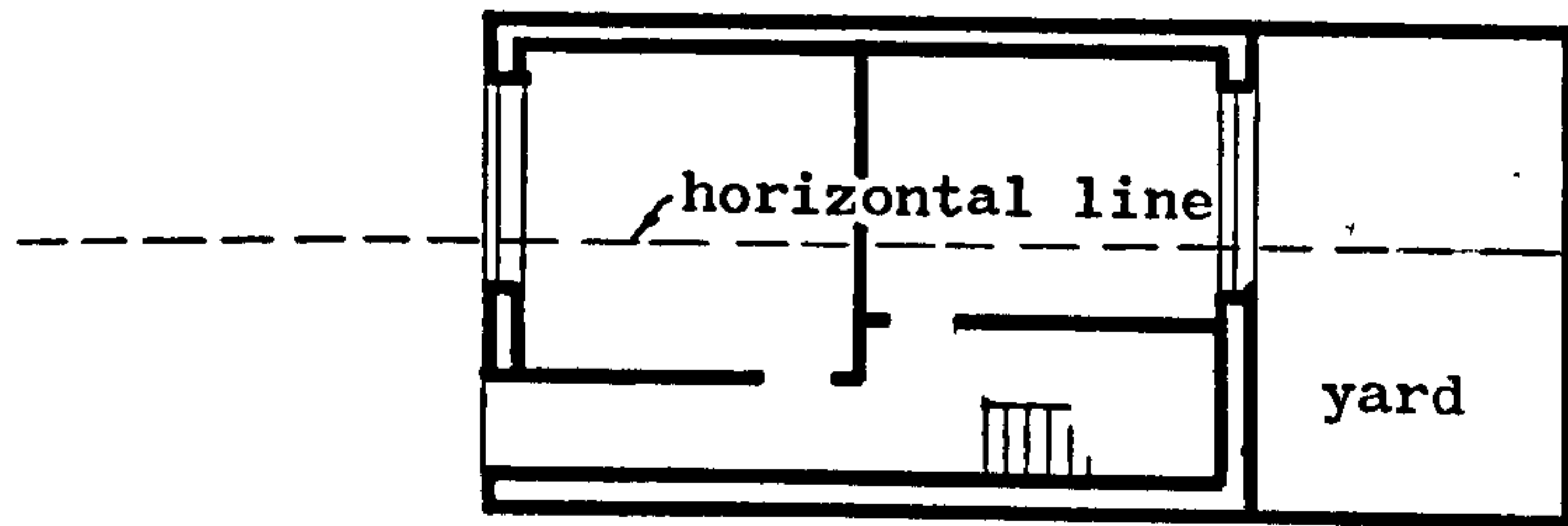
In all types of building covered by these schedules, where an increase is required in thickness in cases when walls exceed 60'0" high and 45'0" length, or in cases where a storey exceeds in height 16 times (or 14 times, as the case may be) the thickness prescribed for its walls, the increased thickness may be confined to piers properly distributed, of which the collective widths amount to $\frac{1}{4}$ th part of the length of the wall.



London Building Act 1894
section 41 Domestic
buildings in streets laid after
1 Jan. 1895. (Horizontal
line raised by 16'0" in cases
of streets laid before Act of
1894)

angle of diagonal line = $63\frac{1}{2}^{\circ}$

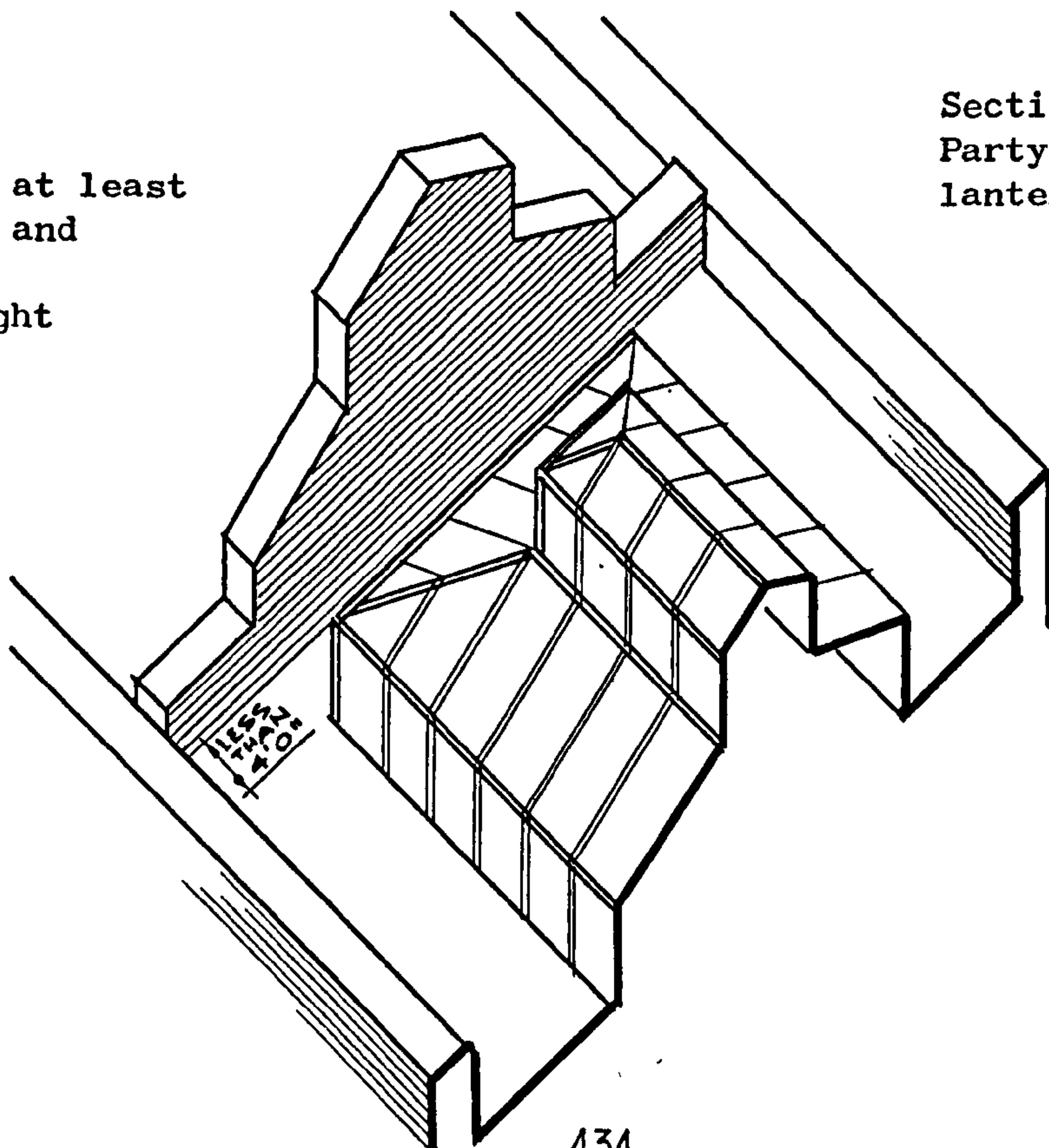
SECTION



FROM
'The London Building Act
1894
Prof. B.Fletcher.
London, 1901, 3rd Edition.
Plate 2 above and
Plate 7 below

PLAN

Party wall at least
12" higher and
wider than
lantern light



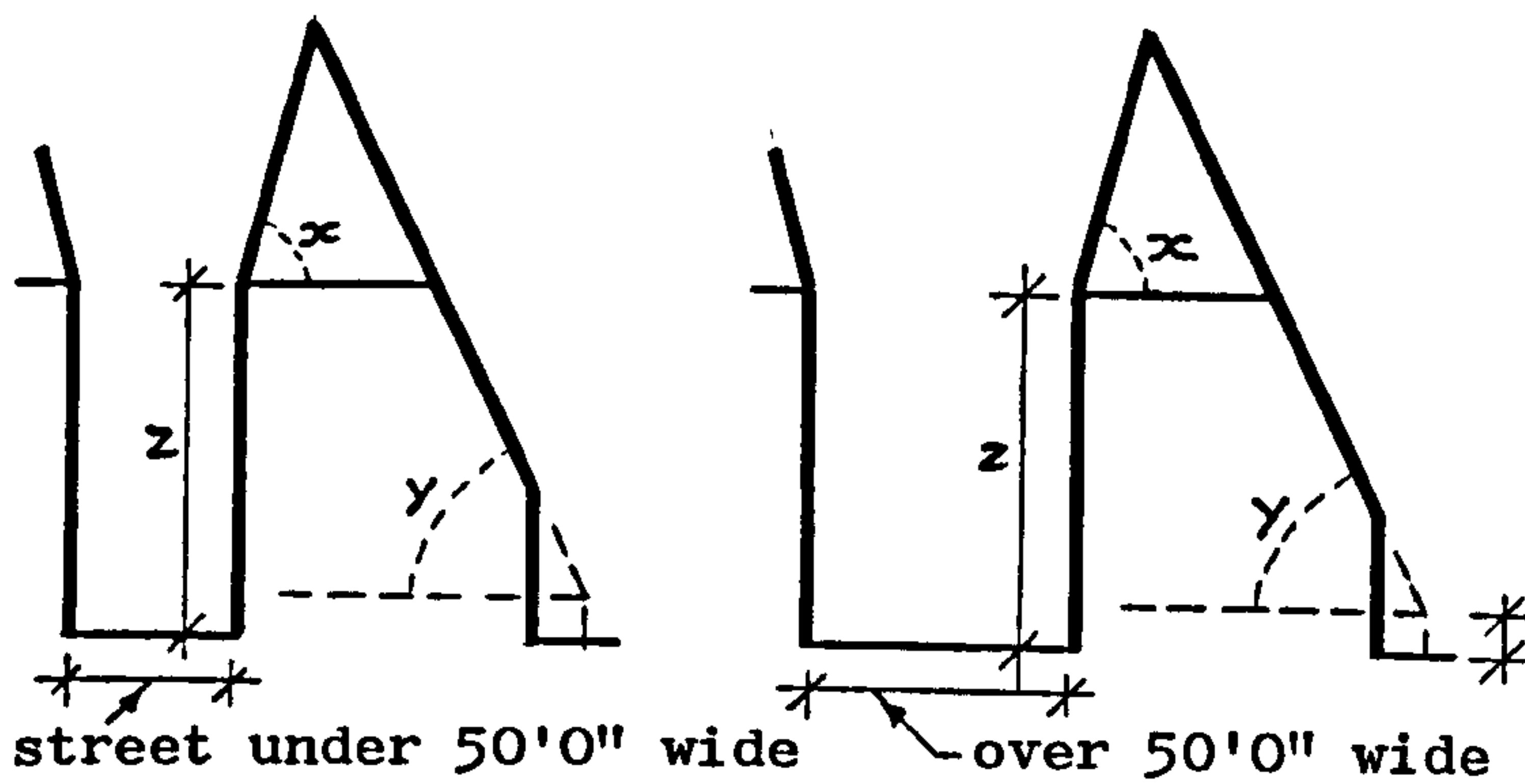
Section 59
Party wall and
lantern lights etc.

STREETS FORMED BEFORE 1862

London Building Act
1894. Sections 41, 47, 49.

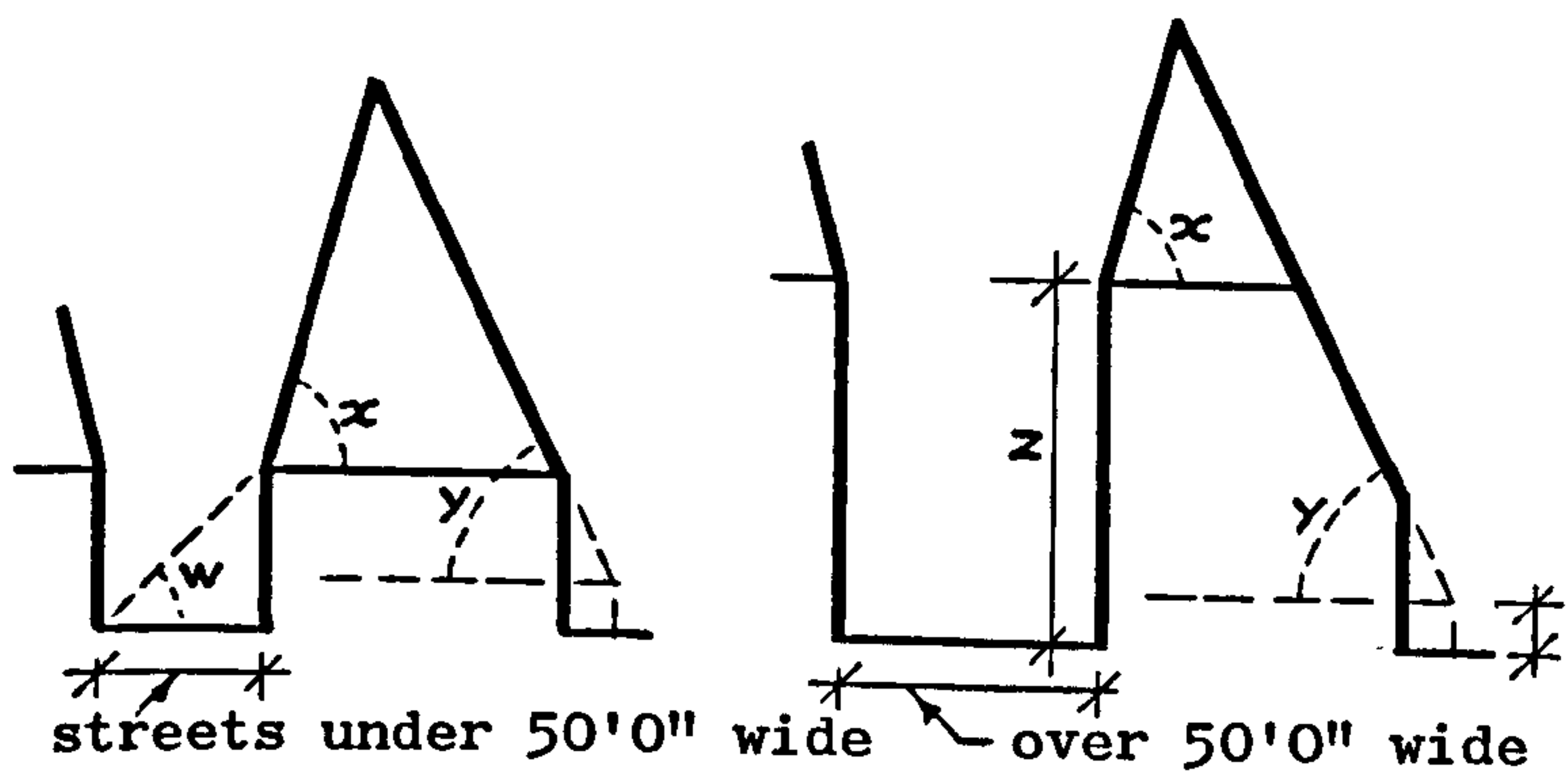
Height and open spaces
about buildings

angle $x = 75^\circ$ max
angle $y = 63\frac{1}{2}^\circ$
dimension $z = 80'0''$ max
max. 2 storeys in roof



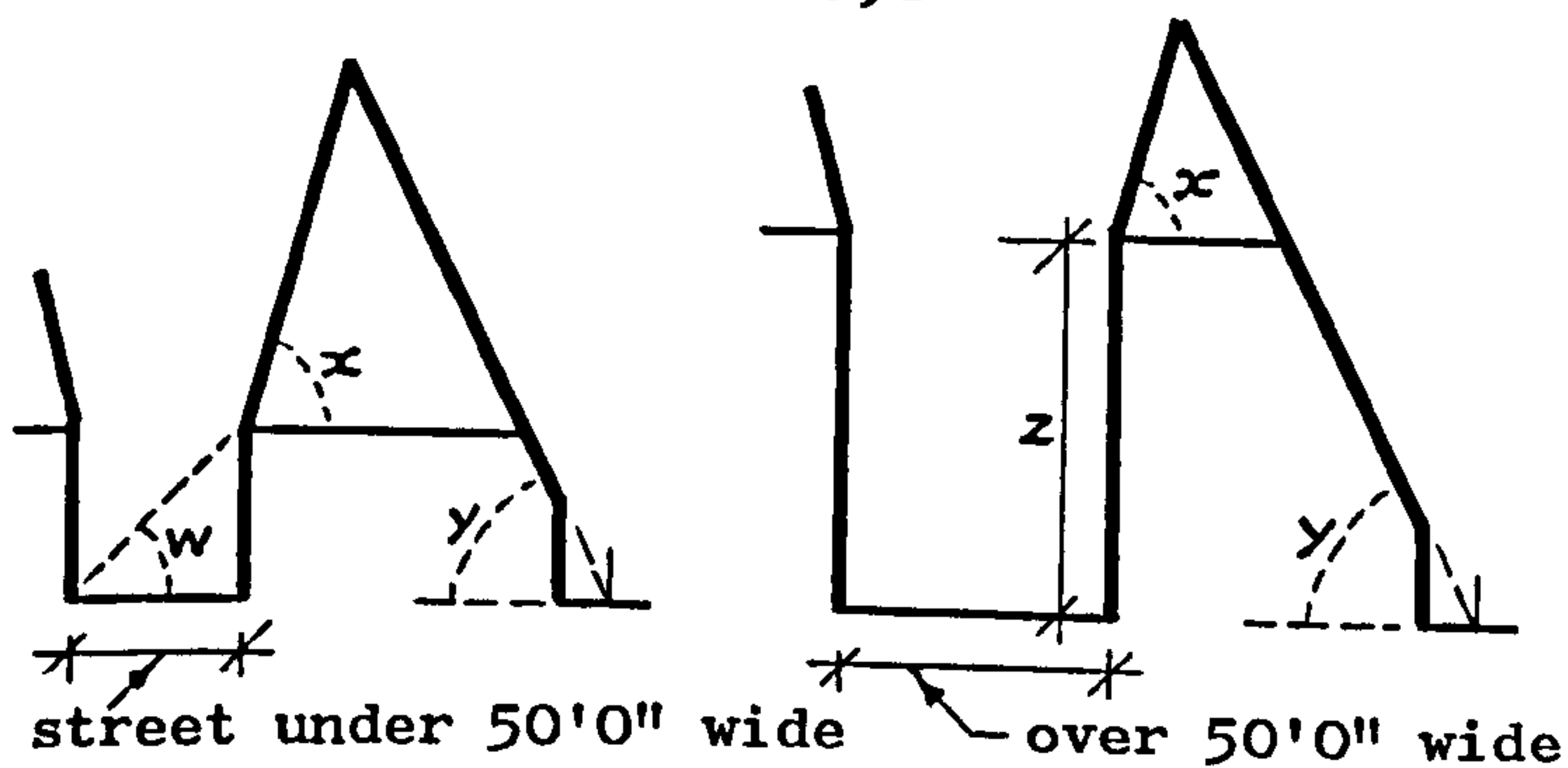
horizontal line
16'0''

STREETS FORMED 1862-1894



angle $w = 45^\circ$
horizontal line
16'0''

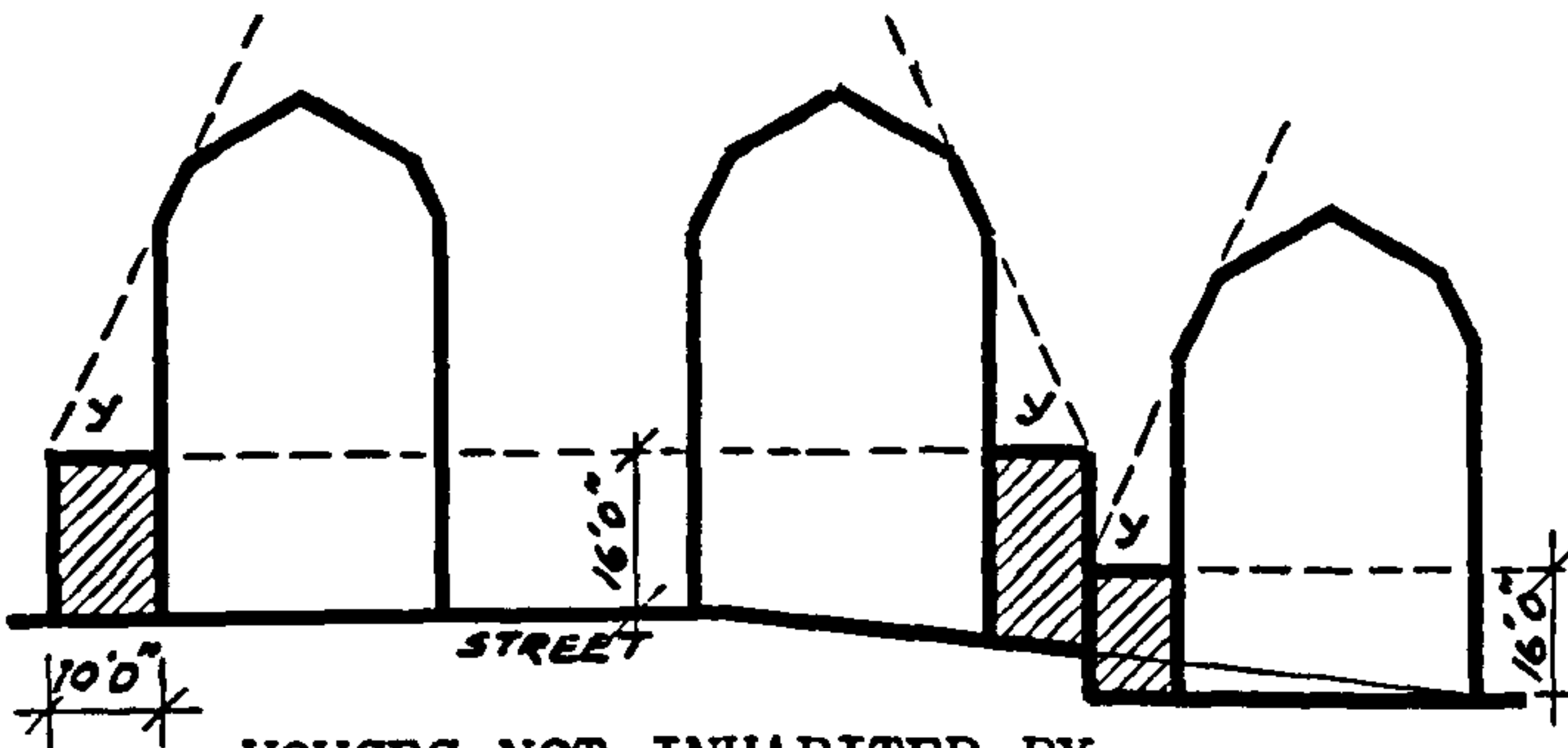
STREETS FORMED AFTER 1894



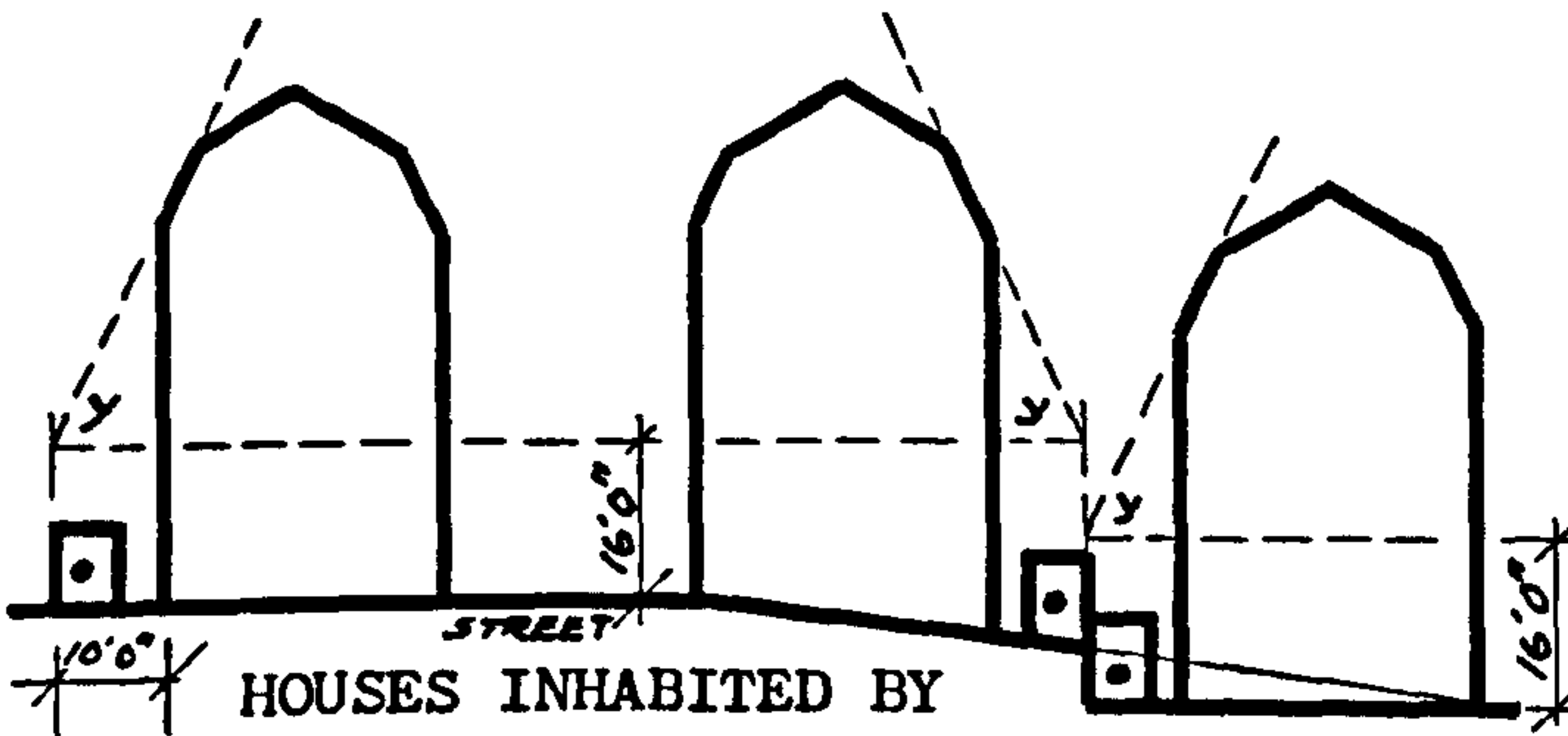
FROM:
'The London Building Act'
1894,
Prof. B.Fletcher.
London, 1901, 3rd Edit.
Plate 5

Domestic buildings on old streets

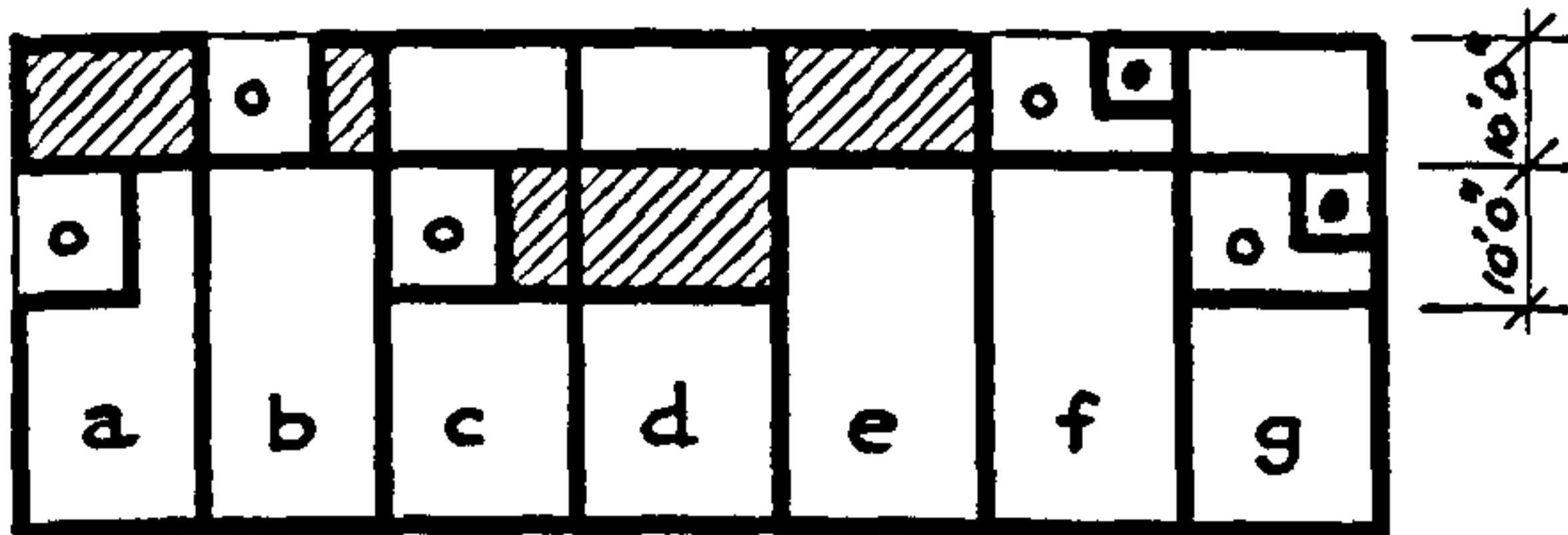
Domestic buildings on new streets



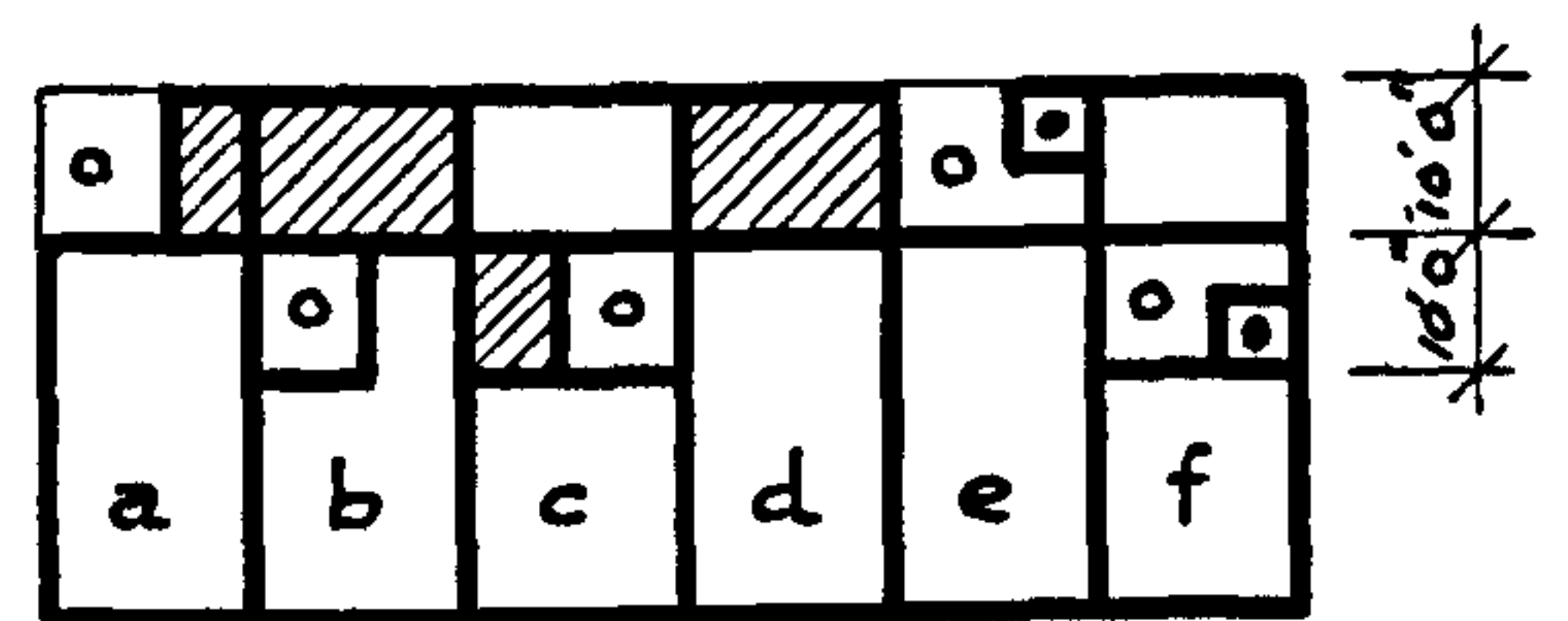
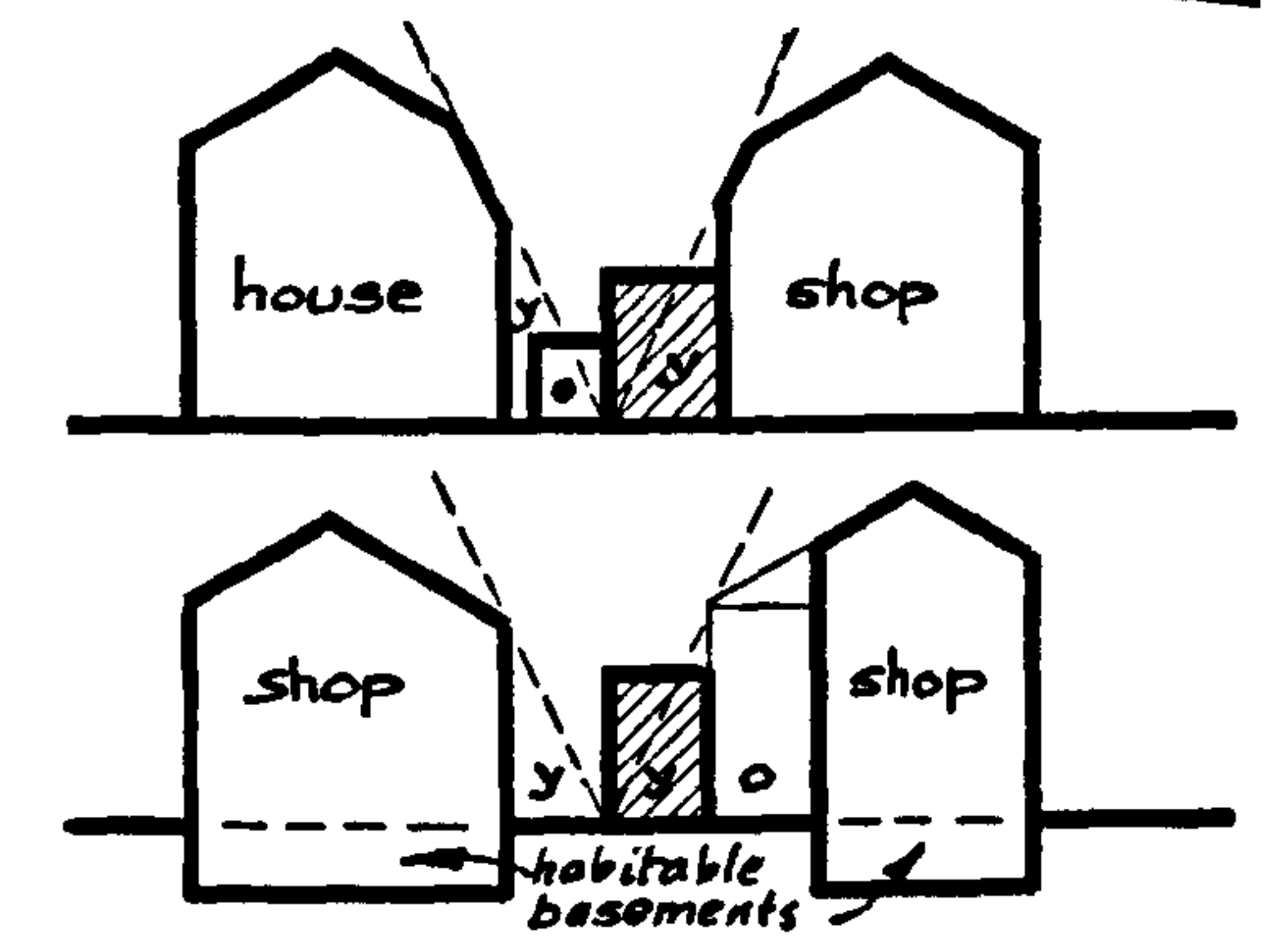
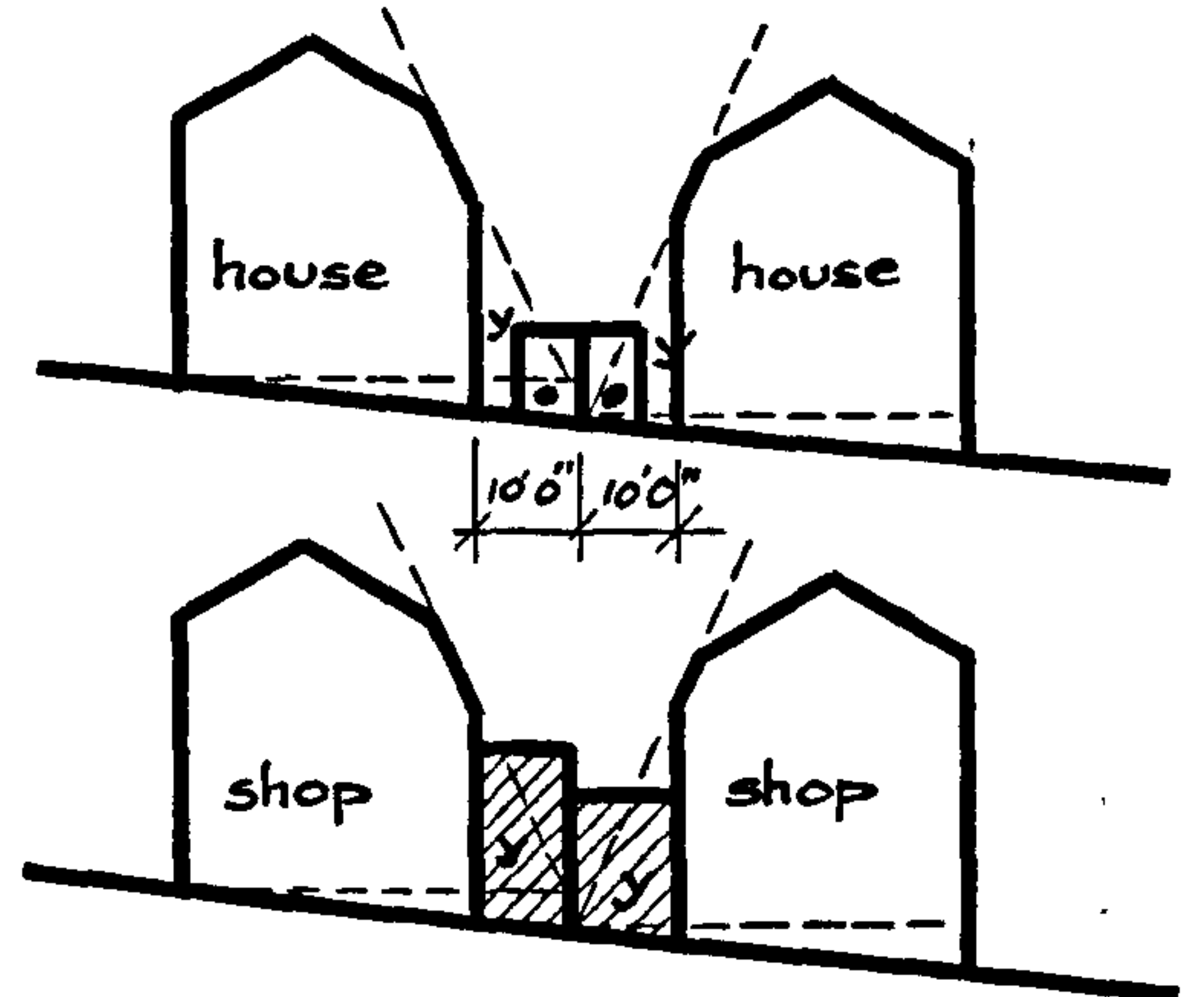
HOUSES NOT INHABITED BY PERSONS OF WORKING CLASS



HOUSES INHABITED BY PERSONS OF WORKING CLASS



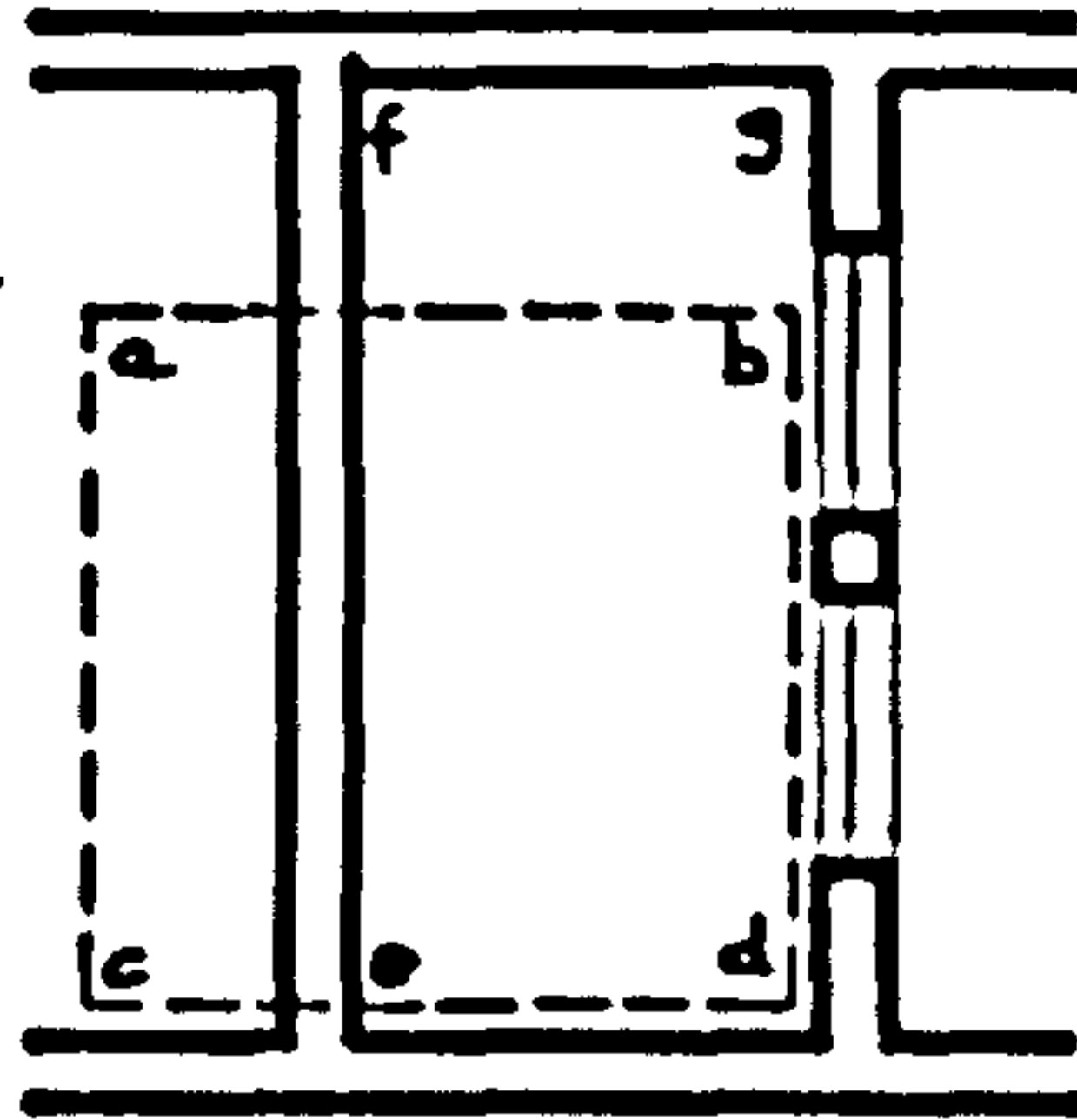
- a = house, not inhabited by working class, with basement 100 sq.ft. open space. Shaded area is building up to 16'0" high only.
- b = as above.
- c = as above.
- d = house, not inhabited by working class, without basement. Shaded area is building up to 16'0" high (as for shops).
- e = as above.
- f = house, inhabited by working class, no basement open space of 150 sq.ft. inc. outside w.c.
- g = as above.
- y = 63½
- o = open space.



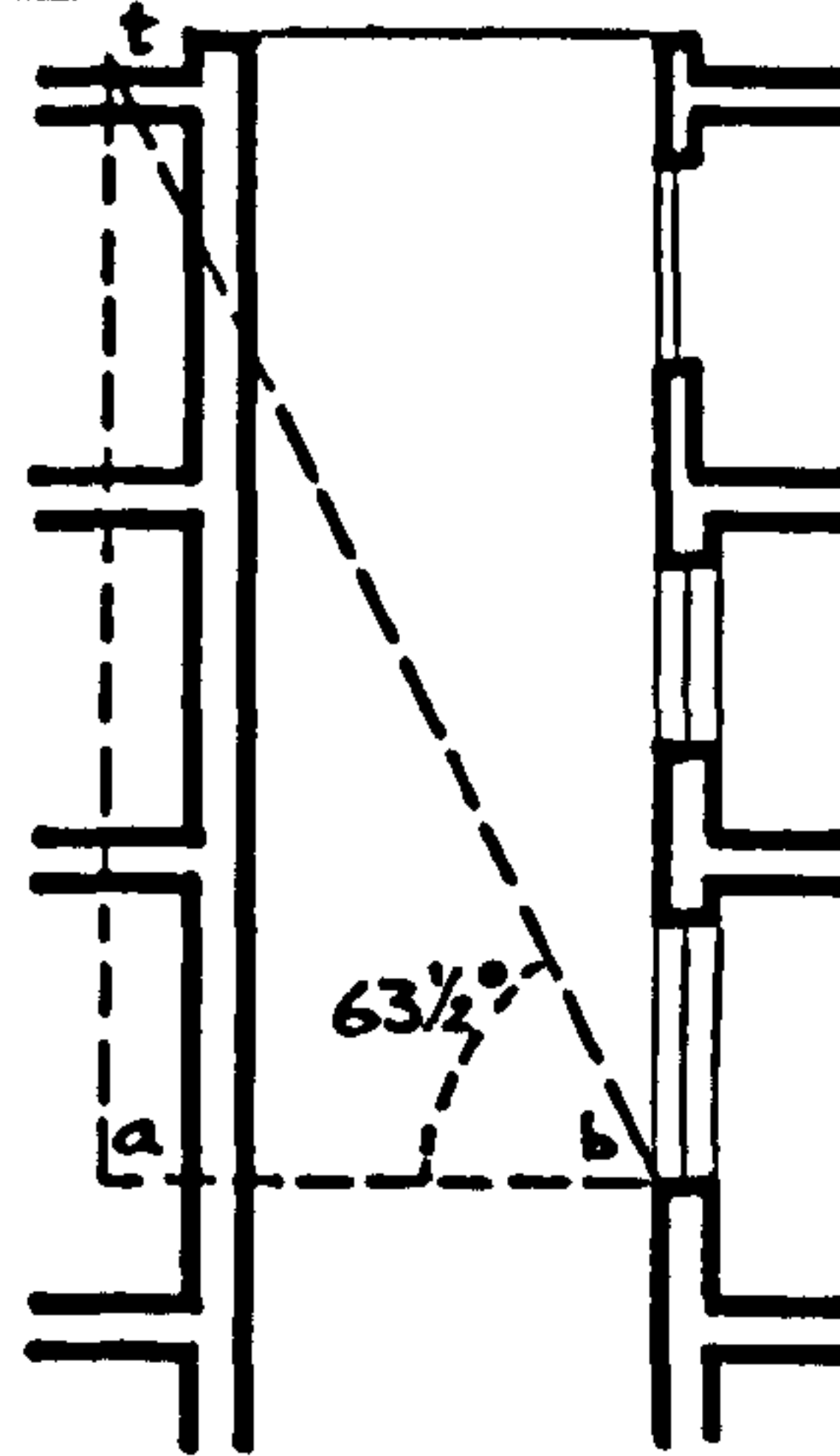
- a = house with ground floor used as shop, with basement, 100 sq. ft. open space. Shaded area is building up to 16'0" high only.
- b = as above.
- c = as above.
- d = house, no basement, ground fl. used as shop, shaded area is building up to 16'0" high.
- e = house only, open space of 150 sq. ft. inc. w.c. not over 9'0" high.
- f = as above.
- y = 63½
- o = open space.
- = w.c.

FROM:
'The London Building Act 1894',
Prof B. Fletcher.
London, 1901, 3rd. Edit. Plates
1 and 3

COURTS WITHIN
 A BUILDING
 ENCLOSED ON
 ALL SIDES



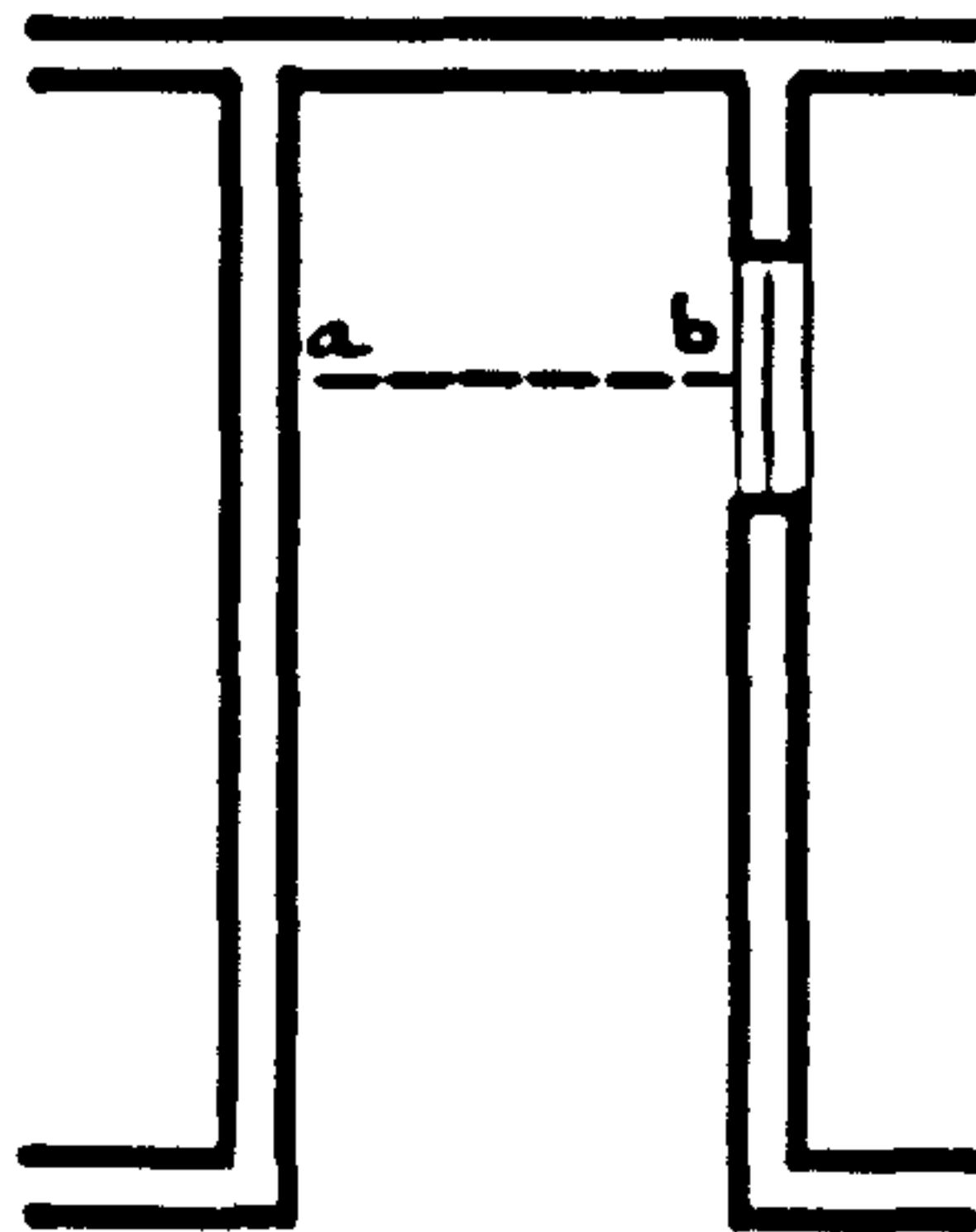
PLAN



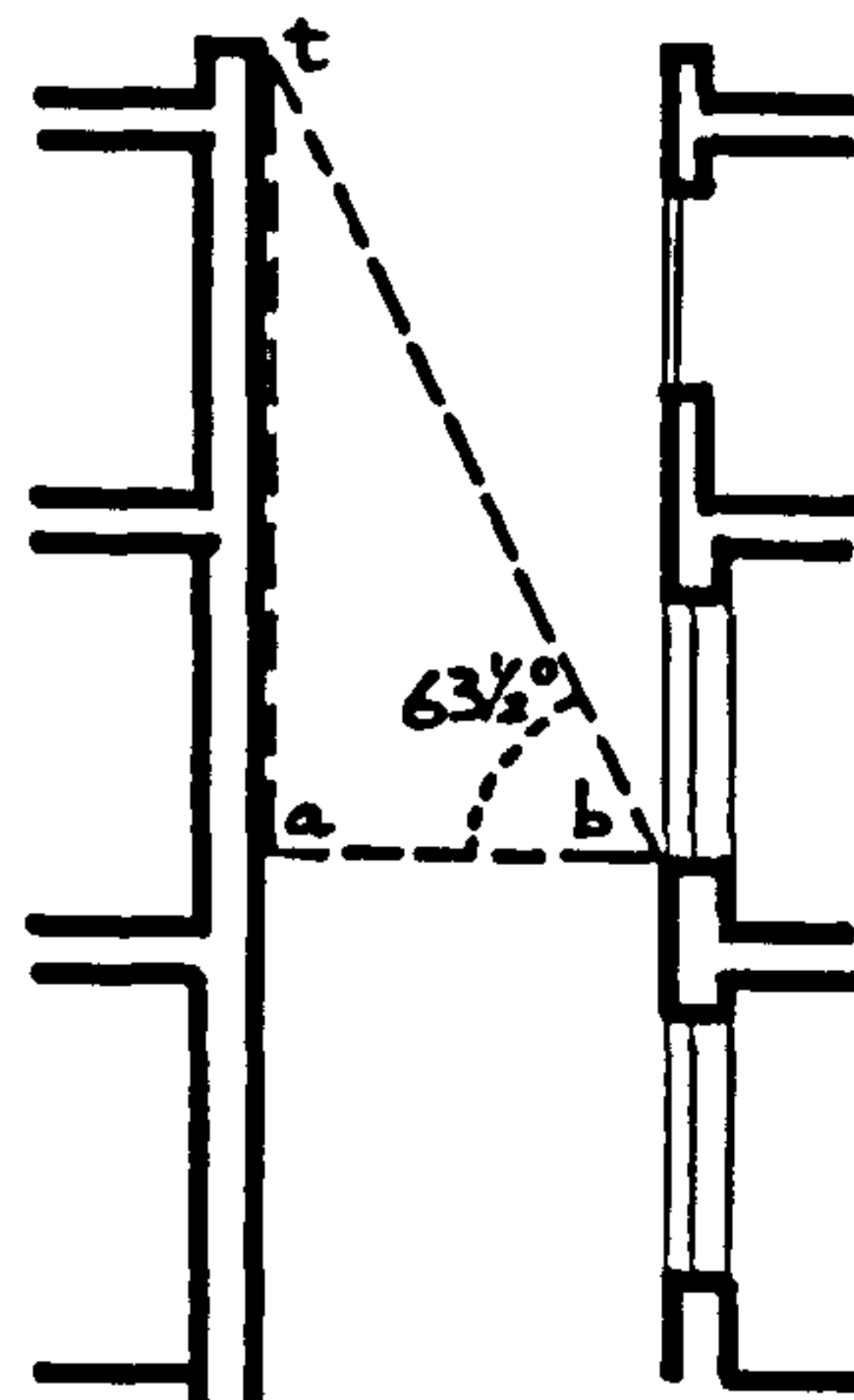
SECTION

1. $ab = \frac{1}{2} at$
2. rectangular court defg will also comply if gd is not more than twice de and if area defg = abcd

COURTS WITHIN
 A BUILDING
 OPEN ON
 ONE SIDE



PLAN



SECTION

1. $ab = \frac{1}{2} at$

FROM:
 'The London Building Act
 1894',
 Prof B.Fletcher,
 London, 1901, 3rd Edition.
 Plate 4 -

COMPARATIVE EXAMPLES OF EUROPEAN
BUILDING HEIGHT : STREET WIDTH REGULATIONS

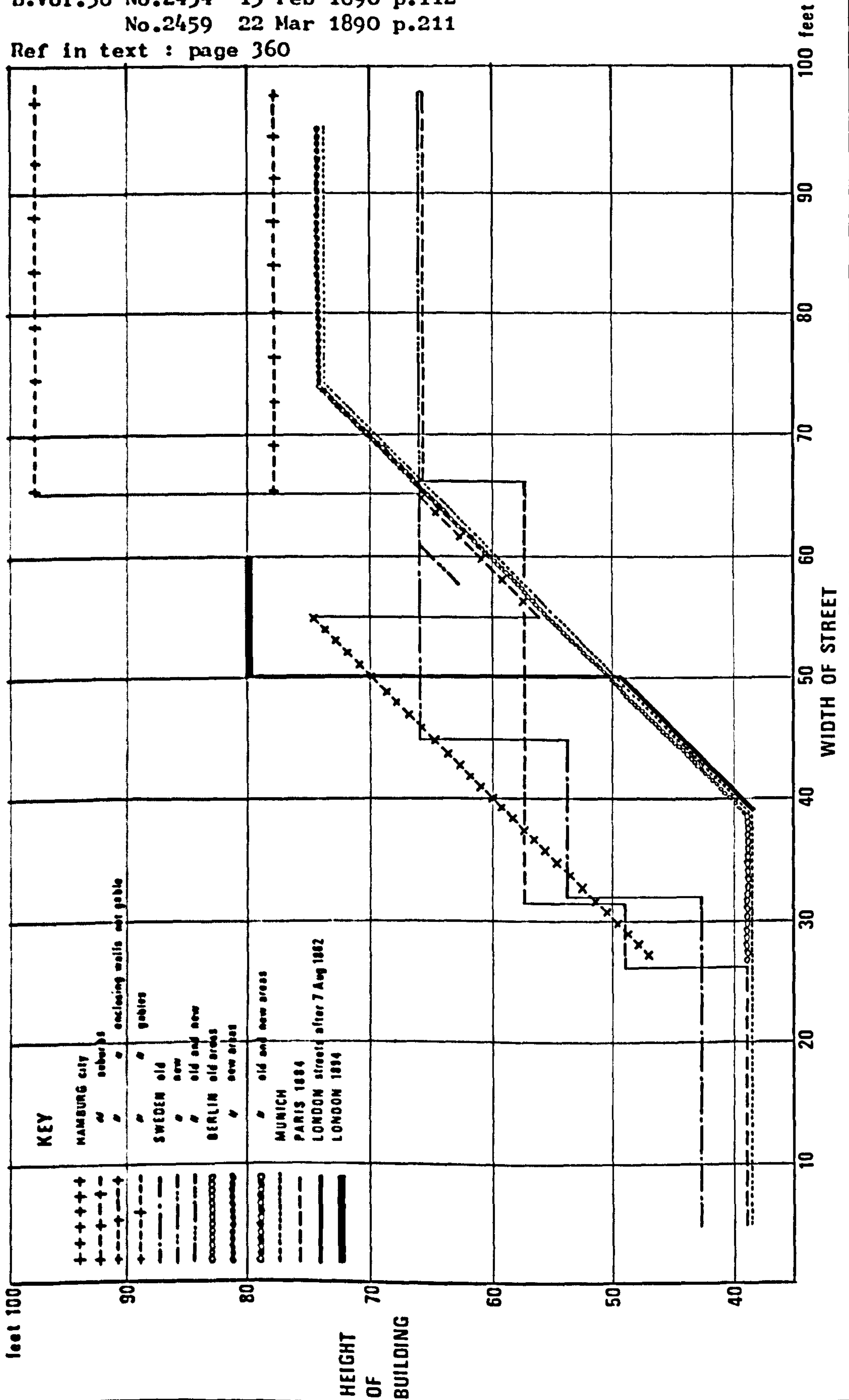
TABLE 14
Sheet 22

Sources:

B.Vol.58 No.2454 15 Feb 1890 p.112

No.2459 22 Mar 1890 p.211

Ref in text : page 360



- 1889 The only conditions, laid down by the Secretary of State were:
1. Limitation of the height to 4 storeys
 2. Living rooms = 144 sq. ft. min., bedrooms = 96 sq. ft. min.
- As from 3 Dec. 1889 the L.C.C. regulations for dwellings were
1. Stairs not to be surrounded by rooms, should be 4'0" wide min. with a dado of glazed or hard pressed bricks.
 2. Conditions for basements to be used for dwellings.
 3. Baths and washhouses to every block of dwellings. Closets to have doors and windows to external air.
 4. Living room = 144 sq. ft. Bedrooms = 96 sq. ft. min.
 5. Height of rooms = 9'0" min.
 6. Every room if practicable, to be distant from any obstructing building by $1\frac{1}{2}$ times the height of such building, and never nearer than the height of the building.
- January 1893 : the above modified due to cost
1. dwellings allowed up to 5 storeys
 2. room height reduced to 8'6"
 3. and later the width of staircases reduced to 3'6"
- 1893 : requirement for all staircases to have access to the yard
- 1894 : requirements of Secretary of State at their least exacting level
- 1894-1898 : tendency to improve class of accommodation - and therefore cost
- 1898 : plans submitted to Secretary of State showed
1. Living rooms average size = 155 sq. ft.
 2. Bedrooms = 102 sq. ft.
- Finally settled at the following sizes:
1. Living room = 160 sq. ft.
 2. Bedroom = 110 sq. ft. (or 100 and 120 sq. ft. when there were two bedrooms)
- These figures became the precise standard. A 45° angle of light to all habitable rooms was also insisted on after 1898, and balcony access discouraged.
- But then at the end of 1899, costs again forced the size of room to be reduced, and they reverted to the sizes of 1889, i.e. 144 sq. ft.

living rooms, 96 sq.ft.bedrooms.

Note : all these regulations are the standards applied only to the L.C.C. schemes built under the Housing of the Working Classes Act 1890, part 1, designs for which had to be approved by the Secretary of State. The Local Government Board approved schemes under Part 2 of the Act. They had a strict attitude to the following:-

through ventilation, lobbies between living and w.c., stairs coming out of the kitchen, wall thicknesses and other detailed points.

From "THE HOUSING QUESTION IN LONDON 1855-1900", C.J.STEWARD. L.C.C. 1900.p.48-51.

CHAPTER IX

MODEL AND PROVINCIAL BUILDING BY-LAWS 1890-1914

This chapter is concerned with the developments of the Model By-laws as they were extended to keep abreast of new demands, and as they were implemented in practice in the provinces. The vocal call for reform came initially from the rural areas, and in particular from the 'landed gentry', whose rights to build cheap labourers' cottages were being increasingly challenged by the encroachment of urban by-law standards into the country areas. Alongside this there was also a constant clamour for a more up-to-date and flexible method of by-law control generally. In both cases, the freedom and opportunities offered by the new ideas of the town planning movement brought the greatest challenge to the restrictive framework of by-law control.

But before resuming the analysis of these developments, it is necessary to return to the point which marked the end of chapter VI, namely the new powers for by-law control offered by the Public Health Amendment Act of 1890. The Model By-laws made soon after the passing of that Act must now be briefly analysed within the main topic headings already used in this respect, namely streets, structure, ventilation and drainage (1).

Model By-laws made after the passing of the Public Health Amendment Act 1890

Streets (Table 16, sheet 1) Before 1890 it had been optional for a private developer when planning a layout of streets and houses, to provide a secondary means of access for the removal of refuse, although it had been a fairly common practice in the North of England. From 1890 however, a local authority could, if it wished, and if it had adopted the Amendment Act, make a by-law compelling the provision of such a secondary access street - but only if it could be shown that it was really necessary. A layout with semi-detached houses, or with a water borne sewerage system would not therefore justify the provision of a secondary access street (2).

Structure (Table 16, sheet 1) The power to control the construction

of hearths was now, very belatedly, accepted and a draft model clause appeared in 1890, based directly on the corresponding clause in the Metropolitan Building Act of 1855 (3). Hearths were a relatively minor area of control however - much more significant were the controls on the sizes of timbers for roofs and floors.

Roof timber controls had not been included in the Model By-laws of 1877, (even though the powers had been there in the Public Health Act of 1875), since it was then felt that only control over the roof covering - by an incombustible material - could be included. This was also the case in London, and furthermore, it was generally felt that the traditional practice of roof construction was quite adequate. With regard to health, the inclusion of any linings such as bituminous felt, to insulate the topmost room and to help to prevent rain penetration, was rejected "because of the increased cost which they would impose on builders" (4).

Now that the Amendment Act of 1890 allowed 'floors' to be controlled by by-laws, the Local Government Board's officials decided to draft model clauses for both floors and roofs. In doing this the two officials concerned, W.Casson the lawyer and P.Gordon Smith the architect, obviously used the Liverpool regulations as a precedent, although they did not admit this at the time (5). As far as can be ascertained, there were no other comparable regulations then in existence. Liverpool had maintained its timber regulations from at least 1825, and by 1882 they had been updated by Goldstraw, the City Engineer, in the Liverpool Improvement Act of that year. As table 16, sheet⁴ shows, the new Model By-laws followed them closely. Three interesting points are revealed. First, unlike the very earliest regulations, the new rules were related to the clear bearing between supports. In the earlier rules they had related simply to the full length of the actual timbers themselves, regardless of any intermediate support - a surprisingly naive and crude understanding of structural principles (6). Secondly, a comparison between Liverpool's earliest regulations and the new Model By-laws, separated by some fifty years, reveals a refinement of the ratios of sectional sizes of the timbers to relate more closely to the greater variety of spans - a reduction in cross sectional area for the shorter spans, and an increase in area for the greater loading over the wider spans in the later by-laws -

largely as the result of experience and observation on site, rather than the more abstract and obscure rules of the theoreticians such as Tredgold (see Table 16, sheet 4). Thirdly, the sizes were based on the assumption that 'good seasoned pine' would be used and, although a warning was included referring to the differing sizes of timbers then being imported from America and Scandinavia (7), it was acknowledged that variations in size could be made where local practice could be shown to be adequate. General rules and formulae were therefore included to assist in making such comparisons on a reasonable basis (Table 16, sheet 2). It was also accepted that 'herring-bone' strutting could lead to a reduction in the sizes specified for joists (8), but no indication was given at this stage as to how this was to be calculated. Indeed, the whole matter was, in spite of the valiant efforts of the Board's officials to make the controls comprehensive but not over-oppressive, a very imprecise area of regulation. Not many of the local authorities adopted these timber by-laws, largely because they had insufficient or ill-qualified staff to deal with the complications of calculation and inspection. It is not surprising when one remembers that the expert London District Surveyors had managed to secure the omission of these same controls from the London Building Act of 1894 (see chapter VIII, note 33).

The parallels between the Model By-laws for fire-resisting floors and stairs in certain public buildings and those in the London Building Act of 1894, reflect their common parentage in the offices of the Local Government Board, but in Knight's Model their range was increased beyond the London standards. Whilst London confined its attention to lobbies, corridors and stairs in public buildings and tenements over 125,000 cu. ft., the Model By-laws included warehouses, chambers (i.e. offices), the stairs of any domestic building, with the sizes of their treads and risers specified for the first time; and the floors of rooms over stables. This latter point was made rather late in the day, and its role was to change to the fire-resisting construction for the floors over motor garages by the 1920's. In practice hardly any of these by-laws were either made or applied, the only ones to gain any wide support were those controlling staircases in public buildings.

The list of fire-resisting materials included within the new Model

By-laws can also be closely paralleled with the second schedule of the London Building Act of 1894 (Table 14, sheet 12), so it is not repeated here. The only variations were that the Model By-law schedule did not include doors which were not less than 2" thick, and for stairs it set a minimum thickness for both treads and risers of $1\frac{1}{2}$ ", whereas London had maintained 2" for this regulation.

Ventilation, open space about buildings and drainage (Table 16, sheet 3)

If a Local Authority adopted Section 23 of the Amendment Act of 1890, it could now legally make a by-law to control room height. Initially Dr. George Buchanan, the Board's Medical Officer and P. Gordon Smith the architect, recommended 9'0" as the minimum, but many local authorities thought that this was excessive and declined to make such a by-law. The Board were persuaded to consider 8'6" - or even 8'0" for the parts in the roof (9), but it was not until 1912 that the official recommendation was published as 8'0" (10). The curious rule of one minimum height for a habitable room of conventional proportions and then another minimum height for an attic under a sloping roof, was challenged at the outset. If one was adequate in a rectangular room, how could it be adequate over only a portion of the area of a room in the roof? "More decisive legislation on this is called for" demanded 'The Builder' (11). With regard to drainage it is only necessary to record that by-laws could now be made so as to affect buildings erected before 1875, and part of the Model By-laws, series IVb, were later made to cover specifically this function.

*

The Rural Model By-laws 1890-1901

On 23 September 1898 one J. Henry Dugdale wrote to 'The Times' from Rowney Abbey, Ware. He noted that in a recent issue, a 'Lady Chairman of a Parish meeting' had bemoaned the absence of proper cottages in rural areas because of 'unreasonable local by-laws'. He himself, in altering a barn, had had to 'diminish the accommodation in order to comply with such by-laws', and a large room upstairs could not now be used for habitation because it was not 9'0" high for at least $\frac{2}{3}$ of its area. Furthermore, in spite of there being no other buildings

within half a mile on two sides and a large open yard on the third, the local Medical Officer had made a special trip to check that the by-law requiring 15'0" of clear space at the front and rear was being complied with (12). This started a flow of similar correspondence. One writer complained about the restriction on thatch...

"which as everyone who has had the advantage of sleeping under it knows is vastly cooler in summer and warmer in winter than the flimsy slated - to say nothing of corrugated iron - roofs with which the urban wisdom of Whitehall is disfiguring our country lanes" (13). He later added that in his Devonshire village, walls could legally go up to 100 feet in height "yet there is no great likelihood of Hankey's mansions being copied in this neighbourhood" (14). A Mr. Hook, whose local golf club had been classed as a 'dwelling house used for human habitation' and liable for a number of unnecessary controls as a result, called for the legislature to exempt rural areas from the by-laws ("after all," as he said, "by' did mean 'town'") (15), but as William Welch pointed out, the continual march of urbanisation into the country was inevitable, the dividing line difficult to determine, and perhaps therefore the Local Government Board's model should be modified for rural areas (16). It was to take the next three years to achieve just that.

As we have seen in chapter V, there had been earlier public health developments in the rural areas. The Sewage Utilization Acts of 1865 and 1867 had applied in rural areas, the Royal Sanitary Commission in 1869 had dwelt on the problem of the rural cottage and had recommended the introduction of simple by-laws, and 1872 had seen both an abortive Public Health in Rural Places Bill and the more successful Public Health Act which had established rural sanitary districts.

The Public Health Act of 1875 had only allowed rural authorities to control sanitary matters - closets, privies and drains - and, under section 184, they were allowed to make by-laws to cover these matters. In practice of course they were rarely applied, most areas lacking the necessary staff and expertise (17). However, rural authorities could also obtain urban powers on application to the Local Government Board, and, by section 276 of the Public Health Act of 1875, if the Poor Law assessment was not less than 1/10th of the total assessment of the district. Kidderminster was cited as an example - full urban building

by-laws had been adopted by a rural authority "without one line of them being either read or discussed" (18). There was a general fear that this would have a disastrous effect on the working classes in the country - new cottage building would be stopped, and old cottages not worth repairing would be demolished. The cost of building was already higher in the country than in the towns. The result would, it was feared, be an increase in cost by 25% and a fall in the rural population (19).

The first salvo from the architectural camp was aimed at the whole administrative framework, and came from William Henman at the local architect's Annual Meeting in Birmingham in December 1898 (20). The by-laws were, he maintained, too confused, too detailed on matters of minor importance and yet omitted matters of structural importance. They were all "wrapped up in vast amounts of unnecessary legal jargon and excessive verbiage" (21). How familiar that still sounds today! The rural aspect was not particularly highlighted by Henman, although one member did point out that he felt by-laws should vary to suit local conditions, and that laws for towns might be excessive for country cottages. It was the design consequences, rather than the economic or social, which were of more concern:

"As architects they would agree...that the charm of our country towns was the picturesque irregularity and diversity which existed, caused by bay and oriel windows, overhung gables and such like projections, and the introduction of timberwork. The charm of these features the by-laws enforced in many country towns would tend to prevent, with the result that in time our country towns would have their streets flattened out in the utterly dreary and monotonous manner of those in suburban Birmingham and Manchester. This they, as presumed lovers of their country, and of the beautiful and picturesque, should protest against and strive to obviate" (22).

With correspondence on the matter in 'The Times', 'The Builder' in full support (23), and the Birmingham architects debating the matter, it was now Lacy Ridge who brought the problem to the attention of the R.I.B.A. in London on 16 January 1899 (24). It was, he said, time to revise the Model By-laws anyway, since the new London Building Act was now in operation, giving opportunities for greater freedom in building and design. He called for, and obtained, a special committee to investigate the administration of by-laws in rural areas - a committee of men 'mainly interested in country work' (25), which he hoped would be as effective as the Practice Standing Committee (which

had been composed almost entirely of London men) had been in the examination of the London Building Bills. He suggested that health should be the main area of concern, with the inclusion of all buildings throughout the country (how "railway stations got rid of their sewage" he could not say); with consideration being given to a greater tolerance for timber in wall construction (the Model By-laws on this matter seemed to him to be nothing more than a fine model for producing dry-rot); and^{with} the problem of firespread between terraces of buildings in the main streets of market towns - and here we see the first mention of the deeply engrained London practice of party wall regulation being suggested for the rural application. Ridge also suggested a three way division of the by-laws : for large towns, towns of moderate size and country districts - a pattern which was to be eventually attained, although not quite identically, in the urban, intermediate and rural models of the following decade (26).

At the Architectural Association, Dr. Poore stressed the problem of providing cottages for agricultural workers in his talk in May entitled 'Aspect and Soil in relation to a Dwelling House' (27). In the discussion which followed, E.D.Till from Eynsford, explained that he was striving to build 'isolated' (i.e separated some distance from each other) cottages all in wood for £100, in an effort to keep workers on the land, but the imposition of the by-laws was resulting in that sum being virtually doubled. Overcrowding, he claimed, was getting worse in the country, indeed it was almost as bad as in London. A cheap cottage, on one eighth of an acre, would, he suggested, ensure 'isolation', so as not to injure its neighbours, and also provide a reasonable garden or allotment (28). Many rural officials were waiting to hear the outcome of the R.I.B.A. Committee's deliberations, whose report duly appeared in June 1899.

The Committee identified the following shortcomings. The by-laws were not always well adapted to general use throughout the country, they could be oppressive in rural areas, were often enforced unnecessarily, and were often an interference with personal liberty. They gave useless trouble to local authorities, multiplied the number of officials, and added to the cost of building. The by-law: "promotes monotony in design, stultifies invention and prevents improvement", and "discourages the erection of cottages for the labouring classes by landed

proprietors on their country estates" (29). The Committee recommended that party wall controls, sanitation and site preparation, with the possibility of street controls for areas likely to become urban, would suffice for rural areas. At the same time they suggested various revisions to the whole of the Model By-laws (which had not been officially revised since their first appearance in 1877), bringing many of them, as they freely admitted, into line with the London Building Act of 1894. From these proposed revisions the following are selected for note: the omission or revision of the controls on wood in external walls, brick nogging, the height of storeys and the ventilation of public buildings. No exceptions were to be made for any buildings from the operation of the by-laws ("certainly not railway stations", which were still being built under their own private acts), except for small 'isolated' buildings such as greenhouses and the like. They called for a 6'0" wide footpath on one side of every new street, the allowance for the space at the rear of a dwelling to be above the ground floor (on the London model, allowing shops to extend back the full depth of the site), internal courts within buildings and party walls projecting above the roof (again on the London model). Wall construction regulations should, they suggested, allow walls above the ground storey to be of 4" timber studding with a covering of tiling or plaster. Party walls should be thinner than the equivalent external walls; a reduction should be made to the thickness of external brick walls when they had a tiled cladding (within the limitation of one storey above the ground storey); and a vertical damp proof course should be stipulated rather than the basement cavity wall. Finally, a special Technical Tribunal of Appeal should be established very much on the London model; and the longstanding and most diffuse matter, lost in the haze of the Common Law,^{of} the regulation of 'Ancient Lights', should now be incorporated (30).

A deputation from the R.I.B.A. met Russell, the Parliamentary Secretary to the Local Government Board in October 1899. Russell patiently explained that the business of the Board, advising local authorities what to do, "was always a delicate matter, owing to the jealousy of local authorities at the interference of a central authority". He thought however that the R.I.B.A.'s idea of grouping the by-laws, so as to identify those which were applicable only to rural areas, to be a good one, but could hold out no hope of any immediate legislation(31).

They had to await a new Parliament (32). They had to wait in fact throughout 1900. The Boer War held the stage, and the 'Khaki' election of October 1900 was an attempt by the Conservatives to capitalize on the victory - this it did, but with no reflection on the level of popularity of its administration. At the R.I.B.A. the attack on the by-laws was still maintained. In January 1901 (the month that Queen Victoria died), J.J. Stevenson was complaining of the harmful effects they were having on "good modern architecture" - why did they have to have high ceilings, why was there a ban on half-timbering, or thatch on 'isolated' cottages or party walls projecting above the roof? And some rural by-laws persisted with the old rule that required window frames to be set back $4\frac{1}{2}$ " from the face of the external wall, yet that rule had now been removed from the recent London Act (33). With remarkably effective timing, the President, William Emerson, announced that the Council had, that very afternoon, agreed once again to approach the Local Government Board on the subject (34).

A second deputation from the R.I.B.A. met Walter Long, President of the Local Government Board in March 1901. He readily agreed that no unnecessary impediments should be put in the way of local authorities endeavouring to deal with the problem of housing the working classes, and he admitted that he was currently reconsidering the by-laws to see what changes could be made (35). A further meeting with the Board's Secretary, Grant Lawson, gave an opportunity for the draft of the Board's Rural Model By-laws to be unveiled, although they were not officially submitted to the R.I.B.A. until August that year. The proposals were, as expected, mainly for sanitary controls, although wall structure, foundations, space about buildings and ventilation were, to a limited extent, also included. The R.I.B.A.'s call for the extension of the party wall regulations was deferred until some unspecified date, and was in fact not resurrected (36).

The subject of the rural by-laws was raised in Parliament. In April 1901 Walter Long confirmed that a series of Rural Model By-laws were being prepared (37). In May he informed a member that local authorities had no power to dispense with by-laws in particular cases in rural districts (38). (Indeed, there was no discretionary power, - once by-laws were adopted they had to be upheld in all cases), and in June he informed another Member that, although the rural by-laws did not

prescribe a minimum room height, there was a mechanism (under the Public Health Act Amendment Act of 1890) to permit rural authorities to do so if they felt it to be necessary (39).

The R.I.B.A. generally received the rural model with approval, even though the party wall matter had been omitted. Ridge still hoped that party walls could be regulated, distinct from external walls (40). Otherwise the construction regulations were not onerous, but the window clauses were seen by the R.I.B.A. as 'frivolous', and the rules for space about buildings had, they felt, not been imaginatively conceived to meet all possible permutations (41).

The Rural Model By-laws of 1901 are summarized in Table 17 and it will be seen that, although they have a more limited range, their technical requirements were largely based on the Model of 1877. But there were some variations. All buildings, other than public, houses or warehouses were excluded, thereby exempting agricultural sheds and the like (except that pigstyes and cowsheds were not exempt if they were attached to a house). The layer of asphalt or concrete over the site of the house needed to be included only when the site was actually damp or the soil of poor quality. This was a concession, but it was not welcomed everywhere. One critic thought that this requirement for the asphalt or concrete layer should be retained everywhere, a better floor being obtained, he felt, from wood blocks being embedded in the asphalt or concrete base rather than in any suspended timber floor (42). The damp proof course was now to be below the lowest floor, not below the timbers as before. There was no definition of wall materials or their thicknesses; window areas were set for houses only, and the areas of ventilators in rooms was reduced from 100 to 50 square inches. 'Access', rather than 'Ventilators', was now required at both ends of drains in concrete under buildings; earth closets were now classed with privies and could not be placed within a building. The minimum distance of privies and ashpits from a house was increased from 6'0" to 10'0", but one critic thought 25'0" would have been better - and why, he wondered, did ashpits still justify six separate clauses, in fact, why did you need ashpits at all in the country? (43).

'The Builder' thought the rural by-laws to be reasonable (44), the

R.I.B.A. likewise, though it still continued to urge the adoption of party wall controls on the London model, but with a modification to omit their projection above the roof in houses not over two storeys in height (45). But there was still nothing to prevent a dwelling being inhabited before it was complete and fit for habitation, and, as with the previous by-laws, the whole legislative framework in this field was still only permissive and not mandatory.

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By-laws in practice. Regional variations and case studies 1890-1901

Whilst our attention has been directed in the previous pages to the building by-laws as they existed on paper, it is time to turn to a very different picture which describes their implementation and interpretation in practice. It must be remembered that all these regulations were only permissive - the Local Government Board had no power to enforce any by-laws. Only if a local authority wanted to make a by-law could the Board exercise any form of control and standardisation, by virtually insisting that it would only grant its approval to a by-law based on its own Model By-laws, unless there was a very good case for a local variation. Again, the Board could have no objection to a local authority deciding to leave any matter it chose unregulated, even where the Public Health Amendment Act of 1890 was in force (46). And beyond the by-laws, towns could, and still did, continue to seek and obtain their own local acts, often at variance with the standards of the more universal by-laws.

An analysis of 75 Midland towns made at the turn of the century may be taken to reveal a typical cross section:

Towns governed by by-laws made before 1877 = 13

Towns governed by by-laws made after 1877, but before 1890 = 19

Towns governed by by-laws made under the Public Health Amendment Act 1890 = 15

Towns governed by by-laws made after 1890, but only under the 1875 P. Health Act = 7

Towns governed by by-laws made after 1890, and supplemented by local acts = 4

Towns where the by-laws were under revision = 16

Town with by-laws made in 1881, but not officially sanctioned = 1 (47).

Examples may also be drawn from around the country to illustrate the wide range of standards and the picture of confusion, contradiction and

chaos which seemed to exist almost universally.

Kirkheaton had virtually no controls at all. Dr. Barry's report on his findings there to the Local Government Board in 1891 revealed a complete lack of regulations. "As a result of this enquiry", he wrote, "it is evident that the 29 or 30 years jurisdiction by the Local Board of Kirkheaton has been of little profit to the district" (48). One wonders what profit it might have been to the local Board and its associated fraternity!

Many towns maintained out-of-date controls. West Bromwich had by-laws made in 1886 under a local act, by-laws that contained only a dozen clauses, so basic that, ironically, the local Surveyor had no difficulty in implementing them (49). Local Acts still persisted as mentioned above. Leicester had eight local acts controlling building, some of which dated back to 1868. Amazingly, one Midland town obtained powers under a new local act in 1883 to allow party walls only $4\frac{1}{2}$ " thick, no traps to drains, and rooms in the roof only 7'0" high - thereby obtaining from Parliament controls which were less stringent and completely at variance with the standards that the Local Government Board were trying to maintain by its insistence on its own Model By-laws (50). Three examples from the building press of 1896 revealed, for example, that the by-laws of Cardiff, Cambridge and Burnley were all well behind the times (51).

Reluctance to change local by-laws is understandable, particularly when one remembers the power of local vested interests and the suspicion of any interference from London. Rochdale's Building Committee deliberated at length in 1895 whether or not to increase the wall thickness rule from 9"; to adjust the rules for the height of walls so as to accommodate attic bedrooms; and make owners responsible for the upkeep of pavements - but decided in the end that the Town Council would never approve such radical changes (52). Cardiff spent 22 years considering amendments to its own by-laws - the replacement, for example, of the antique rule which required 4 square yards of open space for every 5 square yards that were built upon, by more generous standards, but there was an immediate outcry from the local shopkeepers, concerned as always at the effects on trade and the reduction of sales space and arcades for the shops. One of the new regulations proposed at Cardiff

incidentally gives an example of the control of a local problem. Bad flooding for many years, particularly in the Grangetown area, resulted in a clause being proposed and subsequently approved by the Local Government Board which required houses built on low lying land to be no lower than 25'0" above the Ordnance Datum (53).

The imposition of 'London standards' was strongly resisted at first by the builders of Dartmouth. Their spokesman, Mr. Ditcham, demanded that the Model By-law standards be dropped - the width of streets was, he said, quite unsuitable for a hilly town like Dartmouth and the rules for back-yards were considered to be most repugnant. Many houses in Dartmouth, even in 1896, had no "air space" at the rear. It was impossible to compete with London or even Brighton, maintained Mr. Ditcham. Dartmouth should, he insisted, be left to formulate its own particular by-laws (54). But in this case the Town Council was not so easily swayed. It over-ruled the local objectors and proceeded to adopt the Model By-law standards (55). Resistance to London was also seen at Bury. They would not adopt the Model By-laws because they considered that they already had ample powers under their own local Act and by-laws. But they still needed the approval of the Local Government Board when it came to their request to change the size of the backyard regulations. The Board's architect was unwilling at first to grant their request, but was prepared to concede in the light of the unusually wide street widths in Bury, although he insisted on sending an Inspector down from London to investigate and report. Needless to day, the local Council were far from happy with this interference, as they saw it, in their own business (56). The degree of local variations was often taken to unnecessarily protracted lengths. At Halifax for example, they insisted on their local practice of using wooden gutters rather than the iron preferred by the Local Government Board. Wood, they claimed, lasted longer than iron (sic) and furthermore, if an iron one was broken one would have to replace a whole length, rather than splice in a new timber section. Halifax R.D.C. met the Local Government Board over this major problem - but it was only after they found that the cost difference was minimal that they agreed to accept the ruling for an iron gutter (57).

Relaxations of the by-laws were occasionally made as a result of pressures from industrial expansion, changes in house fashion and a

recognition of the peculiarities of historic areas. Coventry, for example, had a sudden boom in house buildings as a result of the increase in the cycle trade - some 2,000 new houses were built in 1897 - and a relaxation of the by-laws was made there specifically in order to assist that development (58). Scarborough's new by-laws of 1890 mentioned 'cycle houses' incidentally, but more interesting was the Council's adjustment of the by-laws to allow the imported timber sizes then currently available at Hull and Grimsby, to be substituted for the sizes laid down in the Model By-laws. Also, as the semi-detached 'villa' was seen to be on the increase in this seaside town, the Council allowed the 'necessary open space' about houses to be divided between the side and the rear, rather than all either at the rear or the side as before.(59) Open space about buildings was also relaxed at Cambridge in 1890. The Local Government Board agreed there that, when houses hemmed in on the small tight sites in the old part of the town came to be rebuilt, they could now be rebuilt on the same sites with no more open space than before, provided the houses were no higher than the ones they replaced (60).

It was not only the local builders who fell foul of the by-laws - in at least one case a local authority itself found itself in an embarrassing confrontation with its own by-laws. Birmingham, having, it will be recalled, been one of the first to adopt the Model By-laws in 1877, submitted a scheme for its own artizan dwellings at Milk Street to the Local Government Board for approval in 1899. The old requirement for party walls to project above the roof, still valid but almost never insisted on, was not incorporated in the Milk Street scheme. The Local Government Board tactfully advised Birmingham to revise its by-laws quickly before resubmitting their Milk Street scheme. (The Corporation also had found that its by-law wall thickness requirements were making the scheme almost prohibitively expensive (61).) New by-laws were therefore hastily prepared and approved, domestic party walls now being legally allowed to rise only as far as the underside of the slates, and the Milk Street scheme duly received the Board's blessing (62).

Examples of local initiative or standards higher than the Model By-laws are, not surprisingly, more difficult to trace. One may note a strong personality carrying a convincing argument against the reactionary

forces of a local council - such as Mr. J.W. Brown, the Engineer at West Hartlepool, a strong supporter of the water borne sewerage system, who required every new house to have a water closet in 1892 (and a covered galvanised dustbin which was to be emptied weekly) (63). Contradictions appeared to exist within one town. There was Leeds in 1896 with 1681 houses built, of which 1229 were still on the back-to-back principle (64), yet the following year it reviewed its by-laws, took its main street widths up to 42'0", included timber regulations and generally updated its standards of construction (65). A year later the Building Clauses Committee there was showing commendable enlightenment when it reported that it was considering advice from experts in the engineering trade to assist them in formulating "modern structural requirements of the engineering shops" (66).

Such examples as these selected here show the variety which existed in formulation and interpretation of the local by-laws throughout the country. When we turn to the type of cases coming before the courts, the range of devious devices employed by the more unscrupulous builder begins to make the case for by-law control all the more tenable.

To build a glass conservatory, which was not covered by the by-laws, and then to replace it with brick walls and change its function to, say, a bedroom, was a typical ruse - as one builder in Hastings attempted in 1890. The Magistrate actually dismissed the case, and it was only on appeal to the Queen's Bench Division that the judgment was, rightly, reversed. The fact that the erection was of the same dimensions as the earlier conservatory did not make it a replacement but an addition to an existing building (67). Buildings on wheels, as we have seen before, were often a test. Mr. Hopkins' photographic studio, trundling all of 3'6" on a track, was held to be a building (68), but tramcars, minus their tracks, were more difficult to decide. Mr. Nuttall of Walkley, Sheffield, received a fine of only two shillings as the Magistrate decided his tramcar was a building, but felt some sympathy for the unfortunate Nuttall (69). Not only was there a problem in defining a building, but there was also a problem in defining suitable materials for the walls of a building. Corrugated iron was now cheap and readily available. The Sanatorium at Bedale School saw fit to use it on a timber frame, but to Cuckfield R.D.C. it was not

'brick, stone or other hard and incombustible material', and the frame being of timber was readily seen to be combustible. The Learned Counsel decided that a wall was 'something that would stand by itself' and as a sheet of corrugated iron clearly could not do that, the offence was upheld. The Plaintiff unwisely persisted in his plea - "what if the wooden posts were taken out and iron ones substituted?" but the Lord Chief Justice tartly retorted "we have answered one conundrum and we don't want another propounded to us just now. You must be satisfied for the present with the answer you have got" (70). By-law case decisions were not the most popular of cases amongst the legal profession.

The 'jerry builder' was a frequent visitor to the courts. "I shall build no more after this lot" stormed the builder of houses in Sharrow Lane, Sheffield, as he left the box, convicted of using horse manure for mortar (71), and surely Mr. Cleland's technique of building at New Chester Road, Birkenhead, with no footings, no damp proof course and no outlets from untrapped drains justified his conviction (72). Eloi Poggio, building inspector at Willesden, decided to cut a hole in Mr Denman's houses - and found only a layer of rags, bones, crockery and vegetable refuse. "The inspector only picked the rubbish out" pleaded Denman. "There should be no rubbish there" retorted the Magistrate and fined Denman £3 (73). Edwin Airey, in Birmingham, claimed to be "born a plumber", but was not slow to cover up his drainage work, the evidence of whose faults brought him a heavy fine when they were revealed, and his case was not helped by the fact that he "gave his evidence in such a loose manner" that he was ordered to leave the box by the Bench (74).

There was also a wide range in the knowledge and understanding of the function and technique associated with a regulation. Take the damp proof course, for example: for Alderman Wray of Barnsley the need for a damp proof course in an internal wall was "a practice quite unheard of" (75). On the other hand a builder in Edmonton wanted to use felt as a damp proof course, a not altogether unreasonable suggestion on the face of it, and it generated quite a lengthy debate with evidence coming from a number of expert sources. In the end it was decided that it would not be impervious to moisture and the builder lost his case (76).

Ventilation and room heights were a further source of contention. Rooms in the roof, being in reality little more than boxrooms, with no ventilation, no fireplace and a low ceiling were often let illegally for habitation. Mr. Blakeman, builder of houses in Queen's Road, Coventry, was fined for allowing a tenant to have a bed in one of just such a 'boxroom' as these (77). More significant perhaps, because it was one of the earliest conflicts between the 'landed proprietors' and the rural by-laws, mentioned in the preceding section, was the case of the Marquis of Hertford in 1899. The 'sleeping rooms' in his addition to Hunsell's Farm near Stratford-on-Avon were only 7'0" high, 2'0" below the by-law requirement. The Bench, after much embarrassed discussion, escaped a direct confrontation with the Marquis by fortunately finding a loophole which determined that the addition was to an old building and not a new one, and the case could therefore be dismissed (78). Such an exalted personage could survive with little trouble and some influence, but we shall meet less fortunate cases later on. (see page 472)

The rigid insistence of the almost inflexible by-laws produced the now familiar pattern of 'by-law' housing, by controlling street widths and the space about buildings. This was appreciated even at the time. Dr. Poore, for example, wrote to 'The Times' in 1898 complaining of overcrowding, and noted "the speculative builder naturally takes them [the by-laws] for his model, with the result that the country is quickly covered with a grid iron pattern of stuccoed slums, while gardens in any proper sense cease to exist." (79). Again in 'The Lancet', Poore noted that the builder simply followed the line of the sewer provided by the local authority, and as for open space "we have engendered a stingy habit of mind towards the question of open space round houses which almost amounts to a national insanity" (80).

In the provinces the controls on open space about buildings were more rigid in their application than in London. A small building on the corner of a triangular site, for example, surrounded by roads and ample light and air, could not be sensibly rebuilt without sacrificing most of the site to the open space required by the by-laws. Yet in London, where there were discretionary powers to consider the exceptional case, such a building could be rebuilt identically (81). As an example of the strict enforcement of the by-laws, we may consider the

case at Bawtry in 1899. The officials insisted that the backyard should be literally at the back of the house. With a plot 88'0" x 15'0" (see plan with note 82), the architects arranged the internal plan of a new house to give the 'front' door onto the narrow frontage and thereby the necessary yard for the open space at the 'back' of the building. The local officials insisted however that the front in this case was the long frontage and that to obtain the necessary open space at the 'rear', the client be advised to buy more land from the adjacent hotel. The lengthy battle which ensued resulted in a just victory for the client - but it showed clearly the inordinate lengths a local authority would go to to defend its own rigid interpretation of its own by-laws (82).

If it saw fit, a local authority could apparently decide to call its own tune. Wimbledon Local Board determined that an addition to an old building (which filled an open space) was not a new building (83). Although Wimbledon had a by-law based on the Model set requiring that no alteration should be made to diminish the area of open space, Wimbledon's Town Clerk insisted that this referred to new buildings only (84). It caused a storm of acrimonious correspondence in 'The Builder' (85). London itself controlled both new buildings and additions to old ones in this respect. The Local Government Board refused to intervene or comment. It was all too much for Mr. Jackson who had originally raised the matter. What was the point, he asked, if a local authority did not exercise proper controls and protect the interests of the public by means of its by-laws? (86) It looked to him very much as though an 'addition', after some unspecified time known only to the local authority, could transform itself into a 'new' building. "So that after all, we come to this - that it rests with the Board to interfere or not pretty much as it pleases" (87). But there was more to this than met the eye. If the building was exempt, why did the applicant bother to submit plans, and why did the Board receive and consider them? Further, the applicant was himself none other than the Chairman of the Local Board, and a builder into the bargain (88). What more crushing evidence of possible corruption, influence and power in local affairs could be needed?

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Pressures for change 1902-1914

The appearance of the Model Rural Building By-laws, and the issue of the admonishing circulars from the Local Government Board, had little impact on the rural authorities and did little to solve the problem of providing cheap labourers' cottages. As Major Rash, M.P. for Chelmsford, learnt in reply to his question in the House of Commons, the responsibility for determining what by-laws, if any, to make rested entirely with the local councils (89). The Councils had to take the initiative - and the legislation was still only permissive.

It was true that many Councils lacked adequate staff to administer by-laws, yet on the other hand it was noted that "some sanitary authorities seem to make it a point of honour to sustain their by-laws, if once passed, against all objections raised by building owners and even against the recommendations of the Local Government Board themselves, as though any criticism of them were a reflection upon their own perspicacity" (90). In spite of this attitude, the Model By-laws were being constantly amended, albeit in only a succession of minor and unofficial amendments (these are summarized in Table 18). Visually, however, the results of the by-laws were often disastrous: "in some absolutely pastoral districts are now to be seen rows of cottages suitable only to congested mining districts" (91). Guy Dawber, in his Presidential address to the R.I.B.A. in 1904 was eloquent on the theme:

"these by-laws ... are killing the last lingering country crafts still in use ... the poorest peasant - his antique smock has been discarded for the cheap tweed suit, his wooden clogs for ready made boots ... his cottage too is changed and is built now in depressing rows after the ugly model laid down by the Local Government Board; the open hearth has given way to the stove, the red tiled floor to linoleum and old fashioned lattice casements to sash windows and coloured glass - all things that doubtless conduce to his material advantage but certainly to the great loss of picturesque effect" (92).

The section of society most affected were the 'landed proprietors' and not surprisingly they formed the core of a new body called the building by-law Reform Association (93). Founded by Sir William Chance in December 1902, its membership was heavily laden with the upper circles of society, yet its subscription of half a guinea did not deter lesser mortals, such as Pomeroy, Till, Henman, Poore, Ridge and Shallcross, whose names appear elsewhere in this work. Another name to catch the architectural eye within this early membership was that of Lutyens (94);

later the name of C.F. A.Voysey was to be added to the membership list. The aims of the new association were to promote new model rural by-laws, to promote them in the country areas, to update the urban by-laws, to secure a method of appeal to the Local Government Board and to generally assist those oppressed by the by-laws. The Association immediately set about its business with enthusiasm, establishing^a committee and canvassing opinion and evidence from a wide range of sources throughout the country (95). But the upper classes tended to dominate : the Duke of Westminster claimed that the by-laws "caused great hardship of the rich" and "that there should be no interference with a private individual who erected private property upon his estate"; Lord Hylton had seen "the consequent restriction of the erection of labourers' cottages" while further down the social scale T.M.Shallcross from Liverpool was becoming increasingly concerned that the urban problems were not receiving equal attention (96), and W.Henman, from Birmingham, soon resigned completely when he saw that only amendments were going to be devised, not a fundamental attack on the basic defective principles of the by-laws as he saw them.

It is worth looking more closely at Henman's theories because they reflect a remarkably sharp criticism whose validity is perhaps relevant today. He considered that the by-laws were wrong because they dictated what is to be done, before any actual requirements had been ascertained. It would be better, he felt, to decide what was detrimental to health and safety, and then to define what shall not be done. This was in effect the principle of Common Law - it did not say that everyone should do this or that for the public good, but when any act was seen to be prejudicial, the law then required that such act should not be done. In building, for example, a wall should not, maintained Henman, be a certain thickness simply because of its height and length set by the by-law before the function of that wall had been ascertained. Rather, the wall should be adequate, proved by scientific means, for the function it had to perform in a particular building:

"The latter is, I venture to say, the correct principle on which all building by-laws ought to be framed, and no mere tinkering with the wording of existing by-laws will ever make them satisfactory or serviceable in the interests of the community. In the existing forms there are hard and fast rules which are frequently inapplicable to particular cases. Architectural Art is stifled, scientific methods of construction are depreciated, invention is stultified and the employment of useful materials is barred". (97)

Another aspect of reform, and a premonition of what has only recently been accepted, was given by T.M. Shallcross: "Instead of futilely attempting to specify before in a positive manner the actual materials and methods of construction ... which are unknown in the future, it would be better to change the principle". Tabulate and analyse the existing by-laws, identify their underlying principles, which would then be universally applied as general principles, and then let the existing by-laws act as a "schedule of acceptable solutions" (in other words, what we would call today the 'deemed-to-satisfy' clauses). A Tribunal of Appeal would also be set up to sanction new methods and materials. Function should be made a stronger determinant in setting standards - street widths should be related not to their length but to their use, or open space should be related to the location and grouping of adjacent buildings, for example. All this was proposed and set out by Shallcross in 1905 (98).

The Building By-law Reform Association drafted its own Bill in 1904. It was short - it was felt that it stood more chance of being carried if it only had a minimum number of points - and it contained essentially two main proposals (99). First, that houses outside a town, provided they had sufficient open space all round them, should be free from all structural (though not sanitary) regulations. (The London Building Act of 1894 exempted all buildings which had 30'0" of open space around them); secondly, that ^{the} Local Government Board should have power to recall or substitute oppressive by-laws (there was a precedent, claimed Sir William Chance, in the exemption procedure granted by the Board to local Boards of Guardians in the administration of the Poor Relief (100).)

Lacy Ridge took the Association's Bill, with approval, to the R.I.B.A. and vehemently attacked the whole by-law system:

"Now these by-laws, founded originally on the London Building Act, in itself a piece of panic legislation, reinforced by the suggestions of theories and faddists, extended recklessly from urban to rural districts, enforced by officials unfit or unwilling to put any but the narrowest interpretation upon them, in the hands of local authorities who receive their instructions from the Local Government Board, who in their turn repudiate the responsibility, and regarded on all hands as binding to the letter, constitute a petty tyranny of a class to which hitherto Englishmen have not submitted themselves" (101).

Ridge's own suggestions, of a mere half dozen by-laws for the country, included a building line 20'0" from the centre of the road to allow,

as he said, for increases in traffic ("and buildings jutting out into the road are often an eyesore in country districts"), open space the same area as the building, site concrete under a house, a ventilated w.c. lobby, a privy 15'0" from the house, and ventilation to waste pipes before they entered the drain (102).

As the Building By-law Reform Association's Bill set off on its course through the House of Lords in 1905, questions were put before the President and Secretary of the Local Government Board in the Commons. What effect were the by-laws having on cottage construction? The President, Walter Long, was "still studying the matter", but at least an official return had been ordered to show the extent of their operation (103). "What action is being taken? Are the rules more stringent than in London?" The Secretary, G.W. Balfour, "could not say" (104), but at the end of March 1905 he told the House that the subject was receiving his attention, although he could not compel the withdrawal of any existing by-law or issue any new building regulations in their place (105).

The favourable reception given to the Cheap Cottages Exhibition at Letchworth Garden City in July 1905 again led to Balfour being questioned. 'The Times' had mentioned in a leading article that month that several of the cottages could not be built everywhere because of by-law restrictions on timber walls and the size of rooms in the roof (106), and Balfour promised to arrange for an official at the Local Government Board to visit the Exhibition and report (107), but nothing was heard of his findings.

The Bill itself came before the Lords for its second reading in May, under the championship of Lord Hylton. The small scale and low key tone of the Bill were emphasised. As a salutary reminder of the need to consider the Bill carefully however, their Lordships were reminded of the fact that when the building clauses had come with the Public Health Bill in 1875, no opposition had been expressed, except from the Duke of Somerset who had expressed the fear, now vindicated, that the building clauses might prove to be of a "harrassing nature" (108). Now the Surveyors' Institution had protested in January 1905 (109) the National Housing Reform Council in April, Mr. Macdona in the other House had been unable to re-erect his 'artistic villas' (villas he had

just bought from the Paris Exhibition) in Lancashire, a county renowned for its half-timbered buildings (110). Then there was Mr. Blunt, whose iron cottages (painted green and held by their designer to be "not ugly") had had to succumb to the rules of East Grinstead R.D.C. (111), and above all there was always the unfortunate case of Mr. Justice Grantham - the details of whose case we must defer to a little later in this chapter (see p.472) (112). In the face of such evidence the Bill was approved and referred to a Select Committee, who in turn confirmed the by now well-known fact that the by-laws were indeed stringent (113), and the third reading took place in August 1905. But it moved no further due to the resignation of A.J. Balfour's Conservative Government at the end of the Autumn. Its course was resumed in the Lords the following year, but we must pause to consider the opinions forming outside Parliament before returning to follow its progress. Taking the year 1905 we may select a number of opinions both for and against the by-laws.

W.A. Casson, Editor of Knight's Annotated Model By-laws, and having been in charge of the by-law confirming department at the Local Government Board for 15 years, not unnaturally found little at fault. "The by-laws" he said, "were not such terrible things as they were made out to be" (114). Dr. Parsons, the Board's Medical Officer claimed that there had been a great improvement in cottage building over 30 years, and Brooke-Kitchen, now the Board's architect following the death of P. Gordon Smith, considered that the by-laws "had a good effect on the construction of villas, I think it has raised the standard of building very much indeed" (115). Some organisations, such as the Rural Housing and Sanitary Association (116) and the National Workmen's Housing Association wanted more control, not less, the latter even sending a deputation to the Local Government Board saying that the by-laws were "absolutely necessary" (117), and a local rural district surveyor suggested at a Sanitary Inspectors' Association meeting that by-laws, the same for both urban and rural areas, should be made to apply universally (118). Indeed, the call for a Universal Building Act was heard again (119) though many seemed to prefer the extension of the London Acts as a model (120).

The cry against the by-laws was, of course, a good popular theme for the newspapers and was readily taken up by them (121). One such cry

came from the 'Southampton Observer and Hampshire News' who, led by the pen of a local architect, R.M. Lucas, attacked, not without cause, the 117 unreasonable by-laws operated by the South Stoneham R.D.C. Lucas's bitter criticisms later re-appeared as a pamphlet entitled 'Anti-Building By-laws, Suggestions for Reform'. "The by-laws," he said, "have reduced the splendid type of 17th or 18th century cottage, with its thick walls ... to a miserable thin walled brick box with a slate lid, as Ruskin called it, made generally to a stock pattern, because any departure in design or material are apt to lead to wearisome explanations to a garrulous committee or to an official, who, in some cases, at least, combines the qualifications of a coster with the authority of a censor" (122).

Lucas's reforms centred on the idea of a 'schedule of instructions' to intending builders' being issued by the local council to every builder, who could ask for specialist advice if he needed it, but who otherwise was to be left alone until he had finished his building. The Surveyor was then to inspect it, and to issue a Certificate of Merit if the result met with his approval - or of Demerit, if it did not. This Certificate would be prominently and permanently displayed in the building for all to see - an attractive idea, but rather naive and open to considerable abuse.

'The Times' received letters equally, if not more, devastating. One writer blamed the by-laws for the lack of morals and physical health in the country. People, he felt, were becoming brutal, selfish and demented beings (his words), physically inferior for the Army and Navy. Germany was now the Model. Germany was, he reported, setting the highest standards in planning towns. The Local Government Board should send its officers to Germany at once. And with an appropriately dramatic flourish, he concluded his letter with the words:

"Is it not far better to stop building altogether than let it continue under the present conditions, at a high cost to the rates present and future, at an expense of pain and suffering, at a loss of the appreciation of beauty and morals and a sacrifice of those Imperial instincts that have made us the greatest Empire the world has yet seen?" (123)

Such was the mighty influence of the poor by-law, at least in one person's eyes. But the reference to Germany was very much to the point, for their work in town planning was already capturing the English imagination. The towns there were operating on a scale of both planning and building houses within an organisational framework which England sadly lacked, with the Germans purchasing land in anticipation of suburban growth and planning to regulate that growth as it occurred.

All this belongs to the history of town planning, which we are not to explore here again to any depth, but, as its example spread to this country it served to throw the inadequacies of the by-laws into sharper contrast. A deputation of housing associations asked the Local Government Board to prepare new by-laws for greater street widths, for more open space at the front and rear of houses - all, as they said, on the lines of Mr. Cadbury's model village at Bournville. G.W. Balfour, however, whilst saying that the Board had no objection to local authorities introducing these measures, added guardedly: "regard must be had to questions of reasonableness and cost" (124).

The Municipal and County Engineers prepared a revised model code themselves in 1905, to lessen the restrictions and to lower the cost of building. They included all the relaxations already proposed - half timber, corrugated iron, and the thickness of walls but added as a recognition of new advances in building, reinforced concrete and iron or steel frames with a fire resistant covering of cement or plaster (125). All that emerged from the Local Government Board's offices however was the Intermediate Set of Model By-laws (see Table 19), where certain modifications for wall thicknesses and for wooden walls were in fact made, though the principal object of these by-laws was to cater for rural places who saw themselves in the process of becoming more urban in the immediate future. They were also later found to be useful in districts technically urban but essentially low density and residential in character, and also for industrial boroughs which had a quantity of factory building. This was because this model allowed them to ask for factory plans, the benefit being that the authority could then accurately assess the amount of drainage likely to enter their main sewers. Finally, the Board wrote to all rural districts in January 1906, asking them to review their by-laws, to amend the urban by-laws and to substitute the rural model if possible (126).

The Board's circular received rather scant attention, as Lord Hylton reported to the Lords when he reintroduced his Bill on 22 March 1906 (127). In most cases this was, as he said, because there were, on the local councils, men to whom it was a positive advantage to retain the complex by-laws, as they were all "grist to the mill" of "certain interested parties". Had not the Clerk of the East Grinstead Council said that a new code would make building easier and cheaper "and that

would be very hard on people who had invested money under the old code" (128). The Bill passed all its stages in the Lords, was read for the first time in the Commons in November, but got no further due to disagreements with the local councils and the general pressure of government business (129). There were in fact a number of bills lost that year because of the antagonism between the Lords and Campbell Bannerman's Liberal Government. The two main points of this abortive Bill were first, that it exempted buildings if they were surrounded by sufficient open space, and secondly, that there was to be a new method of appeal, and local authorities could override their own by-laws if they were "manifestly impracticable". It would have been compulsory in all rural areas; semi-detached cottages were to count as one building if they had a proper party wall; and the provision for exemption if a building was surrounded by sufficient open space, was to be extended to urban areas.

More success attended the Government's own Public Health Bill of 1907. Introduced in February, it was law by August as the Public Health Act (Amendment) Act. By this a further fragment of building legislation was added to the already long and complicated list. Clause 24 extended the powers to enable a local authority to control the chimneys of buildings, the height of buildings and the structure of factory chimney shafts - this latter being a direct influence from the London Building Act of 1894 (see Table 20). Further detailed regulations were added to control the paving of yards, temporary buildings, and there were clauses aimed at preventing alterations being made to the entrances to courts which would result in them being narrowed or built over.

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The By-laws in Practice. Regional Variations and Case Studies 1901-1914

Complication, contradiction and confusion characterise the formation and operation of the local building by-laws in this final period. From the variety available, a selection is made to show the extent of the range.

The economic considerations and malpractices of the speculative builder were inevitably still to the fore. Local builders in Swansea

complained that the requirement for $13\frac{1}{2}$ " walls was stopping economical house building - there was no such restriction in neighbouring Cardiff or Bristol, nor in the larger cities of Birmingham or Liverpool, so why should Swansea be made to suffer? (130). Pudsey, on the other hand, deliberately framed its by-laws in 1905 to make it easier for the builders to erect economical houses, by reducing the height of rooms from 9'0" to 8'0" and by relaxing the controls on timber sizes, but even so they could not successfully encourage the 'scullery-houses', a type that Leeds was still building in sufficient quantities to encourage local people in Pudsey to move to Leeds and to the cheaper rents there (131). Equally, the Council at Lincoln, whose by-laws even the Mayor called "antique", was quite prepared to allow $4\frac{1}{2}$ " brick walls to the sides of tunnel passages "since it could mean more rent for the working man if 9" walls were insisted on" (132). And the shopkeepers of Plymouth bewailed the fact that open space had to be provided at the rear of shops, depriving them of valuable sales and storage space. Rather than lose up to one third of the site with open space on rebuilding, the Plymouth shopkeeper preferred to patch up his existing building (133).

Plymouth's by-laws seemed particularly severe - a room 9'0" high in all habitable rooms meant mansard roofs to ensure any reasonable use of the roof space - but geographical factors also played a part, the steep hills of that town having a devastating effect on street layouts which lacked any gradient controls, and which produced difficult slopes in streets laid at right angles to the contours (134). The same problem was noted in Abersychan, where the narrow Welsh valleys and wide by-law street widths also were reported to have effected the availability of good building land (135). If those streets were considered to be too wide, in other areas 36'0" was considered to be too narrow for "modern traffic", particularly in urban areas with the increasing use of tramways (136). Liverpool, in its Corporation Act of 1902 (137), took the width of its main approach roads up from 36'0" to 80'0" (138); Manchester in 1907 made its main roads 50'0" wide; and Oldham in 1909 set all buildings alongside the main approach roads 40'0" back from the centre of the road (140). Some local conditions could never have been anticipated from the distant Metropolis : Burnley, for example, brought in new regulations for intersecting streets in 1908, owing to "special and peculiar circumstances existing in Burnley with regard to

loom-making foundaries, weaving sheds and other manufactureries" (141).

Yet some towns displayed signs of tolerance and leniency. Hastings allowed cavity walls, half timber and tile hanging in its by-laws of 1904 (142); Birmingham likewise, in 1909, with the addition of regulations for steel and iron frames and an increase in the size of open space about buildings up to 300 sq.yards (143), no doubt under the influence of Cadbury, Nettlefold and T.C.Horsfall's enthusiastic reports from Germany. The pressure of a growing seaside holiday industry induced Littlehampton to relax its by-laws in 1904, to allow garrets to be built in small houses without requiring an extra thickness for the lower walls - "to benefit the tenants of small houses who required all the rooms they could get during the season" (144). Billericay, admittedly after some "pressure" from the Local Government Board, relaxed its by-laws sufficiently to allow a Mr. J.Good to erect an experimental Australian dwelling, adapted to this country's needs by a system of pile foundations (no other details are available), which would "go a long way to solve the problem of cheap workmens' houses in the area" (145). But concessions such as these were rare and the by-laws were generally firmly maintained. Why else would one local Surveyor write to 'The Builder', in 1906, desparately asking if anyone knew of any Borough Council which had had its by-laws rescinded with Local Government Board approval, or which had been allowed to adopt less stringent by-laws? His own town wanted to repeal or alter its by-laws "because they have stultified all building operations for ten years" (146).

Bad drafting of by-laws was not unknown. Angry debate ensued in the Council chamber at Darlington when it was revealed that their by-laws were not defined with enough precision to make the building of back-to-back houses illegal (147). In the same year, 1902, Manchester referred its new by-laws back to its drafting committee since they contained, as one councillor put it "fossilized ideas and elementary notions" (148). But to stay with Manchester for a moment, a number of new ideas were to be introduced into its by-laws five years later: a density control on cottages of 24 per acre (149); the wider street widths mentioned earlier; stair treads and riser at 9" and 8" respectively; ventilation to stairs and an increase in the amount of open space around houses to 250 sq.ft.(150). This latter clause was duly copied by neighbouring Gorton in the same year (151), copying being a

feature we have seen before in the same area many years before (see page 128). The following year Manchester banned all blind alleys, requiring now all passages to lead to main streets; specified that blocks of houses should contain no more than 10 dwellings "to avoid long monotonous rows", (an obvious influence from the ideas of the town planning and Garden City movement); handrails to stairs and a real curiosity, which in the event was not approved by the Local Government Board since they were not permanent fixtures - the provision of fire-guards around domestic hearths (152).

The regulation of room areas had been proposed by Manchester in 1902 - Liverpool still had such controls under its own local act - but the Local Government Board were not in a position to authorize them in the form of by-law controls (153). By 1906, however, Levenshulme was proposing just such a by-law (154), as was Widnes in 1908 (155), though Oldham in its Corporation Bill of 1909 found its proposals refused by a select Committee of the House of Commons (156). The one consistent feature in all these proposals was that the only ones to come through were those contained in the form of local acts. The range of areas contained in the local bills proposed in 1913, for example, varied from 115 sq. ft. for living rooms at Aberystwyth to 132 sq. ft. at Morley, then in contradiction, from 60 sq. ft. for the minimum size of a habitable room at Morley to 90 sq. ft. at Aberystwyth (157). Many such local acts were passed at this time - and many continue to be valid to the present day (158). The local act was a persistent feature - the Manchester Improvement Act of 1845, section 40, regulated the level of the ground floor of new dwellings. It was still valid in 1967 (159).

There was a degree of influence emanating from the London Building Acts which permeated through to some provincial towns, particularly the controls on fire matters. Keighley's Local Act of 1908, for example, called for fire-resisting material in all public buildings over 50,000 cu. ft., with the timbers for stairs specified as oak, jarrah, teak or kari; other structural timbers to be protected by 2" of plaster, and enclosed shafts provided for staircases (160). Oldham proposed fire escapes for buildings over 35'0" high (161), as did Widnes (162) and Skegness (163).

Closer to London were the expanding suburbs on its periphery, outside

the range of the London Building Act, and having in most cases local by-laws based on the Model By-laws. London kept a watchful eye over these boroughs, anxious to ensure that their regulations were sufficient "to prevent slums being built round London" (164), no doubt in expectation of a future expansion of 'the great wen.' At the 1900 conference on 'Houses for the Working Classes' at The Sanitary Institute, the Chairman, R.M. Beachcroft, considered that it was "time the London Building Act was made applicable to districts say within 20 miles of London" (165). The R.I.B.A. likewise, in its annual report of 1903-4, reported that it had drawn the Local Government Board's attention to the desirability of maintaining uniformity in the local building by-laws (some 29 areas in fact had such by-laws), and suggested that the Board withheld sanction from any new by-laws which would prove more onerous than the London Building Act (166). The London Act itself did not extend, for - in one district at least, Penge - it retreated. Penge ceased to come under the London Building Act on 21 January 1902, and formed its own code of building by-laws on the basis of the 1877 Model By-laws (167).

Whilst the majority of complaints about by-laws in rural areas were the result of the adoption of urban standards, unsuitable to country districts, there was also, to a lesser extent, an opposite side to the coin. Chester-le-Street, for example, was a rapidly expanding urban area in 1905, yet it still retained its rural by-laws, much to the distress of Dr. Hill, the Medical Officer of Health for Durham. Even he was prepared however, to admit some relaxation of standards (two of them, site concrete cover and adequate room heights, had both been cherished requirements of the medical world for many years), simply for the sake of economy in building (168). Health took a second place to financial speculation. Hayfield, in the Derbyshire Peak, was experiencing the invasion of bungalow builders from both Sheffield and Manchester in 1905 - builders who would not conform to the standards of the local by-laws, over wall construction in particular. Yet the Local Government Board refused to allow Hayfield any discretion in this matter, but was prepared to offer alternative model clauses for wall construction for small houses (169).

Finally, what of Liverpool, the pace setter of the 1840's and 1880's? Their regulations were again slipping behind the times, their Act of

1902 for example, still maintained the setting back of timber from the external face of the wall by $4\frac{1}{2}$ " (170), a rule which London had seen fit to abolish eight years earlier. And yet the Corporation in Liverpool were prepared to allow a building with two storeys of glass, covering 3,600 sq.ft., without brick walls, and the glass 3" proud of the external face, so the contemporary description records (171). T. Myddleton Shallcross was Liverpool's most vehement critic of its positive by-laws. Whilst the rounding and splaying of corners, the removal of posts supporting pavement awnings at the kerb (a vestige of the 18th century street improvements), and the provision of wider streets were all acknowledging the growing pressure of town planning ideas, the building construction matters were less advanced. Footings unrelated to the nature of the foundation, illogical timber joist sizes and unreasonable sizes for flues were some of Shallcross's complaints (172). Rigid application of illogical by-laws, such as those requiring the fixing of superfluous timbers in order to conform with a uniform interpretation of the regulations, was apparently a characteristic of Liverpool at this time (173). It was, as Shallcross said, all "straining at gnats and swallowing of camels" (174).

Perhaps the ultimate proof of the inadequacies of Liverpool's regulations came when the Corporation itself had to relax its own by-laws (by means of section 60 of the 1902 Corporation Act), to allow alternative provisions to be made for air space and ventilation, so that their working class dwellings at The Peoples' Homes, Bevington Bush and Arden Street could be built (175), and again in 1906, when the same clauses were relaxed to enable a disused chapel in Netherfield Road to be converted into a block of labourers' dwellings (176).

By 1907, the local architectural society in Liverpool were calling for more "elastic" by-laws, particularly in order to allow steel and concrete, since they had noted that "rather than face delay, owners abandon new methods of construction and fall back on old ways" (177). The recognition of reinforced concrete came in the General Powers Act of 1908 (178). This Act also repealed the old room size controls of the 1846 Building Act, and now allowed living rooms to be 120 sq.ft., one bedroom 108 sq.ft., the others 95 and 72 sq.ft. Room heights still remained at 9'0", although 8'0" was allowed in rear bedrooms over

sculleries. The same act also moved into the town planning field, just ahead of the national Housing and Town Planning Act of 1909, and introduced controls on the number of houses, their density, road and open space layout (179). This influence of the town planning movement is resumed as a theme a little further on (page 474). Before continuing with that it is necessary to pause and consider a number of significant cases which came before the courts in this period.

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The majority of court cases reported in the building press concerned building in the rural areas. E.D.Till, from Eynsford in Kent, battled unsuccessfully against Dartford R.D.C. who refused to allow him to build timber cottages. Their pre-1901 by-laws "held a brief for the bricklayer" and whilst, as Till insisted on pointing out, the King of Scandinavia could live in a wooden palace, isolated wooden bungalows were prevented in Dartford and in places as far apart as Hampshire and Anglesey (180). Furthermore, as Henry Lovegrove, a London District Surveyor pointed out in support of Till, such isolated small cottages would have been exempt from the regulations in the area of the L.C.C. (181).

Ernest Pomeroy, who, like Till, was also a member of the Building By-law Reform Association, was prevented from erecting a billiard room at Malvern. The building was to have been clad externally with iron and lined internally with matchboarding (182). There was a legal point here, as there was with the similar case of *Salt v. Scott Hall* (where a wooden bungalow built 200 yards from any other building was also prohibited), in that the Justices did have a discretionary power (under section 16 of the Summary Jurisdiction Act of 1879), but which they did not see fit to implement. This power would have enabled them to inflict only a nominal penalty or to dismiss the summons if they saw fit, thereby giving a much sought for degree of elasticity in the interpretation of by-laws. Their refusal to use this facility in what appeared to the building world as a trivial and unreasonable reading of the by-law, caused resentment and an outcry in the building press (183).

The case which caused by far the greatest public interest at this time was that concerning Mr. Justice Grantham. Refused permission by Chailey R.D.C. to build cottages for his own agricultural labourers at

Barcombe, Grantham went ahead and built them, thereby breaking the law which he, as a judge, was bound to uphold (184). When the case reached the Lewes Bench a compromise ruling was arrived at. A part of the plans were satisfactory, and other parts were not - "but it looked from the drawings as if it were intended to conform, but did not, due to a misapprehension". Grantham, who fancied himself as an amateur architect, proudly refused a compromise and threatened to go to a higher court (185). The outcome was altogether unsatisfactory - it said in effect "not guilty, but don't do it again". There was a popular outcry in support of Grantham, but 'The Builder' was rather more cautious : "looking at his drawings" it said "we do not think he should be trusted to build cottages without the authorities' supervision" (186). Lacy Ridge at the R.I.B.A. also remarked, in private to his fellow members, that Grantham's "interest would have been better served by having a proper set of drawings" (187). The cottages were in fact nothing more than a row of single rooms, each room having only one door to the outside air. Chailey R.D.C. had adopted the rural by-laws word for word from the model of the Local Government Board and, to be fair, all they wanted to see were proper plans of what was intended to be built, not Grantham's sketches, which were merely rough instructions to his clerk of works or local builder, who had previously erected a number of similar cottages on his estate (188). In the end Grantham gave way, and by 1905 the cottages had been pulled down, but the damage was done, not to Grantham but to the much maligned image of the rural by-laws (189).

In 1907 a similar case almost occurred when the Duke of Northumberland built some cottages adjacent to his fish hatchery at Barrasford. In the process he fell foul of the by-laws at Hexham, but he stoutly maintained that they were meant for urban areas only. The case was reported in 'The Times', and the local Bench, considering all the "exceptional circumstances", dismissed the case (190). 'The Builder' however thought that the case was similar to that of Salt v. Scott Hall of 1903, and implied that the dismissal of the case was in no small way due to the "exalted position of the defendant" (191).

Finally, the case of King v. Holyhead U.D.C. 1908 raised a matter which was always very close to the architects' prerogative of design skill and copyright. The Judge of the Divisional Court of the King's Bench

decided in this case that it was legitimate for an authority to request drawings of a buildings' elevations (192). The understanding originally was to require elevational drawings simply to help the Council understand the plans more easily, and similar requirements were included in a number of local acts, such as those at Widness and Skegness for example. Seen from the architectural arena, there were perhaps more sinister implications. Belfast's proposal to require elevations showing the height, character and design of the proposed and adjacent buildings had raised objections from the local architects there in 1901 (193), and Royal Tunbridge Wells not only required elevations but, under its by-laws of 1869, asked for and kept duplicate copies, refusing to return them or to give any reasons for rejecting any scheme (194). Presented with that attitude it was not unreasonable for all manner of suspicions to be aroused in the architectural world.

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The history of the Garden City movement, of the ideas of Ebenezer Howard, of Lever and Cadbury, Parker and Unwin, have been already described by a numerous of other writers, and it is not intended to repeat that history here. The German initiative has also been mentioned. Given the more liberal and imaginative concepts of the garden city and of the early town planning movement, their roots were partly embodied in the history of the by-laws as well, but the inherent rigidity of the by-laws soon led inevitably to a series of confrontations and an erosion of the by-law monopoly. Street widths and open space were the main areas of contention, closely followed by wall construction and the aesthetic awareness inherent in the garden city of a vernacular revival, the scale of which was obstructed by the by-law controls on windows and room heights. Hampstead Garden Suburb Trust/^{who}made one of the earliest breakthroughs, (with its own local act of 1906 controlling street widths and the securing of modifications to the Hendon by-laws), allowed a number of architectural features to be realised, including sound proof hollow party walls, half timber and tile hanging, overhang bays, lower ceiling heights, houses designed to 'turn corners' and rooms in the roof at any level (not just on the top floor) (195). Unwin recognised that the by-laws had done some good in preventing overcrowding and bad building, but that they needed now to be operated with a discretionary power from the local authority, and that their

range might have to be extended to include the planning of towns (196). Propaganda from the Garden City Association of 1899 and the National Housing Reform Council of 1900 also urged the Local Government Board to revise its by-laws with regard to open space, lower housing densities, streets and new materials. In fact, the by-laws did not extend in that direction, and entirely new powers were to come through in the first town planning legislation which was linked with working class housing.

The culmination was the Housing and Town Planning Act of 1909 (197), and this provided the first break through the monopoly of control vested in the by-laws. At one level it allowed local authorities, in preparing town planning schemes, to cover many of the matters often not previously held under the by-laws - minimum room sizes, building lines, density, height and character of buildings, numbers of rooms in a house, shopping areas, public open space and areas of natural beauty; and also some which by-laws had controlled, such as building on unsuitable ground and the height of windows in habitable rooms, the control of street widths and habitable cellars - the last being directly under the Public Health Acts (198). Section 43 prohibited at long last back-to-back houses - "notwithstanding anything in any local act or by-law in force in any borough or district", section 44 gave the Local Government Board the initiative to say whether or not by-laws were impeding the construction of working class dwellings (199), and under section 55 (2) the local authority could suspend the by-laws when it was preparing a town planning scheme.

Generally there was a new spirit abroad. The Incorporated Association of Municipal and County Engineers heard Mr. Haynes in 1910 admit that whilst the by-laws had prevented really bad work, they were inelastic, had paid too much attention to detail and had "not got to the root of the matter". This was still difficult for many local surveyors to accept, many having spent a large part of their working life defending and carrying out the strict letter of the by-law. "Co-operation" said Mr. Haynes "is to be the future guiding principle of town development. Can it be applied to the proper and intelligent codification of building regulations and their subsequent administration?" (200)

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In addition to the town planning movement, there was at this final

period of our study, signs of an increasing demands from an advancing building technology and, once again, concern over the building of rural cottages.

School building, taking new ideas from the initiative of Staffordshire's Medical Officer and the Derbyshire's education architect, was breaking new ground, and provides one good example where new building techniques were appearing. North Surrey District School at Annerley for example, designed by Cecil Sharp in 1909, had a steel frame and concrete slab cladding and could only be allowed as a 'temporary building' under the local by-laws (201). The Board of Education Committee Report, on the cost of school building in 1911, unanimously agreed that schools should be exempt from the by-laws, to give freedom for design, the use of new materials and be subject only to the approval of the Board of Education. There was, the Committee said, a need for experiment, and the costs of schools were increased by by-laws requiring "excessively strong walls and floors and extravagant construction", and they referred to the experimental concrete work then being undertaken by the General Post Office in London (202) (and see page 529). The need for by-laws to control reinforced concrete was recognised, and although there was nothing in the existing by-laws to actually prevent reinforced concrete, there was equally no recognition of a more scientific and determinate control of such structures. The Institute of Municipal Engineers called attention to this (203), and the Concrete Institute expressed the hope that the concrete regulations of the L.C.C. (see page 528) would be followed by all local authorities (204). Yet 'The Builder' counselled caution - it was all still "in its infancy", the economics of reinforced concrete work in small building were uncertain and there was, of course, a distinct lack of men trained in this work to act as enforcing officials (205).

The rural cottage building problem had not been eased by the introduction of the rural by-laws. The subject reached the distinguished pages of 'The Architectural Review' in 1906 (206). The Building Bye-law Reform Association continued to meet - it was still drafting amending bills in 1909 (207), but by 1912 the Association had been absorbed into the British Constitutional Association. At its meetings in 1913 the architectural opposition to the by-laws, crippling the fashionable return of the low traditional forms of the English

Vernacular, were championed by C.F.A.Voysey. He gave the by-laws no mercy:

"Were the most cultured and trained architects appointed to frame them? No! The chief in the beginning was a fireman, and a model document was then supplied to the butchers and bakers and candlestick makers of the provinces upon which to base their own regulations" (208).

He continued with an attack on the requirements for high ceilings, on the total disregard for local climate, the requirements for large window areas and "all the mistaken notions about height of rooms and health". His solution was nothing less than the total abolition of the by-laws, and the substitution of one qualified official who would report to his local council whenever a proposed building was likely to be dangerous to the life or liberty of others. If such a building were to be shown to be causing injury, it would be a criminal offence and the owner would be responsible. Such increased responsibility would, he claimed, serve to elevate the status of the owner in ^{the} eyes of the public (209).

Meanwhile, the Local Government Board, responding in part to these pressures, issued another circular to all the local authorities on 29 August 1912 (210). In this they now referred to new methods of construction - concrete, hollow walls and hollow blocks, timber and steel frames, and acknowledged the possibility of road layouts being on 'Garden City' lines. It asked the local authorities to review yet again their by-laws, to ensure that they were not too stringent, particularly in rural areas, and recommended their rural and intermediate models to the attention of the authorities, along with their revised urban model (Table 21).

Back in Parliament, the Bill proposed by Sir Arthur Boscawen in 1911 (211), when it reached the Committee stage in the Commons, revealed that it was now proposed that local authorities could themselves approach the Local Government Board to request a relaxation of the by-laws, if it was seen that they were impeding the construction of working class dwellings, provided sufficient open space and ventilation were still provided. This was because it had become clear that section 44 of the Housing and Town Planning Act of 1909, which only granted such initiative to the Local Government Board and not the local authority, was not working as well as had been expected.

Boscawen's Bill had a long, difficult and ultimately fruitless course

over the next three years. Burns, the President of the Local Government Board at this critical time for these matters of local government, planning and building, maintained a slow, retrogressive attitude which not only retarded the pace of the town planning movement, but also maintained the hold of the by-laws. He was particularly concerned at possible increase in cost in administration (212), and would not agree to any by-law exemptions being granted towards privately financed schemes, even though the schemes for housing and other building by the Boards of Education, Agriculture and the Office of Works could be so exempted. The Bill reappeared in 1913 and again in 1914, still with a proposal to exempt the private builder, provided the Local Government Board passed his plans, but this proposal was now refuted by Herbert Samuel, President of the Local Government Board, on the grounds of its administrative complexity (213). The Government did not agree with the promoters on the main proposals, the Bill collapsed, taking the by-law exemption clause with it, and from the pieces, a Departmental Enquiry was set up to enquire into the whole question of the building by-laws (214).

The Committee's task was "to consider the control at present exercised in England and Wales over the erection of buildings and the construction of streets by means of by-laws and local regulations and their effect on building and development and to make recommendations". Whenever the Government reached an impasse on this difficult question of by-laws, the escape route always seemed to be an official enquiry, as we have seen so often in this history. The twelve man committee included only one architect, Raymond Unwin. 'The Builder' was rightly sceptical - surely more architectural representation was needed "to consider the effect of the by-laws on architecture as a fine art"?(215).

And so the building regulations, in the form of by-laws, were now at their lowest ebb, thoroughly discredited on all sides. In Parliament Herbert Samuels readily agreed that they were restrictive (216), the sanitary world was calling for their reform on town planning lines (217), the Reform Association, through Sir William Chance at the British Constitution, was still promoting Bills for their amendment (218), and the building and architectural worlds had reached what was virtually a state of exhaustion (219). At this low point the whole business was overtaken by events of far greater magnitude, and when it

re-surfaced after the Great War in 1918, a new world with very different expectations awaited it - a world which belongs more to the living memory and not to the pages of this history.

This chapter has focussed on the building by-laws themselves, on their growth, their technical content and on their realisation in practice, with examples selected from a range of provincial towns and from a number of the cases coming before the courts.

The overall picture is one of gradual disintegration, not so much in the content of the clauses as in their range of application. Paradoxically, in an attempt to keep pace with an ever-widening sphere of control, the almost desparate succession of rural, intermediate and urban by-laws, as well as with new amendments to the acts, there is no real unification. More and more piecemeal legislation is being added to an already complicated collection of regulations. Why, really, should an amendment to the Public Health Act, passed in 1907, have generated an isolated set of by-laws for factory engine chimney shafts (even if we accept that they were following the similar rules in the London legislation of 1894), when the main powers for all chimney construction were still embodied in the 1875 Public Health Act and translated into the Model By-laws of 1877? And yet with all these additional rules, there were still some alarming gaps in the range of topics covered. The control of columns and beams, for example, was still absent, yet steel and concrete frame structures were on the increase. The control of space about buildings was still only for the free circulation of air - nothing for the benefit of daylight and sunlight, at a time when these topics were assuming a new degree of importance in the ideas of the 'garden city' sponsors. Attempts by the Local Government Board to maintain what little control it had were proving less and less effective, as the response to the admonitions and circulars to the local authorities showed. At the same time, local authorities themselves, newly reformed and less corrupt, were becoming more efficient and accountable. They employed more experts as their officials, and as authorities they grew in stature and importance, although the tension between central and local authority was still apparent. In the face of this disintegration and growing disquiet

over the whole business of by-laws, with questions being asked about their effect on the larger issues of housing and employment, it was perhaps inevitable that there should have been a departmental committee enquiry established in 1914.

The problem of the rural by-laws served to highlight both these and a number of other aspects which have a longer term significance. First there was the influence of the R.I.B.A. with its predominantly London based thinking. With the example of the 1894 London Building Act to its credit, it seems to have maintained its London attitude when it came to proposing by-laws for the rural areas. Secondly, the problem of the rural by-laws served to bring the whole matter of the building by-laws out into full public discussion. The by-laws came under attack in the press, supported by the respected authority of the 'landed gentry'. It was also a time when there were embarrassing problems in the more heavily charged political arena of housing and unemployment, and to some extent the by-laws became a convenient scapegoat. Finally, within the architectural arena, the rural by-laws brought about a confrontation between architectural design and building regulation which was almost inevitable. Architects were involved in a broader scale of operation, and in particular were pursuing the revival of a vernacular style of architecture in a number of country houses. As the urban based by-laws were transposed out into the rural areas the collision was inevitable. To men like Voysey, anticipating a wide range of creativity within the freedom of the vernacular style, the appearance of petty officialdom in the form of the restrictive by-laws was an unwelcome intrusion. The rise of the 'garden city' concept and the early development of town planning must be noted here also. It had a rural and picturesque origin, and it represented a new attitude towards a more sophisticated and positive form of social engineering. Planning was to be more for the long term benefits of society, whilst the building by-laws were to languish as a purely negative device to merely safeguard the public from danger. Furthermore, as it now seemed, the individual could not achieve these basic rights and standards for himself, it was now being accepted that society as a whole, in the form of state intervention, should provide those needs for him on his behalf. The acceptance of town planning was one sign of that new belief.

Within the general development of social history in England there were

a number of significant developments in this period which, whilst not directly related to building regulation, form an important part of their background. They all centre on the emergence of new concepts in social welfare - various benefits in terms of health, housing and education which would be not only for the benefit of the individual, but also for the benefit of society as a whole. The 1880's had seen the formation of much of this new attitude, and the practical effects began to be felt around the turn of the century.

From the 1880's came the Fabian Society, with Shaw and Webb, and there was William Morris's Socialist League - all concerned with the inequality of the social structure and the distribution of wealth. From the 1880's too came the extension of the franchise to the country areas, the reforms in local government, the enquiries into working class housing, a new attitude towards public health in terms of the individual as well as the environment, the beginnings of elementary education for all and the continuation of the collection and unbiased analysis of statistical evidence. It was all leading towards a more humane attitude, a more vital social conscience, and the coming of the welfare state. Charles Booth studied the life and labour in London; Seebohm Rowntree produced a similar study for York. A rise in unemployment presented fresh problems and there were ideas of labour exchange, with examples like that of Canon Barnett for 'farm colonies' to temporarily employ the urban unemployment. (And did not the rural by-laws, as we have seen, stand in the way of temporary and simple accommodation for the agricultural labourer?) There was some support for these ideas from Walter Long at the Local Government Board, and there were further signs as Lloyd George's Liberal government came into power in 1906. All this is part of a much wider subject, and it is impracticable to stray too far into it in this Thesis. But it is not impossible to see how the building by-laws were a part, admittedly a very small part, of this much wider condition and attitude in society. Yet the building by-laws were unfortunately trapped within the tight framework established around them in the nineteenth century, and they were unable to break out and to translate themselves into the new role which the more enlightened and liberal attitude of the early twentieth century demanded. It was town planning, unencumbered by the heavy cloak of nineteenth century restrictive legislation, which overtook and made progress beyond the by-laws.

To complete this history, we must now return to London and study the very different pattern of development which occurred there between 1895 and 1914.

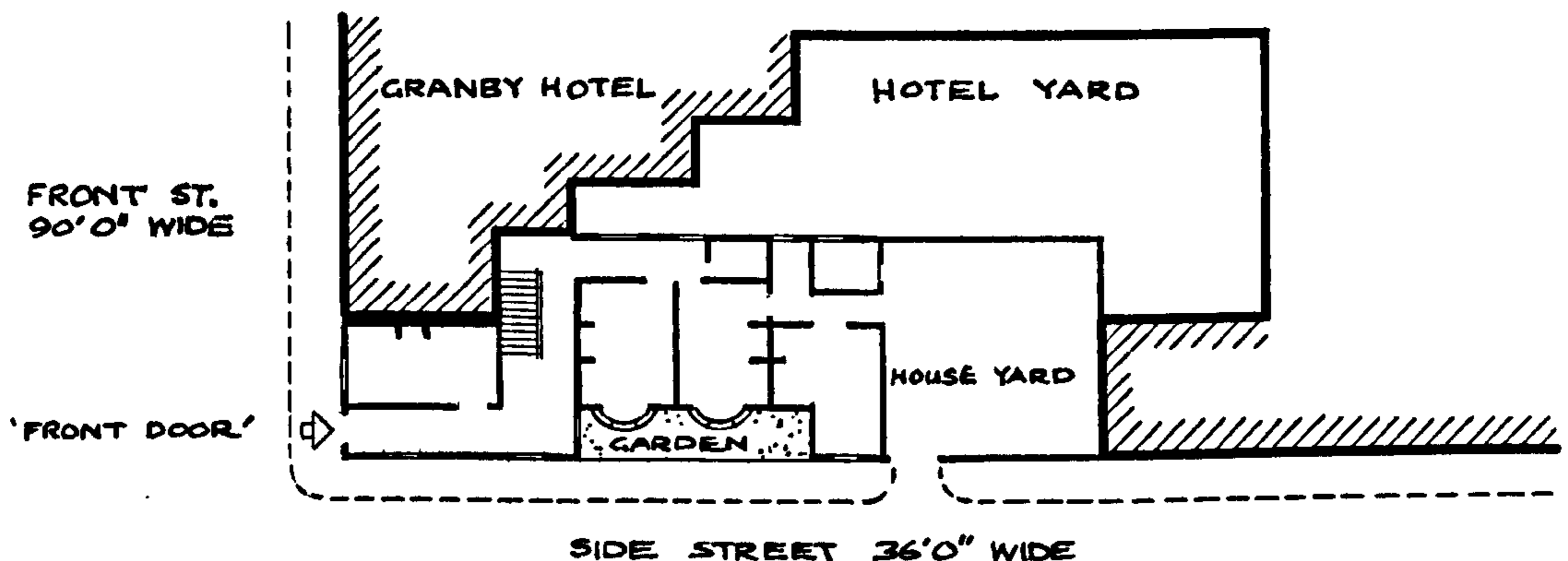
NOTES TO CHAPTER IX

- 1 The term 'model by-law' is here used for both the official Model By-laws issued by the Local Government Board and the unofficial (though almost universally accepted) model by-laws which were incorporated in the various editions of Knight's Annotated Model By-laws. The two do not always coincide. For example W.A.Casson, the barrister in the legal department of the Board, drafted a model by-law for the height of habitable rooms which appeared in the seventh edition of Knight in 1905, page 191. A clause on the same subject did not however appear in the official Model By-laws until 1912. Similarly, model clauses for roof and floor timbers were not in the official model, but the architect to the Local Government Board had drawn up a set which were published, unofficially, in the same edition of Knight in 1905. By-laws were therefore often quite legally made and approved long before they were officially sanctioned by being incorporated in the Local Government Board's official set.
- 2 Knight's Annotated Model By-laws, Seventh edition, 1905, p.190.
- 3 Ibid, p.192. This by-law was not always included by many local authorities and, according to Knight's eight edition, p.134 (1928) it was not to be found in the official model. (as explained in note 1 above).
- 4 Knight, op.cit. 7th edition, 1905, p.193. There was however at least one exception to the rule. Brighton, amending its by-laws in 1898, stipulated that rooms in the roof should have the roof closeboarded and a layer of felt laid above the rafters, under the slating. B.Vol.74 No.2877 26 Mar 1898 p.307.
- 5 This was later confirmed. See 'Proceedings of the Incorporation of Municipal and County Engineers, Vol.XXVIII, 1901-1902, p.156.
- 6 Knight, op.cit., 7th edition, 1905, p.193.
- 7 This point was a constant source of concern. In 1907 it was noted that imported scantlings were not the same size as the by-laws stipulated and the authorisation of variations would lead to delays and to increased costs. A plea was made for some type of formula which could be generally applied - and which could be adapted to iron and steel as well. B. Vol.92 No.3342 23 Feb 1907 p.224.
- 8 Knight, op.cit. 7th edition, 1905, p.202-3.
- 9 B.Vol.62 No.2560 27 Feb 1892 p.154 and Knight, op.cit., 7th edition, 1905, p.191.
- 10 Knight, op.cit., 8th edition, 1928, p.170.
- 11 B.Vol.62 No.2560 27 Feb 1892 p.154.
- 12 The Times, 23 Sept. 1898 p.5 col.f.
- 13 Ibid. 24 Sept 1898 p.10 col.g.
- 14 Ibid. 21 Oct 1898 p.8. col.f.
- 15 Ibid. 4 Oct 1898 p.13, col.c.
- 16 Ibid. 18 Oct 1898 p.14. col.c.
- 17 B.Vol.70 No.2774 4 Apr 1896 p.290.
- 18 The Times, 17 Nov. 1898 p.11 col.d.
- 19 Ibid.
- 20 R.I.B.A. Journal, Vol.VI, No 4, 24 Dec 1898, p.105.
- 21 Ibid.
- 22 Ibid. p.107.
- 23 B.Vol.75 No.2908 29 Oct 1898 p.377.
- 24 R.I.B.A. Journal, Vol.VI, No.6, 28 Jan 1899, p.161.
- 25 The members of the Committee were: S.F. Clarkson, H.O.Cresswell,

- E.G. Dawber, W.M. Fawcett, A.S. Flower, W. Henman, L.W. Ridge, A.E. Sawday, H.D. Searles-Wood, and Professor T. Roger Smith.
- 26 R.I.B.A. Journal, Vol VI, No 6, 28 Jan 1899, p.162.
- 27 B.Vol.76 No.2937 20 May 1899 p.492.
- 28 Ibid. p.495.
- 29 R.I.B.A. Journal, Vol.VI, No.15, 17 June 1899, p.449.
- 30 Ibid. p.450-3.
- 31 R.I.B.A. Journal, Vol. VII, No 1, 11 Nov 1899, p.18.
- 32 As Lacy Ridge noted, but the subject was still kept alive. In June 1900 he gave a talk at the R.I.B.A. entitled 'The Responsibility of Local Authorities in respect of Building By-laws', R.I.B.A. Journal, Vol VII, No 16, 30 June 1900, p.414.
- 33 R.I.B.A. Journal, Vol.VIII, No.6, 26 Jan 1901, p.123.
- 34 Ibid. p 128.
- 35 R.I.B.A. Journal, Vol VIII, No.9, 9 Mar 1901, p.211.
- 36 R.I.B.A. Journal, Vol.VIII, No.10, 23 Mar 1901, p.242-3.
- 37 H.Vol.93 p.948.
- 38 H.Vol.94 p.52.
- 39 H.Vol.96 p.989.
- 40 B.Vol.81 No.3068 23 Nov 1901 p.457.
- 41 R.I.B.A. Journal, Vol.IX, No.2, 23 Nov 1901, p.40.
- 42 B.Vol.83 No.3100 5 July 1902 p.8-10, E.D. Cecil to the Institute of Sanitary Engineers' Congress at Buxton, 17 June 1902.
- 43 Ibid.
- 44 B.Vol.81 No.3069 30 Nov 1901, p.477.
- 45 R.I.B.A. Journal, Vol.IX, No.3, 7 Dec 1901, p.68-70.
- 46 F.C. Cook : "Position of Local Authorities in regard to Building By-laws". Proceedings of the Incorporated Association of Municipal and County Engineers, Vol.XXVIII, 1901-2, p.143.
- 47 Ibid.
- 48 B.Vol.61 No.2549 12 Dec 1891 p.438 (Brownhills also ignored controls on privies, ashpits and cesspools by not adopting all the controlling powers given in the Public Health Act 1875 see B.Vol.63 No.2579 9 July 1892 p.27).
- 49 F.C. Cook, op.cit., p.152.
- 50 Ibid. p.145.
- 51 Cardiff: lacked control over the connection between house drains and the main sewers. B.Vol.71, No.2788 11 July 1896.
Cambridge: "Notoriously behind the age in sanitary and construction practice". Editor of 'The Builder' B.Vol.70 No.2766. 8 Feb 1896 p.107.
Burnley: proposed to increase backyards from 120 to 150 sq ft and to ban wooden walls in buildings B.Vol.71 No.2803 24 Oct 1896 p.342.
- 52 B.Vol.69 No.2741 17 Aug 1895 p.125.
- 53 B.Vol.78 No.2982 31 Mar 1900 p.327.
- 54 B.Vol.70 No.2763 18 Jan 1896 p.61. There seems to have been some reluctance in the South-West generally to the adoption of the model by-law standards. Local builders at Paignton considered them too stringent and pointed out that Plymouth, Exeter and Teignmouth had not adopted them. The timber regulations would, they estimated, add some 25% to the cost of building a house B.Vol.78 No.2981. 24 Mar 1900 p.299.
- 55 B.Vol.70 No.2777 25 Apr 1896 p.369 (The example of the London Building Act was not lost in the provinces. The builders at Sleaford in Sussex were upset to find that they had to provide 13½" thick walls whereas their London counterparts could still

use 9" walls (in the 2nd and 3rd storeys of houses not over 30'0" high) and petitioned the local board for a change to be made. It was, they felt "rather hard on the builders of Sleaford" B.Vol.71 No.2812 26 Dec 1896 p.544).

- 56 B.Vol.71 No.2808 28 Nov 1896 p.456.
 57 B.Vol.73 No.2841 17 July 1897 p.59.
 58 B.Vol.72 No.2814 9 Jan 1897 p.40.
 59 B.Vol.79 No.3010 13 Oct 1900 p.326.
 60 R.I.B.A. Journal, Vol VI, No 6, 28 Jan 1899, p.163.
 61 R.I.B.A. Journal, Vol.VII, No.16, 30 June 1900, p.414.
 62 B.Vol.76 No.2932 15 Apr 1899 p.376 On this point, Sheffield had what a Mr. Potter told the local Society of Architects to be a "privilege which favoured lower costs for working class houses" - no requirement for party walls to project above the roof and also two storeys plus a room in the roof were allowed which needed only to have 9" external and party walls. B.Vol.80 No.3024 19 Jan 1901 p.62.
- 63 B.Vol.63 No.2598 19 Nov 1892 p.404.
 64 B.Vol.71 No.2795 29 Aug 1896 p.170.
 65 B.Vol.73 No.2858 13 Nov 1897 p.407.
 66 B.Vol.74 No.2887 4 June 1898 p.552.
 67 B.Vol.78 No.2470 7 June 1890 p.412.
 68 B.Vol.71 No.2803 24 Oct 1896 p.344.
 69 B.Vol.81 No.3053 10 Aug 1901 p.143. (There was an earlier similar case of Richardson v. Brown in Feb 1895).
 70 B.Vol.68 No.2730 1 June 1895 p.413.
 71 B.Vol.60 No.2519 16 May 1891 p.399.
 72 B.Vol.79 No.3017 1 Dec 1900 p.497.
 73 B.Vol.65 No.2672 21 Apr 1894 p.315.
 74 B.Vol.65 No.2645 14 Oct 1893 p.289.
 75 B.Vol.71 No.2789 18 July 1896 p.63.
 76 B.Vol.75 No.2898 20 Aug 1898 p.178.
 77 B.Vol.67 No.2694 22 Sept 1894 p.212.
 78 B.Vol.77 No.2945 15 July 1899 p.69.
 79 The Times, 21 Nov 1898 p.14 col.d.
 80 B.Vol.62 No.2573 28 May 1892 p.425 and The Lancet, 21 May 1892.
 81 B.Vol.75 No.2910 12 Nov 1898 p.436.
 82 B.Vol.77 No.2943 1 July 1899 p.18-19. plan below refers:



- 83 B.Vol.68 No.2709 5 Jan 1895 p.5 and B.Vol.68 No.2710 12 Jan 1895 p.30. (There was a precedent for this ruling in the case of Shiel v. Mayor and Corporation of Sunderland, 1861 (6 Hurlstone and Norman 796). Under section 159 of the Public Health Act 1875. It was determined that an addition to an old building was not a new building within the meaning of the section. See also Chapter V, note 22).

- 84 B.Vol.68 No.2711 19 Jan 1895 p.40 and B.Vol.68 No.2714
9 Feb 1895 p.109.
- 85 B.Vol.68 No.2713 2 Feb 1895 p.88.
- 86 B.Vol.68 No.2715 16 Feb 1895 p.128.
- 87 B.Vol.68 No.2712 26 Jan 1895 p.68.
- 88 Ibid.
- 89 H.Vol.114 13 Nov 1902 p.872.
- 90 B.Vol.84 No.3142 25 Apr 1903 p.439.
- 91 B.Vol.87 No.3225 26 Nov 1904 p.539.
- 92 B.Vol.87 No.3218 8 Oct 1904 p.360.
- 93 The Times, 11 Dec 1902 p.13 col.e. (The Editor of 'The Builder' suggested that they first reform their own spelling, returning to 'by-law' rather than 'bye-law' B.Vol.84 No.3151 27 June 1903. p.662.
- 94 B.Vol.84 No.3132 14 Feb 1903 p.176.
- 95 B.Vol.84 No.3146 23 May 1903 p.544; B.Vol.84 No.3151 27 June 1903 p.662; B.Vol.85 No.3152 4 July 1903 p.19 and The Times, 29 June 1903 p.16 col.c.
- 96 B.Vol.86 No.3187 5 Mar 1904 p.250-1.
- 97 W.Henman, "A Plea for reform of the Principle in which Building By-laws are founded" Pamphlet, Dec 1904. (originally published in 'British Architect')
- 98 The Times, 9 Sept 1905 p.14, col.d.
- 99 R.I.B.A. Journal, Vol.XII, No.4, 24 Dec 1904 p.132.
- 100 The Times, 9 Sept 1905 p.14 col.d.
- 101 R.I.B.A. Journal, Vol.XII, No.4, 24 Dec. 1904, p.120. Lacy's view of the London Building Act was rather extreme, although the amending bills of 1902-3, following the Queen Victoria St. fire, were panic measures.
- 102 Ibid.
- 103 H.Vol.141 23 Feb 1905 p.1076 and P.P.1905 272 and LXVII p.373:- out of 668 rural district councils, 246 had no regulations for new buildings, in parts of 114 there were by-laws based on the urban model. In 106 districts and parts of 32 there were by-laws based on the rural model. In 11 districts and parts of 6, the by-laws were not on any model code and were made before 1877. No information appears to have been available for the remainder.
see also Local Government Board : 35th Annual Report, P.P.1906, Vol.XXXV, p.lxix.
- 104 H.Vol.143 27 Mar 1905 p.1196.
- 105 H.Vol.143 30 Mar 1905 p.1720.
- 106 The Times, 31 July 1905, p.7. col.d.
- 107 H.Vol.150 27 July 1905 p.586.
- 108 H.Vol.146 11 May 1905 p.12.
- 109 A.R.Stenning, "Urban and Rural By-laws and Suggested Amendments" at the Surveyor's Institution, 16 Jan 1905. (He called for one set of by-laws for the whole country, the ending of the deposition of plans, which was not required in London, the need for properly trained surveyors and a Tribunal of Appeal.)
B.Vol.88 No.3233 21 Jan 1905 p.60.
Also see W.Mensies, "Building By-laws in Rural Districts" given at the same meeting of the Surveyor's Institution. B.Vol.88 No.3233 21 Jan 1905, p.61; No 3235 4 Feb 1905 p.119 and The Times, 17 Jan 1905 p.6. col.c.
- 110 The Times, 21 Jan 1905.
- 111 W.Blunt, "By-law Tyranny and Rural Depopulation" Nineteenth Century, Vol.56, p.643. also referred to in B.Vol.87 No.3219 15 Oct 1904 p.387.

- 112 H.Vol.146 11 May 1905, p.15-16.
- 113 H.Vol.149 20 July 1905 p.1343. The main complaint was the requirement for walls to be of brick or stone, thereby ruling out timber. But according to the Assistant Secretary of the Local Government Board, wood was not that much cheaper than brick, it cost more to maintain, and in 14 parishes near Guildford which did not have any by-laws, no one had seen fit to build any cottages in wood.
B.Vol.89 No.3278 2 Dec 1905 p.577 (The Editor of The Builder, H.H.Statham, was also cautious about wood. He considered it cold, not durable, suitable only for weekend cottages and preferred brick, concrete of brick with roughcast, although he was against cavity walls since they could be full of unknown vermin)
- 114 B.Vol.88 No.3237 18 Feb 1905 p.178.
- 115 B.Vol.89 No.3278 2 Dec 1905 p.578.
- 116 The Times, 9 Sept 1905 p.14. col.d.
- 117 B.Vol.88 No.3235 4 Feb 1905 p.120-1 and No.3236 11 Feb 1905, p.154.
- 118 B.Vol.90 No.3292 10 Mar 1906 p.261.
- 119 Proceedings of the Incorporated Association of Municipal and County Engineers, (Norwich June 22-24 1905) Vol.XXXI, 1904-5, p.296.
- 120 Ibid. p.302
- 121 B.Vol.89 No.3278 2 Dec 1905 p.578.
- 122 R.M.Lucas, "Anti Building By-laws. Suggestions for Reform", pamphlet. 1905 (based on articles originally published in the Southampton Observer and Hampshire News)
- 123 Letter from Mr. I.Dixon, Manchester. The Times, 25 Aug 1905, col.d.
- 124 B.Vol.88 No.3261 5 Aug 1905 p.161.
- 125 B.Vol.89 No.3270 7 Oct 1905 p.362-4 and also "Proceedings of the Incorporated Association of Municipal and County Engineers", Vol.XXXI, 1904-5, p.281-322.
- 126 The Times, 6 Jan 1906 p.11 col.a. and R.I.B.A. Journal, Vol.XIII, No.5. 13 Jan 1906, p.131.
- 127 H.Vol.154 22 Mar 1906 p.518-532 Public Health Act Amendment Bill P.P.1906, iv, p.699; also Local Government Board : 36th Annual Report, P.P.1907, Vol.XXVI, p.lxix.
- 128 H.Vol.154 22 Mar 1906 p.524.
- 129 L.W. Ridge, who supported the Bill, in addressing the R.I.B.A. said "I am afraid it will wait for many months the attention of the House of Commons".
R.I.B.A. Journal, Vol.XIV, No.3, 8 Dec 1906, p.89-90 and also B.Vol.106 No.3720 22 May 1914 p.605.
- 130 B.Vol.87 No.2220 22 Oct 1904 p.424.
- 131 B.Vol.88 No.3253 10 June 1905 p.637.
- 132 B.Vol.87 No.3218 8 Oct 1904 p.373.
- 133 B.Vol.83 No.3089 19 Apr 1902 p.397 : A.S.Parker to the Devon and Exeter Architectural Society.
- 134 Ibid.
- 135 B.Vol.93 No.3337 26 Oct 1907 p.451.
- 136 B.Vol.82 No.3089 19 Apr 1902 p.397.
- 137 2 Edw. VII cap.240.
- 138 B.Vol.84 No.3130 31 Jan 1903 p.117. This was also partly to avoid having to pay compensation for any later road widening.
- 139 B.Vol.94 No.3398 21 Mar 1908 p.345.
- 140 B.Vol.96 No.3459 22 May 1909 p.625.
- 141 B.Vol.94 No.3412 27 June 1908 p.755.
- 142 B.Vol.87 No.3209 6 Aug 1904 p.146.
- 143 B.Vol.97 No.3487 4 Dec 1909 p.624.

- 144 B.Vol.87 No.3210 13 Aug 1904 p.187.
- 145 R.I.B.A. Journal, Vol.XX, No.3, 7 Dec 1912, p.94.
- 146 B.Vol.91 No.3334 29 Dec 1906 p.753.
- 147 B.Vol.83 No.3119 15 Nov. 1902 p.455.
- 148 B.Vol.82 No.3080 15 Feb 1902 p.165.
- 149 B.Vol.92 No.3335 5 Jan 1907 p.20.
- 150 B.Vol.92 No.3337 19 Jan 1907 p.70.
- 151 B.Vol.92 No.3342 23 Feb 1907 p.233.
- 152 B.Vol.94 No.3398 21 Mar 1908 p.345.
- 153 B.Vol.92 No.3080 15 Feb 1902 p.165.
- 154 B.Vol.91 No.3309 7 July 1906 p.22. (Levenshulme also proposed 400 sq.ft. for the space about buildings, a handrail and ventilation for stairs, all as at Manchester, but added, rather unusually, a control on the pitch of the stair at 45°)
The Times, 25 Aug 1905, p.5, col.d.)
- 155 B.Vol.94 No.3405 9 May 1908 p.553)
- 156 B.Vol.96 No.3459 22 May 1909 p.625. The areas proposed were Living Room = 120 sq.ft., main bedroom = 120 sq.ft., other bedrooms 80 sq.ft.
- 157 B.Vol.104 No.3649 10 Jan 1913, p.55.
- 158 For example, local acts regulating room sizes (inter alia), passed before 1914 and still valid in 1967 include the Corporation Acts of:-
Newcastle upon Tyne 1892; Wigan 1893; Morley 1900; York 1902; Gateshead 1903; Hull 1903; Widnes 1908; Heywood 1909; Southampton 1910; Middleton 1910; Gloucester 1911; St Helens 1911; Luton 1911; Halifax 1911; Northampton 1911; Swansea 1912; Southport 1913; and West Bromwich 1913.
Source: R.I.B.A. Journal, August 1967, p.355-6.
(The author personally experienced the persistence of these regulations when employed by Northampton Development Corporation. The Northampton Corporation Act 1911 Section 65(2) set a minimum room size which was slightly larger than the minimum provided in a system built house, but a house which still complied overall with the minimum areas of the Parker Morris standards for M.O.H.L.G. approval and subsidy. The system built house was itself constrained by a dimensional control which related to the component elements of the system).
- 159 R.I.B.A. Journal, August 1967, p.355-6.
- 160 B.Vol.94 No.3388 11 Jan 1908 p.51.
- 161 Private Bill 1909. B.Vol.96 No.3459 22 May 1909, p.625.
- 162 Local Act 1908. B.Vol.94 No.3405 9 May 1908 p.553.
- 163 Local Act 1908 B.Vol.94 No.3407 23 May 1908 p.612.
- 164 B.Vol.85 No.3177 26 Dec 1903 p.676.
- 165 B.Vol.79 No.3000 4 Aug 1900, p.100.
- 166 R.I.B.A. Journal, Vol.XI, No 13, 7 May 1904, p.355.
- 167 Local Government Board : 32nd Annual Report, P.P.1903, Vol.XXIX, p.clxix - Penge had been separated from the County of London under the London Government Act of 1899.
- 168 B.Vol.89 No.3277 25 Nov 1905 p.569.
- 169 B.Vol.88 No.3239 4 Mar 1905 p.246.
- 170 B.Vol.84 No.3130 31 Jan 1903 p.117.
- 171 B.Vol.83 No.3112 27 Sept 1902 p.277.
- 172 B.Vol.84 No.3142 25 Apr 1903 p.439-440 and B.Vol.83 No.3120 22 Nov 1902 p.474-5.
- 173 B.Vol.83 No.3112 27 Sept 1902 p.277.
- 174 Ibid.

- 175 B.Vol.84 No.3130 31 Jan 1903 p.118 and Local Government Board : 32nd Annual Report P.P. 1903, Vol.XXIV p.clxx.
- 176 Local Government Board : 36th Annual Report, P.P.1907, Vol.XXVI, p.lxxii.
- 177 B.Vol.93 No.3376 19 Oct 1907 p.408.
- 178 8 Edw. VII cap.821.
- 179 B.Vol.93 No.3386 28 Dec 1907 p.703.
- 180 B.Vol.83 No.3119 15 Nov 1902 p.451 and No.3122 6 Dec 1902, p.531.
- 181 B.Vol.83 No.3120 22 Nov 1902 p.475.
- 182 B.Vol.85 No.3153 11 July 1903 p.53.
- 183 B.Vol.85 No.3159 22 Aug 1903 p.198 and No.3160 29 Aug 1903 p.231. (for Salt v. Scott Hall 1903 see 67 J.P. 306 and B.Vol.105 No.3685 19 Sept 1913 p.299.)
- 184 B.Vol.87 No.3225 26 Nov 1904 p.556.
- 185 B.Vol.87 No.3229 24 Dec 1904 p.674.
- 186 B.Vol.87 No.3230 31 Dec 1904 p.686.
- 187 R.I.B.A. Journal Vol,XII, No.4, 24 Dec 1904, p.119.
- 188 B.Vol.88 No.3237 18 Feb 1905 p.187
- 189 Referred to in a review of "How to Build or Buy a Country Cottage and fit it up" by 'Home Counties', London 1905 in B.Vol.89 No.3260 29 July 1905 p.130.
- 190 The Times, 3 Feb 1909 p.6. col.c. and B.Vol.96 No.3446 20 Feb 1909 p.225.
- 191 B.Vol.96 No.3448 6 Mar 1909 p.284.
- 192 B.Vol.94 No.3387 4 Jan 1908 p.26.
- 193 B.Vol.81 No.3073 28 Dec 1901 p.587.
- 194 B.Vol.79 No.3000 4 Aug 1900 p.110.
- 195 The Hampstead Act (6 Edw. VII c192) of 1906 set a density of an average of 8 houses per acre, 50'0" between opposite houses, allowed by-laws to be made for gardens, recreation grounds and open space and it modified the local street by-laws.
- 196 R.Unwin, "Town Planning in Practice", London, 1909, p.319-355; 386-403.
- 197 9 Edw. VII cap.44.
- 198 No cellar to be used as a separate dwelling if the floor more than 3'0" below the ground, unless the average height was 7'0" and unless it had proper lighting, ventilation and precautions against damp penetration.
- 199 For example, Gateshead by-laws required 13½" min. wall thickness (which was reasonable in such an exposed coastal position). The local builders asked for a change to be made to 9", including a cavity - but the local authority would not agree, although they would allow a cavity in the 13½" wall.
Source: questions 31, 32, Minutes of Evidence. Departmental Committee on Building Bye-laws, 1918
- 200 B.Vol.98 No.3515 18 June 1910 p.686.
- 201 B.Vol.96 No.3461 5 June 1909 p.673.
- 202 R.I.B.A Journal, Vol.XVIII, No.11, 1 Apr 1911, p.385. This was confirmed by section 3 of the Education (Administrative Provisions) Act 1911. Schools, approved by the Board of Education, were to be exempt from local by-laws. ('The Builder' also suggested that hospitals should also be exempt. B.Vol.106 No.3720 22 May 1914 p.605).
- 203 B.Vol.103 No.3637 18 Oct 1912 p.447.
- 204 B.Vol.106 No.3707 20 Feb 1914 p.235. (P.M.Fraser : "Factory Construction")
- 205 B.Vol.105 No.3680 15 Aug 1913 p.161-2.

- 206 A.F. Topham, "Building By-laws in Rural Districts' Architectural Review, Vol.XIX, No.112, March 1906, p.109.
- 207 B.Vol.96 No.3460 29 May 1909 p.656 and The Times 28 May 1909 p.7 col.e.
- 208 B.Vol.104 No.3655 21 Feb 1913, p.239.
- 209 Ibid. see also: R.H.Harper "The conflict between English building regulations and architectural design 1890-1918" Journal of Architectural Research, Vol 6, No.1 March 1977, p.24.
- 210 B.Vol.103 No.3631 6 Sept 1912 p.285.
- 211 Bill to amend the Housing of the Working Classes Act 1890, and the Small Dwellings Acquisition Act 1899.
- 212 B.Vol.102 No.3618 7 June 1912 p.670-1.
- 213 H.Vol. 20 March 1914 p.2465 (and also Departmental Committee on Building Bye-laws Report, 1918, p.36.
- 214 Ibid, p.2469.
- 215 B.Vol.106 No.3718 8 May 1914 p.549 and R.I.B.A. Journal, Vol.XXI, No.13, 9 May 1914, p.444.
- Membership was : A.E.Collins, E.J.Gowen, F.R.Harding Newman, W.T.Postlethwaite, R.Unwin, H.Vivian, W.Jerred*, H.Lewis* (Chairman), R.Baker*, E.Fiennes, Mr Hiley*, Mr Pointer*, S.Walsh@, A.G.Boscawen@, D.Davies@, W.E.Hart@, A.N.C.Shelley (Secretary).
- ▶ * = later resigned due to the War. @ = later appointments.
- 216 H.Vol.63 18 June 1914 p.1338.
- 217 B.Vol.107 No.3729 24 July 1914, p.96.
- 218 B.Vol.106 No.3701 9 Jan 1914 p.46; P.P.1914, V.p.609; B.Vol.106 No.3721 29 May 1914 p.642.
- 219 B.Vol.106 No.3723 12 June 1914, p.696. The Editor wrote that amidst the housing and land reform proposals of the political parties "someone in authority is conscious of the bedrock weakness of existing conditions". Since 1875, when control was over the quality of the individual building "we have come to understand that not only is it necessary to control each building but there must be some control over the grouping of buildings. This, the science of town planning, was unknown when our code of by-laws was originated".

MODEL BY-LAWS MADE 1890-1905

TABLE 16
Sheet 1

following the powers contained in the Public Health (Amendment) Act 1890

Source: Knight's Annotated Model By-laws, Seventh Edition, 1906

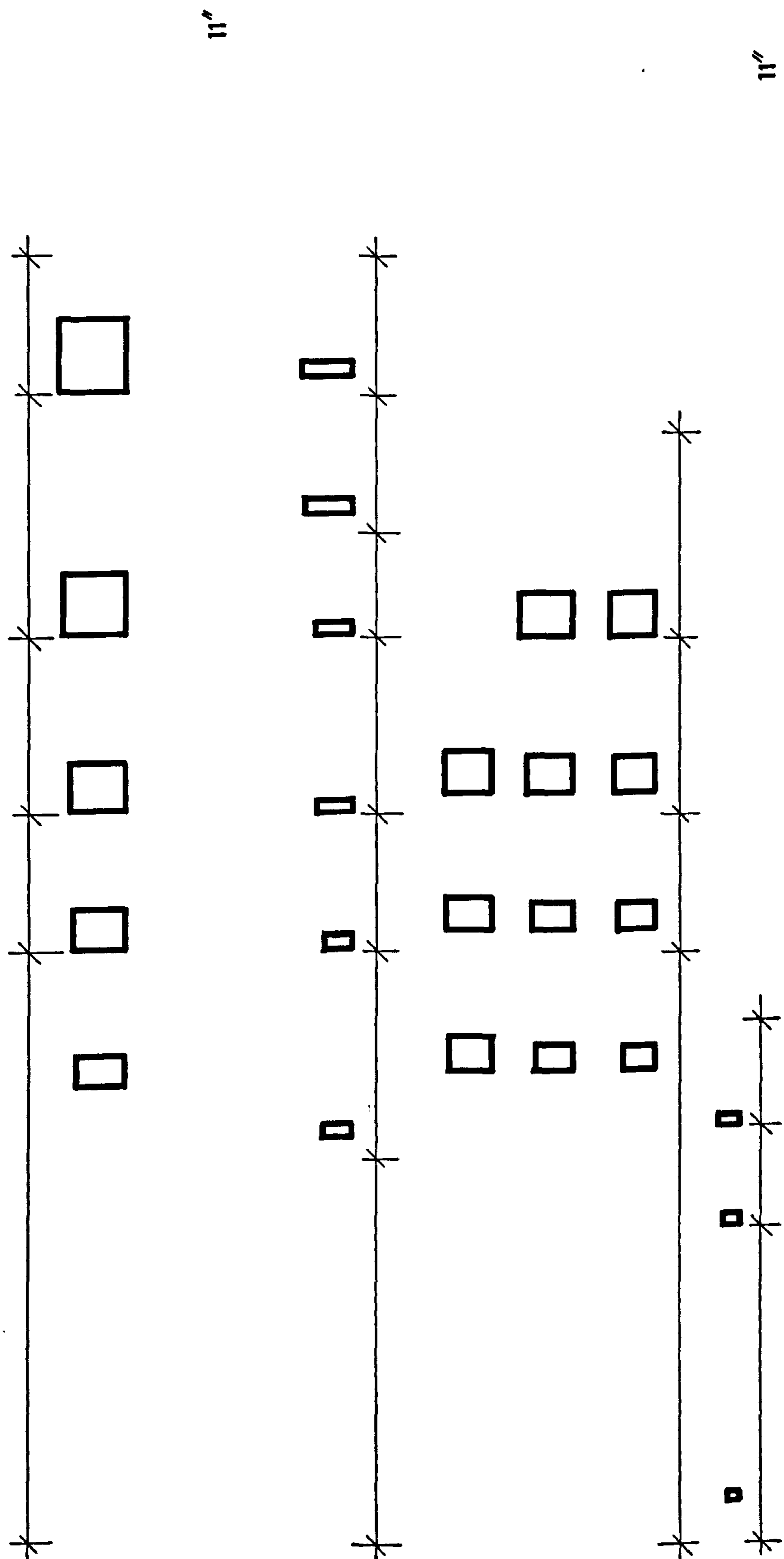
Editor: W.A.Casson (Barrister at Law, to the Local Government Board)

Reference in text : Page : 441

NOTE: All except clause No 3, were not in the L.G.B. official Model, but were accepted by them as valid.

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
3	<p>STREETS A <u>secondary street</u> to be provided, connecting with the principal approach street (for the removal of house refuse, etc.)</p>	T10.c6	T21.c7
5	<p>STRUCTURE <u>Hearths</u>: of stone, slate, brick, tile or other incombustible material. Size 6" longer than the width of chimney opening, projecting 18" min. from chimney breast. To be on stone or iron bearers, or brick trimmer arch, or brick, stone or other incombustible substance, 7" min deep below surface of hearth. (on lowest storey, hearth may be bedded on solid ground).</p>	T6.c20 and T7.c11	T14.c6 ⁴
6	<p><u>Roofs</u>: rafters and purlins - scantling sizes see Table 16, sheet 4.</p>	(Liverpool Act 1882 and earlier Liverpool acts)	still valid in 1914
7	<p><u>Floors</u>: beams and joists (domestic and warehouse) scantling sizes, Table 16, sheet 4.</p> <p><u>Floor trimmers and trimming joists</u> a) Domestic : Trimmer joist, to take a max. of 6 common joists, and to be 1" thicker than a common joist of the same span. Trimming joist, to receive a trimmer at not more than 3'0" from one end, to be 1" thicker than a common joist of the same span. b) Warehouses : as above, but thickness of trimmer to be 1/4" greater than common joist of same span and thickness of trimming joist to be 1 1/2" greater than common joist of same span. c) Public Buildings : as for domestic, but joist spacing</p>		

	<p>treads = 1" thick min, risers = $\frac{3}{4}$" " "</p> <p>2. treads = 8" depth; risers = 9" height.</p> <p>3. handrail required.</p> <p>f) floor of habitable room over stables: 3" min concrete plugging required between joists.</p>		
4	<p>VENTILATION</p> <p>Height of habitable rooms:</p> <p>1. not a sleeping room = 9'0" (*) min.</p> <p>2. sleeping room, not in attic = 8'0" or 8'6" (*) min.</p> <p>3. sleeping room in attic or roof, 8'0" or 8'6" (*) min. over at least 2/3rd of floor area and never less than 5'0" in height. (*) = recommendations of Local Government Board.</p>	T7.c15	T14.c70
10	<p>DRAINAGE</p> <p>W.C. to be kept supplied with sufficient water.</p>		(T17.c24)
11	<p>Yards and open space in connection with dwelling houses to be paved. No habitable room or workplace to be built over a privy, cesspool or ashpit.</p>		
	<p>NOTE: Sec.23(2) of Public Health Act Amendment Act 1890 enacted that by-laws for drainage and sanitation could be made so as to affect buildings erected before 1875. Model series IVb were issued to cover this -</p> <p>1) no plans or sections had to be submitted, as was the case for new buildings.</p> <p>2) These by-laws could not actually require drains for an old building, they could only prescribe how such drains should be constructed when it had been found necessary to put them in.</p> <p>These by-laws were therefore not stringent - according to Knight (Eighth edition 1928, page 215) this was because they might otherwise deter an owner from inserting drains himself!</p>		



CROSS SECTIONS (see also Table 16 sheet 1) dotted line indicates variations as in earlier source - Liverpool Improvement Act 1882 Scale: $\frac{3}{8}'' = 1'0''$ inches		BEAMS at 10'0" centres max warehouses domestic	JOISTS at 15" centres max warehouses domestic	PURLINS at 7'6" to 9'0" spacing at 6'0" to 7'6" spacing at spacing up to 6'0"	COMMON RAFTERS at 15" centres max	SPANS IN FEET
						0
						1
						2
						3
						4
						5
						6
						7
						8
						9
						10
						11
						12
						13
						14
						15
						16
						17
						18
						19
						20
						21
						22

ROOF AND FLOOR TIMBER SIZES (OVERLAY)

Liverpool Building Act Amendment 1885 and 1889
 and Liverpool Building Act 1842

TABLE 166

Sheet 4a

<p>PLANKS at 12' 0" centres max</p> <p>warehouse domestic</p>	<p>JOISTS at 15" centres max</p> <p>warehouses domestic</p>	<p>PURLINS at 7' 6" to 9' 0" spacing</p> <p>at 6' 0" to 7' 6" spacing</p> <p>at spacing up to 6' 0"</p>	<p>COMMON RAFTERS at 15" centres max</p>
<p>SPANS IN FEET</p>			
			0
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21
			22

Reference : The Builder Vol.81, No.3069 30 Nov 1901
p.477-8 and Knight's Annotated Model By-laws
7th edition 1905. p.227-235
Reference in text : page : 450.

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
3	STRUCTURE Site to be covered with concrete - 6" thick "wherever the dampness of the site or the nature of the soil renders such a precaution necessary".	T8.c10	T21.c20
4	D.p.c. - beneath level of lowest floor, in public building or dwelling house, and 6" above ground level. Walls to rooms below ground level - to be impervious and to have cavity 2½" wide, from base to height of at least 6" above ground, with suitable wall ties, and with d.p.c. at base and at 6" above ground level.	T8.c17 & T9.c17	
5	Top of parapets to be properly coped.	T8.c27	
6	SPACE ABOUT BUILDINGS FOR VENTILATION Open space at front - as 1877 Model By-laws (and also, if street less than 24'0" wide, the front of the building must be set back at least 12'0" from centre of street).	T8.c53	
7	Open space at rear - as 1877 Model By-laws.	T8.c54	
8-12	Ventilation - as 1877 Model By-laws. (but modified as follows:- cl.11 area of ventilator = 50 sq.in. cl.10 size of window openings to apply to new domestic buildings only.	T8.c55 to c59	
13 & 15-18	DRAINAGE Drains, pipes, vents, traps - as 1877 Model By-law.	T8.c60 to 65 inc	T21.c66
14	Rainwater to be carried away from roof by downpipe so as not to make foundations damp.	T5.c74 and T10.52a	
19 & 20	Waste pipes from slop sinks now to be treated as soil pipes. Soil pipes to be 3½" dia.min. Length of channel from trapped waste pipe to trapped gulley not now stated.	T8.c66	
21 - 23	W.C. - windows not required for w.c. which is not within building, but opening needed for ventilation and light.	T8.c67 and 68	T21.c69

TABLE 17
Sheet 2

24	Occupier of premises to be responsible for supply of sufficient quantity of water for flushing w.c. (and no need for flushing cistern as in cl.69 of the 1877 model).	T16.c10	T21.c69
25 - 32	Earth closets and privies now to have similar construction and to be 10'0" from habitable building. Size of receptacle increased from 8 to 12 cu.ft. otherwise as 1877 Model By-laws.	T8.c70 to 79 inc.	T21.c75
31 - 38	Ashpits, now 10'0" from habitable building and a cubic capacity of 20 cu.ft. to take one month's refuse, rather than one week as before. Otherwise as 1877 Model By-laws.	T8.c80 to 85 inc	T21.c82
39 - 42	Cesspools - as 1877 Model By-laws.	T8.c86 to 89 inc.	T21.c89
43 - 44 on	Closing of buildings unfit for habitation, deposit of plans, notices, penalties.	T8.c90 to 99 inc.	
1	GENERAL Interpretation - as 1877 Model By-laws.	T8.c1	
2	Exemptions - as 1877 Model By-laws, but now excludes also buildings which are not public or warehouse class or dwelling houses i.e. plant houses, orchard houses, summer houses, poultry house, tool houses - all unrestricted, but pigstyes and cowsheds not exempt unless detached from house.	T8.c2	T21.c2
<p>Notes Laying out and construction of streets, and materials for building not in by-laws. The drainage matters under clauses 21-43 are not <u>required</u> to be constructed, the by-laws only regulate their construction when they are provided.</p>			

Source : Knight's Annotated Model By-laws 7th Edition 1905.
Edited by W.A.Casson
Reference in text : page : 459

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
8	STREETS Entrance to new streets - one end at least to be open from ground upwards to full width of street (allows cul-de-sac and prevents the placing of posts at both ends of a street).	T8.c8	T21.c9
9	Sewerage of streets - provision for carrying off surface water.	new	
11	STRUCTURE Site concrete or asphalte, 6" thick or 4" thick if properly grouted on upper surface and floated over into a smooth cement surface.	T8.c10	T21.c11
13	Low lying and excavated sites (as Knight 1883).	T9.c10	T21.c13
14	Hollow walls - cavity width = 2½", Half timber walls, not over 3 storey, not less than 15'0" from other building, not less than 6" above ground level, inside plaster backing and on good brick or stone base. Also, in blocks of 4 houses, if party wall carried out to external face, brickwork between timbers, 4½" brick behind timbers (except plaster back allowed in one storey building or in top most storey). Tile hung external walls on buildings complying with dimensional requirements as above, and for 2 storey work also - on framework of timber, iron or steel.	T10.c11 T9.c11A	T21.c14 T21.c14 and T19.civ
34	Timber in party walls - laths and slate battens in good cement, may now extend across top of party wall; joists, etc, can extend to centre of party wall if surrounded by 4" min. brick, or in an iron box with a solid back.		T21.c34
36	Chimneys - can now be on metal girder(@) or corbels, if it does not project more than the thickness of the wall immediately below the corbel (allows chimneys to start above ground floor level, and was useful for shops).	(@) = T14.c64	T21.c36

TABLE 18
Sheet 2

37	Pargetting - unless a flue lining of fireclay or stoneware not less than $\frac{3}{4}$ " thick.	T8.c37	T21.c37	
47	Timber - distance away from surface of hearth now 10", not 15" as before.	T14.c64	T21.c47	
53	SPACE ABOUT BUILDINGS FOR VENTILATION Building on hillsides - re-erection of building on same site - owner can re-build with same area of open space as previously existed.	T10.c54A	T21.c53	
55	Ventilation of space beneath lowest floor = 3" (if concrete or asphalt covering), 9" if not. Airbricks required.	T10.c56A		
56	Now includes bathroom, lavatory, scullery (which may or may not be habitable room) to have one window to external air.	new		
56B	Ventilation of principal staircase in building with separate tenements - by windows at every storey or skylight to external air. Hand rail required for staircase.	T14.c69		
61A	DRAINAGE Sewerage not to discharge into surface water sewers and/or surface water not to discharge into sewerage sewers.	new		
65	<u>One</u> vent pipe now required for drains - as near as possible to building - can be the soil pipe (but not for drain under 30'0" long and not having internal communication with a building except for a w.c. only entered from external air).			
66	soil pipe = $3\frac{1}{2}$ " int.dia.			
66A	(duplicate drains).			
67A	position of w.c. or e.c. in house.			
67B	antisiphonage traps.			T23.c17
67C	trough closets, for schools, etc., (but by-laws rarely made in practice for these).			T10.c66
69	Water supply to w.c. to be distinct from that to domestic service pipe.			T13.c39
69A	Automatic slopwater closets - to supersede privies, (but not later enforced since considered objectionable by Ministry of Health in 1925).			

2	GENERAL		
	Exemption of schools from by-laws, see text page 476.		
3	Exemptions: "a building intended to be erected in a solid and substantial manner and intended and adapted solely for the housing of a bicycle or tricycle - walls of galvanised corrugated iron or sheet iron, not over 6'0" high and not over 250 cu.ft.		T21.c2
5	Wooden buildings on brick foundations - Agricultural sheds, not within 8'0" of street or 30'0" from nearest non exempted building. Not over 125,000 cu.ft, not over 30'0" high. If over 30'0" high and over 125,000 cu.ft, to be 30'0" from street and 60'0" from nearest building, Garden sheds also exempt if not close to other buildings.		T19.s1.
98A	House to be certified fit before being occupied. (Based on case of a by-law to this effect being held to be reasonable but rarely put into operation. Horsell v. Swindon Local Board 52. J.P. 597).		

Reference in text page : 465

CLAUSE	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
	GENERAL Interpretation and exemption clauses, all as for the urban model.	T8 and T18	
	STREETS as for urban model.		
	STRUCTURE as for urban model, except: i) clauses governing all classes of building in the urban model are confined to public and domestic (NOT warehouses) in Intermediate. ii) Requirement for concrete or asphalte covering of site restricted to only those sites where dampness or nature of soil renders this necessary. iii) "walls to be true and plumb" clause omitted in this series. iv) external and party walls = 8½" thick min, except : cement concrete or reinforced concrete, to be of such thickness to ensure stability, or a wall of a new building, entered only from the outside, if wall is not over 9'0" high by 10'0" long - then wall may be 4" thick or external wall of a timber, iron or steel frame, with a slate or tile covering (a simplification of the similar controls under the urban model by-laws). No controls for cross walls in this series. v) Wooden and other buildings. Building, not over 2 storeys, not over 18,000 cu.ft., with good material for external wall, brick or brick piers to height of not less than 6" above ground, not less than 40'0" from opposite side of street, and 15'0" min. from other buildings (10'0" if they are of incombustible material), not more than 4 buildings in a block with proper party walls. If more than 2 buildings in block, their external walls to be of incombustible material. Note: this clause was particularly		still valid in 1914
		(T12.c2a)	see also T26.s1.
		T18.c14	
		T18.c5	still valid in 1914

TABLE 19
Sheet 2

useful for timber and other patented wall systems and was transferred to the urban model after 1918.		
SPACE ABOUT BUILDINGS FOR VENTILATION as for urban model.	T8 & T18	
DRAINAGE as for urban model .		

Reference in text page : 466

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
sec 23	<p>GENERAL of the Act extends the definition of a 'new building'.</p>		
sect 24	<p>of the Act extends sec. 157 of the Public Health Act 1875 to include height of chimneys of buildings, height of buildings, structure of chimney shafts for furnaces of steam engines, breweries, distilleries and manufacturies. By-laws could be made to ensure that a chimney of a building adjoining a dwelling house could be carried up to a certain height above the eaves of the house.</p>		
1	<p>STRUCTURE Construction of chimney shafts for furnaces: Brick, on concrete bed, extending 18" beyond bottom of footings, bed to be 18" thick min.</p>	T14.c65	still valid in 1914
2	Brick footings to have regular offsets.		
3	External 'diameter', above footings = square plan = 1/10th total height of shaft polygonal = 1/11th " " " " circular = 1/12th " " " "		
4	Batter = 2½" in every 10'0" min.		
5	8½" thick brick at top, and for not less than 20'0" below the top, increasing in thickness by ¼" for every 20'0" downwards.		
6	Independent lining of firebricks for 1/6th of height of chimney, separated from external brickwork by 1" cavity.		

THE MODEL BUILDING BY-LAWS. URBAN SERIES IV 1912
 The complete set, based on the 1877 set, and
 incorporating all the revisions officially made in
 the intervening years.

TABLE 21
 sheet 1

Source: The Local Government Board. H.M.S.O. 1912
 Reference in text page : 477.

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
2	EXEMPTED BUILDINGS as 1877 set, with the following added:-	T8.c2	still valid in 1914
	Cycle shed, orchard house, summer house, poultry house, boathouse, toolshed, potting shed, aviary - not over 600 cu. ft. If over 600 cu. ft. and a poultry shed or aviary then to be 10'0" min away from other buildings.	T17.c2 and T18.c3	
	3	Exemption of iron buildings-(as 1890 amendment).	
4	STREETS Gradient of streets-(as 1877 set).	T8.c3	still valid in 1914
5	Width and length of carriage road-(as 1877 set).	T8.c4 & c6	
6	Width and length of non-carriage road - (as 1877).	T8.c6	
7	Secondary access street - (as 1890 amend- ment).	T10.c6A and T16.c3	
8	Width and construction of carriageway and footpaths and kerbs-(as 1877 set).	T8.c7	
9	One end of new street (at least) to be open from ground upwards for full width of street - (as 1877 set and 1904 amendment).	T8.c8 and T18.c8	
10	STRUCTURE No building on fill etc.-(as 1877 set).	T8.c9	still valid in 1914
11	Layer of concrete etc under house-(as 1904 amendment).	T18.c11	
12	Clay pit - fill before building-(as 1883 amendment).	T9.c10A	
13	Building on low lying sites-(as 1883 amendment).	T18.c13	
14	Walls - brick, stone, mortar-(as 1877 set).	T8,c11	
	Cavity wall construction-(as 1890 amend- ment). "The Board have not included any provision allowing walls to be construc- ted of steel framing, but would be	T10.c11 new but see L.C.C.	

TABLE 21
Sheet 2

	prepared to consider a proviso allowing this form of construction".	steel regs. on T25	still valid in 1914
	Half-timber walls - as 1904 amendment, but number of houses in blocks reduced from 4 to 3 max.	T18.c14	
15	Cross wall - construction-(as 1877 set).	T8.c12	
16	No overhanging walls, except for ornament, etc, -(as 1877 set).	T8.c13	
17	Wall at angle to another to be properly bonded-(as 1877 set).	T8.c14	
18	Walls to rest on footings, sizes of footings - (as 1877 set). also walls may rest on bressummers (L.B.A. 1894).	T8.c15	
		T14.c11	
19	Footings to rest on solid ground, etc.- (as 1877).	T8.c16	
20	D.p.c.-(as 1877 set).	T8.c17	
	D.p.c. in cellar-(as 1883 amendment).	T9.c17 and T18.c4	
21	Rules for determining wall height and lengths-(as 1877 set, except top storey rule omitted).	T8.c18	
22	Wall thickness schedule : domestic, -(as 1877 set).	T8.c19 and T8.s8	
23	Wall thickness schedule : public/warehouse, -(as 1877 set). (Note: the figure for the max. storey height in assessment of wall thickness altered from the 10'0" of 1877 to 11'0").	T8.c20 and T8.s9	
24	Cross walls-(as 1877 set).	T8.c21	
25	Walls of materials other than bricks - (as 1883).	T9.c22A	
26	Openings in external wall-(as 1877 set).	T8.c23	
27	Parapet-(as 1883 amendment).	T9.c25A	
28A	Party wall projections (as 1877 set) in buildings over 30'0" high.	T8.c26	
	Party wall projections in houses not over 30'0" high-(as 1883 amendment).	T9.c26A	
28B	Alternative to above - party wall to underside of slate in all cases.		
29	Parapet coping-(as 1877 set).	T8.c27	
30	No openings in party wall.(as 1877 set).	T8.c28	

TABLE 21
Sheet 3

31	Recesses in walls-(as 1877 set).	T8.c29	still valid in 1914
32	Chases-(as 1877 set).	T8.c30	
33	No timber in party wall-(as 1877 set).	T8.c31	
34	Bressummers etc in party wall (as 1877 set) and as 1904 amendment.	T8.c32	
		T18.c34	
35	Bearing for bressummers-(as 1877 set).	T8.c34	
	CHIMNEYS		
36	on solid footings (as per 1877 set) and amendment of 1904.	T8,c36	
		T18 c.36	
37	Flue pargetting, etc.as per 1877 set, but flue piping alternative now 1" thick again, after being $\frac{3}{4}$ " thick in 1904 amendment.	T8.c37 and T18.c37	
38	Flues to boilers etc-(as per 1877 set)	T8.c38	
39	Arch over opening-(as per 1877 set).	" c39	
40	Jambs-(as 1877 set).	" c40	
41	Breast-(as 1877 set).	" c41	
42	Backs-(as 1877 set).	" c42	
43	Angle flues-(as 1877 set).	" c43	
44	Chimney thickness and height above roof-(as 1877).	" c45	
45	chimney width/height relation-(as 1877 set).	" c46	
46	iron holdfast-(as 1877 set).	" c47	
47	timber to flue, hearth, plugs, (as 1877 and 1904 amendment).	T8.c48 and T18.c47	
48	Rendering of flues-(as 1877 set).	T8.c49	
49	Openings for valves-(as 1877 set).	T8.c50	
50	Smoke pipe/timber-(as 1877 set).	T8.c51	
51	Roof coverings (as 1877 set, but drainage clause transferred now to clause 60 in this 1912 set).	T8.c52	
52	SPACE ABOUT BUILDINGS FOR VENTILATION Open space in front (as 1877 set).	T8.c53	still valid in 1914
53	Open space at rear (generally as 1877 set, but with allowance for variations when the site is awkwardly shaped or abuts two or more streets: space may be at rear or side, or not less than previously provided, but not less than 100 sq.ft. and may be connected by passage to street, as suggested in 1890	T10.c54A and T18.c53	

TABLE 21
Sheet 4

	amendments and 1904 model). Stable also to have 150 sq.ft.open space.		
54	Windows to open onto open space provided in cl. 53 (as 1877 set).	T8.c55	still valid in 1914
55	Ventilation below floor-(as 1877 set).	T8.c56	
56	Window size,etc-(as 1877 set).	T8.c57	
57	Vent in room without fireplace-(as 1877).	T8.c58	
58	Vent in public building-(as 1877 set).	T8.c59	
	DRAINAGE		
59	Subsoil drainage-(as 1877 set).	T8.c60	still valid in 1914
60	Rainwater from roofs, gutters,etc (as 1877 set).	T8.c52	
61	Drainage of lowest storey-(as 1877 set).	T8.c61	
62	Pipes, materials, sizes, drains, traps, (as 1877 set).	T8.c62	
63	Disconnecting trap-(as 1877 set).	T8.c63	
64	No right angle junctions-(as 1877 set).	T8.c64	
65	Ventilation of drains (as 1877 set, but with addition of following relaxations:- This clause 65 not to apply to w.c. not inside building and not more than 10'0" from intercepting trap. If between 10'0" and 30'0" then s.v.p. at least 10'0" high required).	T8.c65	
66	Drains, soil pipe, wastes etc (as 1877 set but with modifications as in Rural model 1901).	T8.c66 and T17.c19	
67	w.c. & e.c. on external wall (as 1877 set).	T8.c67	
68	window + air brick to w.c. & e.c.	T8.c68	
69	w.c. & e.c., if not in building, to have opening for light and vent. (as Rural model 1901).	T17.c21	
70	w.c. to have separate cistern (1904 amendment).	T18.c69	
71	earth closet, receptacle for earth, to last 3 months or 40 cu.ft.min (as 1877 with 1890 amendments).	T8.c70 T10.c71	
72	e.c. outside building, floor 3" above ground.	new	
73	e.c. contents not to be exposed to rain.		
74	e.c. inside building, 2 cu. ft max cap.		
75	privy, 'x' ft from house (as 1877 set).	T8.c73-79	

76	privy 'x' ft. from drinking water (as 1877)	T8.c73-9	still valid in 1914
77	" ready access for cleaning (as 1877).		
78	" to be vented at top (as 1877 set) and floor to be 6" above ground, with fall of $\frac{1}{2}$ " per 1'0".		
79	privy, removable receptacle 2 cu. ft., 9" floor under.		
80	privy not to be in rain, floor 3" above ground, 8 cu. ft max capacity, adjustable seat.	new	
81	no part underneath to connect to drain.		
82	ashpit, 'x' ft. from house.	T8.c80-85	
83	" " " drinking water.		
84	" ready access for cleaning.		
85	" 6 cu.ft. max.	new	
86	" flagged floor, 9" walls rendered (as 1877).	T8.c80-95	
87	no ashpit to connect to drain.		
88	movable ashpit, galv. iron + handles 6 cu.ft. max.	new	
89	cesspool, 'x' ft from house.	T8.c86-89	
90	" " " drinking water.		
91	access for cleaning.		
92	of 9" brick, rendered, or 6" concrete, arched over and vented.		
93	Above by-laws on w.c., e.c., privies, ashpits, and cesspools to building erected both before and after passing of Public Health Act 1875. (But this by-law can not be used where Part III of the Public Health Amendment Act 1890 is not in force).	new	
94	closing of buildings as unfit for human habitation (as 1877 set).	T8.c90-99	
95 - 101	Notices, deposit of plans etc.		
102	Penalties.		still valid in 1914
103	Power of court to remove or pull down any work begun or done in contravention of by-laws.		
104	Repeal of by-laws.		

CHAPTER X

LONDON : FIRE, STEEL AND REINFORCED CONCRETE 1895-1914

The initial reaction to the London Building Act of 1894

In the building and architectural world, the reaction to the new London Building Act in its early years was one of general approval. This was largely due to the involvement of the professions, particularly the architects, in its formation. Having spent so much time on the bills, and having received a sympathetic reception from the L.C.C., the architects naturally saw the Act as being something of their own progeny. Outside this sphere however, there were various sounds of discontent. The Act was felt to be particularly severe in relation to the problem of building working class dwellings, where the effect on density and economics was now being critically affected by the new controls on light and air.(1) A more penetrating criticism of the detailed working of the Act was given by Dr. Longstaff of the L.C.C. in a talk to the Architectural Association in November 1895 (2).

Longstaff stressed the anticipated beneficial effect that would result for architectural design as a result of removing from the regulations the controls on bay windows and overhanging projections. (Thomas Blashill, speaking at the same Association three years later, confirmed that it had been thought that houses were "too flat", as houses built earlier in the century had had bays running the full height, and the drafters of the new legislation had consequently allowed bay windows to return because of the "amiable idea that some variety would be produced in London as a result" (3).) Turning to construction, Longstaff regretted that party roof projections above the roof were still required even though, as he pointed out, a House of Commons Select Committee had come out against them. He supported however the retention of the 9" thick brick wall - "taking into consideration the great importance of cost", that all important constraint, but there was evidence of opposition to this requirement in other quarters. A Mr. Black, speaking at the Surveyors' Institution, condemned the lack

of proper damp prevention in the 9" wall, an objection agreed to by 'The Builder', although it added significantly "what an outcry there would have been if they^[the 9" walls] had been condemned" (4). On the nature of control itself, Longstaff accurately noted that controls on fire escape and the spread of fire could be subject to "pedantic and officious treatment", since the authority which implemented them was of course the same authority which had the responsibility for extinguishing fires and operating the Fire Brigade. But on the official control of aesthetics, Longstaff came out firmly in opposition. "Any system of municipal control would" he said, "be apt to hamper the noblest efforts of genius and at best would tend to strengthen the tyranny of the prevailing fashion of the day" (5). The only concession he would allow to this sensible view was the necessity to control the 'sky signs'.

Speaking from within the audience at Longstaff's talk, Professor Robert Kerr announced his support for the concept of municipal control in these matters, including the control of design, even though, as he said, private individuals so disliked being dragooned. The beauty of London - or the lack of it - was being widely discussed in a number of circles, and the need for some form of control on aesthetics was beginning to be accepted by a number of architects, although they seemed to have assumed that such controls would work entirely in their favour and be to their ultimate benefit. Kerr recognised that the Building Act was probably not the best place for such controls, since the legislature would be unlikely to support anything that went beyond minimum standards. What he was searching for was, as we can now see it, town planning legislation, but the time was not yet quite opportune. The hint was more than there however. Francis Hooper, for example, who had studied the Parisian building controls back in 1889 (6), asked why the municipal authority could not control street layout and frontages, as they did in Paris, and as already^{had} happened in London privately, on the Cadogan, Grosvenor and Norfolk estates (7).

Three technical matters were raised in the discussion following Longstaff's talk which were to prove to be the cause of further amending legislation. One was clause 74, which required the separation of dwelling rooms from trade premises below, to prevent the spread of fire. Curiously, this had not been objected to by the professional

bodies in the draft stages of the bill, but now Henry Lovegrove, a District Surveyor, expressed his growing concern at the practical effects of operating this clause. It was open to a variety of interpretations and evasions. Secondly, there was the lack of proper controls on the structure of piers. Only bressummers and the piers supporting them when adjoining a party wall could be controlled, and the critical corner columns, for example, could not. Longstaff tamely explained that the reason for this omission lay in the difficulty they had had in trying to find the most specific form of words. It was all still to be left to the 'satisfaction of the District Surveyor', but with the increasing use of skeleton framed structures, this was to prove no longer satisfactory. Indeed the years up to 1909 and beyond were increasingly concerned, as we shall see, with achieving stricter controls on these matters. Finally, there was a minor but longstanding complaint - there was still no control over the precise quality of stone which should be used in building.

Almost as the inevitable reaction to increasing municipal controls, as now vested in the L.C.C., there was a growing voice calling for more say in local control. Longstaff had anticipated this in his talk - "there would be a great discussion on the delimitation of powers soon", and the local vestries, who still controlled drainage matters, were beginning to clamour for the transfer of other Building Act matters to them, rather as the provincial towns were enjoying under the operation of their own building by-laws. In August 1890 the vestries had, in a petition to the Prime Minister, sought the transfer to them of the District Surveyor's function; in 1896 the vestries and the L.C.C. had conferred to identify which areas of control could be transferred to the vestries, and in 1898 the L.C.C. Building Act Committee had recommended that streets, small buildings, the height of buildings, open space for working class dwellings, balconies and projections, and the appointment of local Surveyors, should all move across to the local level (8). The London Government Bill of 1899 eventually brought matters to a head. The R.I.B.A. petitioned A.J. Balfour to ensure that the proposed forty corporations would not be allowed to make building regulations of their own, that the District Surveyors should remain independent and that the L.C.C. should make by-laws for 'sanitary matters' (9). The London Government Act of 1899 finally abolished the old, and in many cases moribund vestries and

substituted 28 new Metropolitan Borough Councils, plus the City, in spite of the opposition from the L.C.C. who naturally resented any such fragmentation (10). In building regulation, all that resulted in the end was the transfer of controls over wooden structures, sky signs and obstructions in streets to the new Boroughs, as from November 9, 1900 (11). Even this had its complications since although the Boroughs controlled part of the act (section 84 on wooden structures), the District Surveyor still retained his controls under sections 82 and 83 - with a resulting split in responsibility (12). For the remainder of our period the subject was never allowed to rest. In 1903 we hear that Paddington informed the L.C.C. that they thought it would be better if the administration of the building act were transferred to the City and Boroughs (13); in 1905 a conference of local authorities in London called for the devolution of the Act from central control to local authorities (14) - a reflection of the growth of the boroughs, and possibly a desire to operate building control at a closer level, as the building by-laws were operated throughout the rest of the country. In 1911 the L.C.C. itself was proposing a further devolution of powers - but as a minor concession only, sufficient to pacify the boroughs, and in fact only for small sheds. It is interesting to note here that the "small sheds" now included a reference to 'motor car sheds' (15).

The old vestries had retained the right to control drainage matters, many having old by-laws which dated back to 1862, and many being at variance with each other (16). We have seen how the L.C.C. had tried to consolidate and introduce some conformity with its own drainage by-laws of 1893 (17). Because of the limitations of the Public Health (London) Act of 1891, these only controlled drainage above ground. Now, in 1897, the L.C.C. tried again, this time under the wider powers of the much older act, the Metropolis Management Act of 1855, section 202 (18), which allowed subsoil drainage, rainwater and waste disposal to be regulated. The by-laws proposed under this act encountered a good deal of opposition, but the intricate details need not detain us here. Whilst following to some extent the pattern of the Model By-laws, professional opinion at the time could now see no good reason why sink and bath wastes should not be connected to rainwater pipes, a reversal of opinion from 1873, when H.H. Collins had disapproved of this practice (see page 181). Nor could they see why inlets to drains could not be

allowed inside buildings in certain situations; why soil pipes had to go on the outside of buildings - old and new; why the anti-syphonage pipe arrangement had to be so elaborate; and why the dreaded intercepting trap should once again be brought back into the legislation (19). There was also a sharp attack on the verbiage and complex style of language used in these by-laws (20). The by-laws themselves, as finalised by 1900, are summarised in Table 23.

But we are moving ahead too quickly. Returning to 1897 we find the first brief amendments being made to the London Building Act of 1894. These were not in fact really fundamental, they were merely alterations necessary to correct minor errors which had inevitably crept into the long and complex original act. These amendments, made by the L.C.C. in the light of recent High Court rulings, are summarised on Table 22, and do not require further comment (21). Of much more significance in 1897 was the fire in Cripplegate, which started the long period of proposals for legislation to control fire escape and which takes us up to the next amending act of 1905.

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Fire and the Amending Act of 1905

At the end of 1897 a group of old houses in Cripplegate, which had been converted into warehouses, burnt down, with a number of fatalities. It was the most notorious in what was to be a long series of fires which occurred between 1896 and 1905 (22). The Cripplegate warehouses were conversions done outside the control of the Building Acts - they had steeply pitched mansard roofs, over half the external walling was taken up with openings and the interiors were lined with matchboarding. It was a rabbit warren of a building which burnt quickly so that escape was virtually impossible. The jury at the inquest asked for matchboarding as an internal wall lining to be banned in the future (23). There was much correspondence afterwards in the building press, pointing out the ineffective provisions of fire escapes and generally attacking the existing legislation. One 'London Architect' reprimanded the 1894 Act for having allowed the return of wooden cornices to dormers and flush window frames. "Is the gain in aesthetics worth the increased fire risk?" he asked (24).

Cripplegate also served to highlight the lack of any uniform fire policy in London, with controls spread between the Building Act, the Theatre and the Factory Acts. Continental cities were found, much to London's embarrassment, to be far better in this respect (25). As a result of all this concern, the British Fire Prevention Committee was formally established in 1897, and embarked on a series of scientifically controlled tests at their Fire Testing Station in Bayswater (26). This committee included Thomas Blashill amongst its number, and it was Blashill who explained the reasons for the worrying increase in the number of fires, when he addressed the Surveyors' Institution in April 1898 (27). He said that there was obviously a general increase in the number of buildings, but now they went to far greater heights, were more densely grouped and with increasing trade, they contained more manufactured goods and made greater demands for storage and packing. There was, he noted, a greater use of machines "driven more by heat", a desire to keep everything drier and warmer, to achieve better lighting with larger window sizes, with skylights, and with artificial lighting. The use of gas, oil and electricity, together with the lift - which destroyed any fire separation as it ran through several storeys - completed Blashill's summary.

To combat these dangers, Blashill proposed shutters on windows in narrow streets, fire-resistant partitions of breeze block and fire-resistant floors - an example of which, using steel joists filled solidly between with coke breeze concrete, he had himself been using in his housing work for the L.C.C. He was prepared to accept timber floors, but only if they were properly pugged, and considered that the same construction, with perhaps an asbestos sheet covering could be used for roofs. In the discussion following his talk it was suggested that this new 'asbestic' might also be used for casing iron girders as they spanned to support incombustible floors, and that concrete could be more readily accepted for the roof, if it had an asphalte covering, particularly since there was now more traffic on them in the form of telephone and "electric wire" men. And as for stairs, concrete was now recognised as being superior to stone (28). The lessons from America relating to fire escape were seen as being perhaps an indication of the way in which things were likely to go in London - New York was then building up to 24 storeys in height and Chicago, following its great fire of 1862, was now insisting on stair or balcony access to every window (29).

Blashill, for his part, considered that trapdoors onto roofs of buildings over 30'0" high should be compulsory, even if there was no parapet - a requirement that was to come through eventually in the legislation of 1905 - and that permanent escapes should be fixed to buildings over 60'0" high, a figure apparently determined by the current length of the Fire Brigade's ladders (30).

The search for a satisfactory fireproof floor occupied the correspondence columns of the building press immediately after the Cripplegate disaster. A solid floor was advocated as being stronger than iron, and various patent floors were offered. J.D. Sedding and then a Mr. Swaine, clerk of works at the new Truro Cathedral, confirmed that they had used such a floor. It had pads of slag wool inserted between the adjacent joists to counteract any tendency for the wood to swell if it got wet, and was also treated with chemicals and further protected by a plaster soffit (31).

Two years later, in 1899, Blashill was again giving his views/ⁱⁿ an almost identical presentation to the R.I.B.A., though now he made reference to the benefits of wire-embedded glass, steel rather than wood for roof trusses, and the linking of balconies together as fire prevention and escape measures. He persisted in stressing the importance of the fire-resistant floor, on the continental model, and cited the Admiralty Office and the Public Record Office as good examples, but the main drawback with all such solid floors was the difficult problem of accommodating the increasing number of services - of telephone wires, gas pipes, and bell wires in particular. Blashill had by now retired from the position of Superintending Architect at the L.C.C., and his successor, W. Riley, mentioned in the discussion that a new code of building had just been received from New York. This met with his approval since it banned any building over 35'0" high if it was not fireproof. With Riley in such an influential position in the L.C.C. this enthusiasm for American practice was to be relevant to the formation of the later legislation. Riley, incidentally, also made the point - and this seems to have been its first emphatic mention - that it was smoke rather than fire itself which was the more serious problem in dealing with escape from fire (32).

Yet from all this discussion and concern, there emerged but one minor addition to the legislation. Fire-resisting concrete, of coke breeze

in the proportion of 5 parts to 1 part of Portland cement, used as a filler (i.e. as pugging) up to at least 5" in depth between the floor joists, was now approved by the L.C.C. as an additional fire-resisting material to the second schedule of the London Building Act of 1894 (33).

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A major fire at Queen Victoria Street on June 9, 1902, in which ten people lost their lives, caused a renewal of concern and clamour for new legislation, although the immediate blame for the high casualty rate at Queen Victoria Street was laid on the Fire Brigade, who had apparently displayed an appalling lack of skill and whose ladders had been woefully inadequate into the bargain (34). The inquest in August concluded, amongst other things, that the Building Act was in dire need of being brought up to date. It needed to be retrospective - to apply to existing as well as to new buildings - and it needed to recognise and to encourage modern methods of construction. The list of fire-resisting materials, in Schedule II of the 1894 Building Act should, the jury recommended, be amended in the light of the findings of the British Fire Prevention Committee (35). The jury further recommended that shops and warehouses should be re-classified, that the city should be divided into zones relating to the different degrees of control, as happened in America and in some European cities, and that the structural controls in the Building Act, Factory Acts and Fire Brigade Act should be brought together in one Fire Act. The state of diversity then existing in all these controls only resulted in confusion and a lack of responsibility (36). 'The Times' noted: "It is the general opinion of experts that London is worse protected against fire than any great city either in Europe or in America, and probably much worse than many of the provincial cities of Great Britain" (37). It also called for an increase in the use of 'sprinklers', since it was, it claimed, common knowledge that American Insurance firms gave reduced premiums for premises fitted with a sprinkler system (38).

In November the L.C.C. responded with a bill to amend the London Building Act. The object was "to secure a reduction to the height above which the provision of special means of escape can be required in the case of new buildings and after a certain date the application of similar provisions to existing buildings". Much to 'The Builder's'

regret very little was proposed to deal with the problem of structural protection against fire, except for a restriction on matchboarding, the enclosure of liftshafts, the control of the roofs of shops which projected beyond the main front wall of a building, and an amendment to clause 74 to clarify the problem of separating trade and dwelling areas within the same building (39). The height above which fire escapes were to be provided was reduced from 60'0" to 50'0" (though 60'0" had been the original limit set by the length of ladders), flats with more than 30 inhabitants were to have escapes provided and, the most contentious issue, only four years were to be allowed during which time all existing buildings would have to be brought into line with these requirements for escape (40).

Not surprisingly, the Bill encountered considerable opposition. One party to be affected, for example, was the hotel trade, and a group of 18 hotels quickly commissioned the architects William Woodward and Henry Florence to investigate the implications of the proposed Bill on hotels, and their findings did much to prevent the passing of the Bill (41). But much more opposition was to come from the 'interests of trade', particularly in the City, where these new controls would also now have to apply. Numerous meetings were held in various City wards in February 1903 (42) to oppose what was called "this panic legislation" which, it was feared, "will occasion serious loss of business", and which was seen by many to be little more than an attempt by the L.C.C. to throw the responsibility and cost for providing fire escape onto the property owner rather than spending more themselves on improving their own fire brigade service. The Bill was also seen to be "an unworkable and unnecessary interference with business and that the measure, if it becomes law, will seriously depreciate the value of property without right of appeal" (43), and it would also lower the rateable value of property (44). Voices in support of the Bill were hardly heard amidst the clamour of the city, but there they were, nevertheless. Edmund Woodthorpe noted that, as a result of an increase in commercial and secretarial services, "a larger number of women and girls were now employed in the upper portions of buildings, numbers which had particularly increased in the city" (45), and gave his support to the Bill. But the trade interests, as always, prevailed, and in March 1903 the Bill was dropped (46). The L.C.C. however were not to be defeated, and maintaining its original objectives, it asked the City Corporation to

"kindly reconsider" the Building Act, its effects on trade, and to make constructive suggestions (47). At the same time the L.C.C. Building Act Committee were becoming increasingly concerned at the growth of a new fire hazard - oilshops (48).

In the lull between this abortive attempt of 1903 and the next attempt at the end of 1904, opportunities were taken at the Surveyors' Institution, the R.I.B.A. and at the International Fire Congress to discuss more closely the scope of the Bill's proposals. Talking to the Surveyors in February 1903 (49), Henry Lovegrove, District Surveyor, gave a detailed analysis of the Bill. He too was worried about the operation of the retrospective clauses. Alexander Payne hoped to see a revision of the 1894 Act in respect of the window frames being allowed to be flush with the face of the wall, and also expressed concern at the development of 'flats', without proper party walls between them. A.R. Stenning said however that he himself never knew of a fire being spread by the flush window frame, and neither was there much evidence of fire in flats. A fire in Hankey's Mansions, built under the old 1855 Act, burnt itself out within the flat - but the floors were made of concrete and steel joists.

At the R.I.B.A. the old campaigner J.D. Mathews objected to the Bill's retrospective character, and found it "of so drastic a character and so absolutely impracticable that the best thing to do was to leave it alone altogether" (50). The older professional, like Mathews, could not accept further infringement and interference in his liberty by the municipal bureaucrats.

Bernard Dicksee, another District Surveyor, addressing the International Fire Congress in the summer of 1903 (51), was rather more practical and constructive in his criticism. The critical areas seemed to him to be first, the possible spread of fire from a lower building to the upper part of an adjacent building when there were windows in the party wall overlooking the lower building, since there had been a recent case of this happening at the Home Life Insurance Building in New York in December 1898. Secondly, there was need for more control on the separation of buildings and thirdly - an aspect not covered in London (though it was a feature of the much praised new Building By-laws of Montreal of 1901) - the control of the distance between windows and

roofs. This was particularly relevant in the case of the projecting shop - as, say, a single storey shop built out in the forecourt of a taller building - since fire in the shop could spread through the roof to the building behind, and could effectively prevent escape from the main building. This had in fact happened in October that same year, with a fire in a shop in the Hackney Road (52). Associated with this topic was the notorious section 74 - the internal separation of a building used partly as a dwelling from a part used for trade - which was now virtually a dead letter. Two recent court cases ((53) and see page 537) had ruled that Public Houses and Beerhouses, the building types most affected, were exempt from this clause, and therefore the whole operation of this clause was in confusion. The abortive Bill of 1902-3, had, as we have seen, attempted to rectify this, but without success. It was also now seen that the 1855 Building Act had required rooms of tenements to be separated by fire-resisting materials (within certain limits) (54), but this clause now covered a growing building type, namely offices, where difficulties were being encountered due to the method of letting 'chambers', and in the remodelling of the Bill the need for fire-resisting partitions between dwellings - and therefore offices - had been lost. Dicksee added further suggestions. The size of a building should always be regulated by its cube, not by its area. Steelwork had not yet been covered by any by-laws, even though the 1894 Building Act gave the L.C.C. the powers to do this, and the protection of steel from fire was an increasing necessity. Matchboarding, and lath and plaster partitions should of course be banned, and lift shafts should be enclosed - as apparently they were in the Montreal regulations. Finally, Dicksee came out strongly in support of the compulsory alteration to existing buildings in order to secure their conformity with the fire regulations, in spite of the opposition of the building owners and the 'interests of trade'. The example was given of the Glasgow regulations of 1900, where exits from warehouses and high buildings had to be built within five years of the passing of that Act (55).

Following Dicksee, Ellis Marsland added the following suggestions, which, with hindsight can be seen to be relevant to later developments - the use of wired glass in windows, the use of steel shutters and the venting of the top of lift shafts. There were also visitors from America present in the audience. One said that he was surprised to

hear so little mention made of sprinklers during the discussion, and another emphasised the importance of limiting the area and height of buildings and protecting openings through the floor. In his home town, Philadelphia, it was, he said, the practice to separate external enclosed escape stairs, which were then linked back to the main building by only a platform (56). The American experience was heard with respect. They had valuable lessons to give, even if many could see little direct comparison. Their experience with framed structures was however to be very relevant - and this we shall study more closely later in this chapter.

At the request of the L.C.C., the R.I.B.A. submitted a lengthy and detailed list of amendments to the Building Act, early in 1904 (57). It would be tedious to list all the minor points, but the more significant are selected here.

First was a call for a better use of language, since, as they said, there were those who had to use the act and yet were "inexperienced in legal phraseology" (a cry still heard today). Considering then matters of construction, the R.I.B.A. recommended the acceptance of the cavity wall, with the total thickness, not just the inner leaf, being equal to the dimensions in the wall thickness schedule in the 1894 Building Act. This 'The Builder' thought to be very unsound and a retrograde step (58). The editor, Statham, similarly viewed the next suggestion from the R.I.B.A. with equal suspicion. It was that floor joists should be taken into account when assessing the structural strength of walls, thereby allowing thinner external and party walls if they were not more than 25'0" apart. What would happen to the walls, Statham asked, if the joists burnt? It also seemed to him, and there was perhaps some truth in this, that the R.I.B.A. had more the interest of the client and cheaper building at heart, than the principles of sound construction. On the other hand Statham was only perpetrating the traditional view of the structural independence for each element - a view which was, in contradiction to their views in this particular matter, to be reversed by the R.I.B.A. when it came out in opposition to the skeleton frame clauses proposed in 1909 (see page 527), when they refused to accept the interdependence of the internal and external elements of a frame structure. The R.I.B.A.'s suggestion that the minimum angle for a warehouse roof should go up to 85° (from 75°) was

equally suspicious. It might provide more storage space for the client, but it was seen to increase the fire risk (59). A curious omission was the tolerance allowed in the earlier clause for the expansion of steel, and the allowance for a bearing of 4" for metal bressummers, regardless of their length, was not particularly sound. Other suggestions from the R.I.B.A. were however welcomed. Party walls to go up to only the underside of the roof (in domestic work), and amendment to section 66 to allow warm air heating in 'coils' (presumably radiators), the reduction of the minimum room height from 8'6" to 8'0", an increase in warehouse compartment size to 450,000 cu.ft., and the complete redrafting of the troublesome section 74. This would now require all buildings over 40'0" in height and over 1,000 sq.ft. in area to have its tenements separated by fire-resistant floors, and no tenement building was to be over 5,000 sq.ft. unless all the floors, stairs, walls, partitions and passages were of fire-resistant construction. Two new appendices were to be added, one dealing with masonry wall pier construction (60), the other with steel frame construction, on the model of New York and Philadelphia - a topic discussed further, later in this chapter.

On the debit side the R.I.B.A. evaded the difficult issue of providing a proper definition of a 'building' and it made no alteration to the street width clauses nor to the 'shaving clause' of $63\frac{1}{2}$ ', although, as William Woodward noted in the discussion of the annual report of the R.I.B.A., this particular clause "severely affected aesthetics" (61).

The L.C.C. took note of the R.I.B.A.'s recommendations, but produced its own equally long and detailed proposals for amending the act, in November 1904 (62). They still included all the fire provisions, and now added the following : a recognition of the fire-resistant quality of a wood joisted floor with concrete pugging between the joists; a protection for windows nearer than 30'0" to adjacent premises (a start of our present clauses relating openings to the boundary of a site); a ban on the practice of matchboard linings with a space behind; an increase in the cubic size of warehouses; and the horizontal separation of properties by a party structure in the form of a solid floor, a construction particularly suitable for longer blocks of flats with deck access. Going beyond these fire provisions, the L.C.C. proposed to allow greater street widths, to allow no buildings to be higher than the width of the street in front of it, to allow a larger

open space behind houses and finally to alter the rules for ventilating internal courts. The Council were urged by the Fire Brigade Committee to secure these amendments as soon as possible in 1905 (63).

The new Bill duly appeared in 1905 and immediately met with as much opposition from the same quarters as had the earlier Bill of 1903. A Conference of Corporations and Boroughs, meeting in February (64), opposed particularly the increase in the minimum width of streets from 40'0" to 50'0", since there would be no compensation available to those who had to sacrifice their land, and there was a fear that this action would further limit the opportunities to provide cheap working class dwellings, with more development outside the city as a consequence. The architect H.H.Collins thought that the entire Bill was simply "crude". Walter Emden saw Riley as the culprit, since he was "from the Admiralty and therefore not competent to frame the Bill" - but it was really the Bill's retrospective character which caused the most concern (65). The hastily formed 'Incorporated Association for the protection of Property Owners' thought that the Bill was "an attempt to improve London at the expense of owners and occupiers" (66), and the London Chamber of Commerce, in its opposition to the Bill, complained about the restriction on building height and the powers of the L.C.C to acquire premises for wider streets - all seen as another attempt to interfere with the natural laws of property and commerce, and yet, as we can now see, they were also embryonic town planning powers (67). As had happened in 1903, the Lord Mayor was persuaded to call a public meeting in protest at the Guildhall in March 1905. Amidst the storm of protest, only one, a Mr. Davis, actually dared to speak up in support of the Bill. (68).

The Institute of Builders made a point of opposing the L.C.C.'s unwise attempt to sidestep the Tribunal of Appeal and were successful in their campaign, preventing as a result the threatened extension of "unlimited autocratic and dictatorial powers" by the L.C.C. (69). The Civil Engineers took a keen interest in the steel frame regulations - or lack of them, since the L.C.C. had not adopted the R.I.B.A.'s recommendations but seemed intent on making their own. Furthermore, they were intent on making them regulations, rather than by-laws, and they had assumed, incorrectly, that they would not have to seek the approval of the R.I.B.A., Local Government Board and other 'interested

parties' (70). The Civil Engineers consequently maintained their opposition to the Bill. The District Surveyors did like wise since their independent status was threatened by a provision in the bill to make them salaried officials. 'The Builder', whilst attacking the R.I.B.A. for supporting the 'property interest' and for putting architectural effect and public health second to that interest, generally supported the new bill, particularly for its amendment to the narrow width of streets, but thought that on the whole a brand-new act, rather than an amendment, should have been proposed (71).

Once again, the L.C.C. backed down in the face of this opposition, and all the Bill, except for Part VIII, which dealt with the fire provisions, was immediately dropped (72). Though they had retired, it was to be only temporary, for the L.C.C. announced that a new bill would be prepared in 1906 (73) following further discussions with all the 'interested parties' in the summer of 1905 (74). The City of London then emerged with its own Bill for fire escape provision, and a Select Committee of the Commons, under Sir Henry Aubrey Fletcher, sat in May and June to consider the City's proposals and those that remained in Part VIII of the L.C.C.'s Bill. The City's Bill was not to be retrospective, which was hardly surprising, and escape was to be provided simply from the roof to an adjoining building. The L.C.C. opposed it strenuously - the escape provisions from floors other than the top was inadequate, and the operation of the measure would involve dual control, with the possibility of split responsibilities, particularly since the L.C.C. also operated the Fire Brigade service (75).

The L.C.C.'s truncated Bill was to be successful, and with a suspiciously hasty manoeuvre the Bill was rushed through Parliament at the end of the summer session, receiving the Royal Assent, as the London Building Act (Amendment) Act, in August 1905 (76). For the first time, if one excepts the exclusion of the minor parts of the Metropolis Management Act of 1878 and the Factory and Workshop Act of 1901, there was now a Building Act which sanctioned interference with existing buildings in London.

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The London Building Act (Amendment) Act 1905

The significant clauses of the Act have been selected and incorporated

in Table 24. Points which should be noted are as follows: the reduction of the height from 60'0" to 50'0", above which escape was to be provided, was the result of the evidence of Captain Hamilton of the Fire Brigade to the Commons Select Committee, on the effective length of their ladders. Factories employing over 20 people, and all other buildings accommodating over the same number, now had to have fire escape provision, though houses with not more than two families and buildings not over 30'0" high or over two stories, were to be entirely exempt. Those buildings outside these limits had to have a proper fire escape at least as far as the roof, by means of dormers or trap doors, with a guard rail or parapet. Previously this escape was only allowed if there was a parapet already in existence. It still seemed that for escape from just below the 50'0" level, one had to rely on internal stairs or, failing that, the fireman's ladder (77).

Shops projecting more than 7'0" from the front of a main building now came under new regulations which required a fire-resistant roof. This caused great concern amongst the trade. For example, 1,000 shops in Islington alone were affected and the owners of 600 of them signed a protest petition in August 1906 (78). Almost inevitably, an "Association for the Amendment of the Projecting Shops Clauses" was formed, and as a result of their petition to the L.C.C., a relaxation was granted where it could be shown that reasonable alternative means of escape could be provided (79). These clauses, numbered 10 and 12, were not strictly enforced in practice and there were a number of fatal fires in shops in the summer of 1906, but it was darkly hinted that the L.C.C. were deliberately being less stringent, with an eye to gaining support from the shopkeepers in the forthcoming elections in March 1907 (80).

The schedule of fire-resisting materials was largely recast in terms relating to the functional elements of a building, an improvement over the earlier list - at least in terms of its layout, but curiously, granite was still retained in the list. The use of concrete pugging, as blocks set between the joists, was added by the R.I.B.A. as a preferable alternative to the wet concrete originally proposed in 1899, which it was feared would soon rot the adjacent timber joists (81). Section 23, which gave the L.C.C. power to "enter, inspect or examine any building" was however still viewed with a good deal of suspicion -

as a direct infringement of personal liberty (82).

Finally, two minor points: first, it was now accepted that drawings for approval could be on 'sun-prints or photographs' - a practical development which in architectural offices has had far reaching consequences in terms of labour and communications; and secondly, in a rather more humorous vein, it was noted that the Inns of Court were to be exempt from this Act, so lawyers could now legally be left to burn to death without apparently disturbing the conscience of the legislature (83).

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Steel and Reinforced Concrete Frame Structure and the L.C.C. (General Powers) Act 1909

The subject of the American experience in relation to fire escape has already been mentioned. Intimately bound up with this was their experience with the framed structure, and it is this subject which now brings building legislation well within the compass of the structural engineer, and which completes the coverage of new legislation in London within our period. It is convenient, though somewhat artificial, to discuss the steel question first, up to the Act of 1909, and then to retrace our steps to cover the development of the reinforced concrete regulations up to the First World War.

The history of the steel frame structure in America up to the end of the nineteenth century has been well documented elsewhere (84), and it is assumed that the reader is aware of its significance. In England at the turn of the century the architectural profession viewed these distant developments with some scepticism, and whilst it was felt that frame development was likely to occur in London as it had in Chicago and New York, it was not expected to reach anything like the same scale. Nevertheless, the American practice was followed with keen interest. R.W. Gibson, for example, talking at the R.I.B.A. on "Fireproof construction in the U.S.A." (85) made two comments which confirm the increasing interest in the theory of the structural frame. The first was the problem of not being able to define accurate loadings necessary for the exact calculations, now that office premises were

sublet without prior knowledge of where the heavy live loads would be located - for fireproof safes, partitions and fittings. Secondly, it was now the practice in Chicago, which was at the time less conservative than New York, to assume that live loads in multistoried buildings could, for the purposes of the calculations, be assumed to decrease in proportion to the number of storeys, and lighter structural members calculated as a result. A little later, R.A.Dennell, discussing American methods of building, at the R.I.B.A. pointed out that America lacked the fragmented and delaying nature of the English building regulations - there being generally just one authority to cover all the related controls. He also made the interesting observation that the restriction on cube sizes laid down in the London Act made it more difficult for the English contractor to store and stack materials on the job itself. This meant that he had to live more from hand-to-mouth, relying on carters to get the materials to the site on time and in the right order, delays in which caused expensive hold-ups, an experience not encountered in America (86).

London's building legislation in relation to such theories of structure were woefully behind the times. There were powers under the 1894 Act to introduce regulations, but the L.C.C. seemed reluctant to introduce them because of their experimental and imprecise nature. The tradition of the Act, with its independent structural masonry wall, regardless of the potential of the frame, was deeply rooted and, as mentioned already, nobody seemed to expect - or to want - London's architecture to emulate the American heights. The Cecil, Savoy and Ritz Hotels however all had steel frames, even though they were covered by substantial quantities of masonry to comply with the Act. Yet it was possible, in a sense, to build a frame structure, because under the 1894 Act a storey wall could be taken as a wall standing on a bressummer, and a bressummer could be taken as the horizontal girder of a frame. So in a multi-storey warehouse for example, walls of only 14" thickness could, according to one architect's interpretation, be built at each storey level (87).

If New York's legislation had been conservative up to 1899, their new building code of that year took them well the other way. Account was now taken of the very latest engineering practice - of the importance of ascertaining varying subsoil conditions, of safety factors, of

loadings on brickwork, the strengths of concrete, and techniques for the fireproof encasing of girders and columns. 'The Builder' considered it was high time for all these matters to be covered by similar legislation in this country (88), and when further regulations appeared from the Borough of Manhattan Bureau of Buildings in 1903, the R.I.B.A. Journal hailed them as being "liberal in spirit" as well as detailed in content (89) so that

"while London jogs along with an obsolete building act, other cities in the world recognise modern practice by framing regulations that permit its [steel] application and at the same time provide for the safety of the public" (90).

The New York code was directly influential in guiding the R.I.B.A. in the formulation of its proposed amendments to the Building Act in 1904, both with respect to steel frames and to masonry pier construction -

New York allowed the same amount of material used in a conventional wall to be redistributed in the form of piers and buttresses (91). The 'curtain wall' would now be possible, and with steel allowing thinner walls with equal if not greater strength, the economics in commercial buildings would be an obvious and welcome benefit (92). It was confidently expected that the steel regulations would be in the 1905 Amending Act (93), but, as we have seen, this and other valuable sections of the Bill were dropped in an effort to maintain the fire escape clauses.

The campaign for the recognition of the frame structure was not lost sight of, in spite of the set-back of 1905. In an article entitled "Steel-skeleton construction and the London Building Act" in the first issue of a new journal entitled 'Concrete and Constructional Engineering' in 1906, W. Noble Twelvetrees wrote that the Act was now fifty years behind the latest practice. The economic argument was particularly irrefutable. In a ten storey block, 100'0" x 50'0" on plan, the floor space occupied by the thicker walls required by the Act resulted in a loss of 7% of the gross area (and a loss of £720 per annum) in comparison with the thinner walls of a framed structure (94). In spite of changes to the main Building Act made in 1907 and 1908 (concerning principally the cubic size of warehouses, see later page 531), it was not until September 1908 that the Building Act Committee recommended an amendment to the Act to facilitate the use of steel and concrete. The detailed technical clauses for steel work were framed and published in December 1908 (95), and in general they followed the R.I.B.A.'s

proposals of 1903-4, which in turn had followed the New York and Philadelphia codes. The greater strength of the steel frame was now accepted, but even so there was still a degree of caution in accepting its full implications. In particular, party walls had to remain as thick as in the original Building Act, ignoring the use of the steel frame for a more economical structural support. This was partly with respect for the tradition of preventing the spread of fire, and partly because of the difficulty of deciding the legal ownership of half of the steel frame. Again, walls for the top 20'0" of a building could be 8½" thick, with 13½" below, whereas they could, in theory, have been the same thickness throughout all storeys. There was also an out-of-date reference to wrought iron - by now vitually unobtainable in structural sections, and the reinforced concrete regulations were completely omitted (see later page 528), though powers had been included in the Bill to allow their eventual formation (96).

There occurred at this point an unexpected and misguided outburst on the part of the R.I.B.A. They now insisted that the steel regulations should apply only to the external walls and not to the internal walls. The interior structure and construction had in the past been left almost entirely in the architect's control, and although the R.I.B.A. complained about the extra delays, cost and the checking of additional drawings (97), what they really feared was the further interference by the L.C.C. in their professional work, even though they would still of course have to satisfy the District Surveyor - but then he was nearly always an architect himself by training (98). Not everyone at the R.I.B.A. took this reactionary stand. William Woodward thought it was absurd, and said that it was obvious that the interior and exterior were structurally related and interdependent and should be totally controlled (99). Similar views were expressed by Professor Henry Adams of the Science Committee of the Concrete Institute, as the Bill went before Mr. Mooney's Select Committee in the Commons in June and July 1909. Riley informed the Committee that in America both the internal and external frame were taken together, and that the L.C.C. had closely studied the American practice, although it had based its rules on the R.I.B.A.'s proposals of 1905. For once there were no property interests in opposition to the Bill, only the professional institutions (100). Largely on the basis of Captain Hamilton's evidence of public safety in fire, the Select Committee over-ruled the

professions' objections and the control of both the internal and external elements of the frame were allowed (101). It was perhaps a little unfortunate, considering later relations, that the L.C.C. did not succeed in taking all the professional bodies into its confidence, and although certain clauses were adjusted (102) - though party walls remained as in the 1894 Act - and although the R.I.B.A. sent a petition in protest to the House of Lords in July 1909 (103), the L.C.C. (General Powers) Act was duly passed on 16 August 1909 ((104) and Table 25). It was essentially an engineer's Act, and as such, marked a significant turning point in the modern development of a more scientific aspect of building regulation, and a move towards an area of specialisation beyond the traditional expertise of the architect. For example, the first building to be designed with a steel frame under the new Act, the Polytechnic in Regent Street, was designed by the architect G.A. Mitchell, but the steel skeleton was designed and calculated by Dorman Long and Company (105).

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We now have to retrace our steps over the same period to outline the development of the reinforced concrete regulations - the inclusion of ordinary concrete into the L.C.C. by-laws in 1886 was included in chapter VII (page 352).

Again with one eye on America, 'The Builder' noted, in 1900, that an eight storey high building had recently been constructed in Washington, with a cavity reinforced concrete wall, having a 3" external leaf and a 4" to 5" internal leaf. It remarked that it doubted if the English regulations should be modified to allow a similar construction here. (106) But developments in reinforced concrete moved quickly in the early years of this century, as the publication of a number of textbooks on the subject (which referred to both American and Continental practice) testify, so that by 1904 'The Builder' was to be heard calling for an amendment to the London Building Act to allow "the economic possibilities of the material to be fully developed" (107). "London", claimed L.G. Mouchel in his talk on the Hennebique Ferro-concrete construction in the same year, "enjoys the unique privilege of being the only town in the civilised world where ferro-concrete constructions are actually prohibited" (108). It was

possible, though rarely realised, for reinforced concrete constructions to be built in the provinces. There was a clause in the Intermediate Model By-laws of 1905 (see Table 19) to allow this. In London, however, where concrete walls still had to be the same thickness as masonry walls under the 1894 Act, it was only in the buildings of the Docks and Railway Companies (which were outside the controls of the Building Act) that the potential of this form of construction could be demonstrated: "Had it not been for the exemption of these great corporations from the provisions of the Building Act, reinforced concrete would be an unknown material within London. It was only the railway companies ... which had been able to afford us the sight of a building constructed entirely in reinforced concrete" (109).

As explained earlier, the unfortunate debacle over the 1905 Amending Act delayed the introduction of the skeleton frame regulations for both steel and concrete, yet pressure for their formulation was maintained. The R.I.B.A. Joint Committee Report on Reinforced Concrete in 1907 brought the subject up to date, and expressly called for by-laws to be altered to allow the material to be fully exploited (110). The argument for the uneconomic use of excessively thick walls was the same for concrete frame as it had been for the steel frame. W. Noble Twelvetrees, a tireless spokesman for the material, speaking at the Municipal Building and Public Health Exhibition in 1908, stressed the cost implications as well as the structural illogicality of unnecessary thick walls and the extra load that they added to a building. He also made a pointed reference to the fact that the Government seemed to be quite confident in relaxing the regulations in their own favour, as the new Admiralty, War Office and General Post Office Extension testified, so why could not these privileges be extended to the public at large? (111). The Austrian Government allowed general regulations for reinforced concrete, so why could not the British Government? (112). 'The Times' took up the campaign with an article on "Regulations for reinforced concrete", with a correspondent stressing again the loss both in floor area and in financial return, and quoted the new General Post Office Extension, built on the Hennebique system, which had effected a 20% saving in cost. "Why should clients generally be debarred equal advantage?" (113)

Although the steel regulations went through under the L.C.C. (General Powers) Act in 1909, the L.C.C. considered that knowledge about re-

inforced concrete had not yet reached a stage when fixed rules could be laid down with any confidence, but powers to make such rules were included in that Act.

With the steel frame regulations safely through, the L.C.C then set about consulting all the interested parties - the R.I.B.A., Institute of Builders, Master Builders, Concrete Institute, Surveyors' Institute and the District Surveyors' Association - in 1910, with a view to producing an agreed set of reinforced concrete regulations (114). The second report of the Joint Committee at the R.I.B.A. on reinforced concrete followed in August 1911 (115), the recommendations of which formed the basis for the L.C.C's revised draft regulations of December that year (116), a lengthy document containing some 160 clauses, most of them^{of} a very technical nature. These soon came in for some criticism. 'The Times Engineering Supplement' of February 1912 pointed out that they made no allowance for the combination of steel and concrete in one building structure, that both the wind pressure factors and the safety factors^{were} at variance with the steel clauses in the 1909 Act; the table of working stresses was higher than the R.I.B.A.'s recommendations and were overloaded with formulae. The need for so many formulae to be included in the regulations was questioned, since it was assumed that such complicated structures would naturally require the services of properly qualified consultants - another erosion of the architects' sphere of control. There was, 'The Times' concluded, altogether too much "specification" and not enough "regulation" (117).

Being regulations, and not forming an integral part of the 1909 Act itself, they had now to go to the Local Government Board, whose dilatory and obstructive character we have already observed in their dealings under Burns' direction with the proposals to improve the provincial by-laws in 1911 and 1912 (see chapter IX, page 478). The Board appeared to distrust concrete, and were diametrically opposed to the position taken by the majority of other Governments who were currently building with reinforced concrete. Protracted negotiations took place between the Board and the L.C.C. in 1912 and 1913, with the Board insisting on higher load factors and higher working stresses (118). They even implied at one stage that concrete of a superior quality would possess less strength than concrete of an inferior quality (119).

Possibly the earlier reluctance of the L.C.C. to press for the concrete regulations was conditioned by their awareness of the problems which lay ahead with the Local Government Board. It is doubtful whether the Local Government Board really possessed any competent members ready and confident to accept the inevitable move into these more difficult and complex areas of structural engineering. Delays followed, and it is necessary here to slightly overrun our period by a year to briefly trace the development through 1915. By July of that year a further set of amendments was issued, which had been agreed to by the R.I.B.A. and all the other 'interested parties'. These regulations were considerably less onerous than the earlier draft, losing some of the formulae, but in essence were concerned with only the skeleton frame itself. They took no account of the effects of any internal walls or brick piers, but they were extended to include roof structures (120). Coming officially into operation on 1st January 1916 (see Table 26), London's concrete structural frames at last received their long awaited liberation. Lighter structures were now possible, walls could be as thin as only 4", party walls could be of concrete, greater floor areas were realised and larger window openings could be formed. The area of window openings went up from one half to two thirds of the total wall surface area. The regulations were basic and straightforward, lacking any sophisticated response to the subtle interpretations of structural theory. These were still to come and form part of the modern development of building control. For 1916, however, the concrete and steel frame regulations represented the peak of advanced regulation and building technology in this country.

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It remains to complete the account of new legislation related to building in London in the period up to 1914, with a brief reference to the L.C.C. (General Powers) Act of 1908. The restrictions on the cubic sizes of warehouses (by compartments formed by party structures), was again coming under attack in 1907 from engineering firms whose activities were increasing in scale, and with the restrictions set by this regulation, they were threatening to move outside London to avoid them. Drapery firms, engineering workshops and motor car works - all involving longer uninterrupted production runs for greater efficiency - were given as examples. The L.C.C. proposed to apply to Parliament in

1908 for an amendment to secure horizontal separation, and to remove the size restrictions, leaving each case to be the subject of individual L.C.C. approval. The Fire Brigade Committee immediately countered by stressing the expected increase in the risk of fire, and sought compensatory measures to strengthen the Brigade facilities (121).

The Act was passed on 1st August 1908 (122). Under section III it repealed sections 75, 76 and 77 of the 1894 Building Act, and allowed the horizontal separation in the warehouse and manufacturing class and sizes over 250,000 cu.ft., with the approval of the L.C.C. Still excepted were the steam boiler factories, gas retort houses and electricity generation plants within 2 miles of St Paul's Cathedral (see earlier page 170). The Act also introduced new rules for uniting buildings, with iron doors in division walls, again subject to various relaxations with the approval of the L.C.C. (123). A list of the regulations in greater detail were proposed and published in 1910 (124).

Case Histories 1895-1914

The initial reaction to the London Building Act of 1894 in the Magistrates' courts was one of confusion, supported by an unsympathetic and arrogant stance on the part of the legislature, although it must be acknowledged that they were being asked increasingly to pronounce on technical matters well outside their practical knowledge.

The early case of *Wallen v. Shoolbred* may be taken as an example. The complaint was that the requisite open space within the $63\frac{1}{2}^{\circ}$ angle of section 41 had not been provided. The magistrate, Sir John Bridge, asked the defendant if he understood the regulation, to which Lord Robert Cecil interposed the opinion that no one understood it when it was passed, and then Sir John, after a careful study of the section, pronounced it "perfectly unintelligible". The defendant gamely offered to explain about the "plane of the line", to which Sir John retorted, with pitiful wit, "I am glad there is something plain about it". The outcome in this particular case was eventually determined by the welcome discovery that Shoolbred's offending building, on the corner of Tottenham Court Road and Grafton Street, was an office or counting

house and that section 41 did not, in fact, apply (125). Even six years later, when the Act had settled down in its operation and was by then working reasonably well, there was still the occasional impatient outburst. Alderman Sir Henry Knight for example, in attempting to resolve the case of *Weary and Jones v. McLachlan* in 1901, exclaimed in desperation "The Act may have been drawn up by some philosopher who sat in his closet and thought it a theoretical accomplishment, but I look upon it as impractical and worthless" (126).

One of the most controversial areas to resolve was that concerning definitions. Some were reasonably straightforward, such as that in the case of *Woodruff v. Meeson* in 1895, which determined that a bathroom was not a habitable room - Mr. Woodruff's bathroom being 7'9" high rather than the 8'6" required for a habitable room (127). Rather more difficult, and a question which reappeared from time to time, was whether an external wall, with windows in it and acting as a party wall at a lower level to an adjacent building, was or was not a party wall within the meaning of the act. Mr. J. Grover's building on the corner of Harewood Place, Oxford Street, had windows in just such a wall, its upper storeys overlooking a lower block of stables. The magistrate referred to an earlier case *Williams v. Ball* of February 1890, and decided that the upper part of the wall was an external and not a party wall (128). In November 1895, the Army and Navy Auxiliary Stores in Coburg Row, Westminster, presented the same problem, and again it was determined that a wall could be a party wall for part of its height and an external wall for the remainder (129).

Turning now to cases involving matters of structure, there was one which produced a particularly important decision. Now it was, of course, still the case that public buildings were exempt from the specific rules of the Act, but that nevertheless they had to be approved by the District Surveyor. Since the new Act of 1894 embodied the latest theories on structure, as promulgated by the various professional institutions, the test was now whether public buildings, designed according to the long accustomed standards of the 1855 Building Act, should have to comply, albeit indirectly, with the more recent and relatively more severe standards of the 1894 Act. The Tribunal of Appeal decided this in a test case in 1896, which concerned a wall at the new ward of the South Eastern Hospital at Hatfield Street, New

Cross. Aldwinckle, the architect for the building, thought that a thickness of 14" was adequate for a two storey wall some 120'0" long, particularly since it received additional support from 'sanitary tunnels' and smoke vent flues. The District Surveyor on the other hand, insisted on a thickness of 18" for the ground floor storey. Should the architect have a free hand? - yet surely a public building should be no less stable than any other ordinary building - indeed, on the warehouse scale, the walls would have had to be 22" thick. The ruling came out in favour of the District Surveyor and in favour of the higher standards of the 1894 Act. The walls had to be 18" thick up to the steel joist at first floor level (130).

It was not unknown for standards to be challenged and empirically resolved. A District Surveyor, for example, considered the stairs at Rowton House Whitechapel to be unsafe. They were made of concrete (3 parts breeze and 1 part cement), partially reinforced, with an upper wearing surface of 2 parts granite and 1 part cement. The architect, whose work in the rest of the building was agreed by all to be more than satisfactory, was not convinced. The stairs were subject to a test loading with 2,000 glazed bricks. Signs of cracking were noted and the Tribunal, after long deliberation, decided that they were not sound, and ordered extra steel joists and a steel string to be inserted (131).

Very few cases came before the courts which related now to matters of health. Assuming that the building press was giving a reasonable cross section of the more controversial cases, this would seem to indicate that the earlier concern over such aspects was lessening, and that the regulations which controlled these matters had, as it were, settled down and were understood and accepted by the majority of the building world. There were occasional examples of course - one, which could have been anticipated when the Act^{of 1894} was passed, concerned the acceptance of the regulation that a living room could obtain all its required light and air directly from a conservatory. Over the years this clause had suffered abuse, the term 'conservatory' being variously applied to sculleries, greenhouses and storerooms. The problem of a precise definition was always difficult and in some instances resulted in living rooms being badly lit and poorly ventilated, even though they conformed to the regulations. (132)

If matters of health were largely under control, the problems of fire, as we have already seen, had largely overtaken them in importance. The cases coming before the courts reflected the severity with which fire was now regarded - and a problem in particular was the increase in the number and size of working class tenements. Their multi-occupancy, lack of overall control when in use, and their cheaper construction were the main concerns. The Portland Industrial Dwelling Company building in Paradise Street, Marylebone for example, being over 125,000 cu.ft. and over 2,500 sq.ft. was required by the Act to have all floors, as well as stairs, passages, and lobbies, built with fireproof construction. It was said that paraffin lamps would be used in the rooms and the fire risk was great. The owner naturally objected to the increased cost which would result from building in the fireproof construction, and dwelt at length on the difficulties of making cheaper dwellings for the poor economically viable - but the magistrate confirmed the fireproof floors (133). There was still the problem of differentiating between fireproof and fire-resisting, the terms being frequently interchanged indiscriminately, and the same applied to the terms combustible and incombustible. Lead, for example, was not combustible, yet it would obviously melt in a fire. When it was applied to the roof of a dormer window at No. 60, Cheapside, the magistrate decided that since it was not in the list of fire-resisting materials, the builder would have to build a party wall 12" higher and broader than the window in question in order to comply with the Act (134).

On fire escape and protection, a complicated case arose over the Berner's Hotel in Berner Street. The architect was none other than John Slater, whose interest in building legislation has been recorded earlier (see page 360), and furthermore he was a member of the Tribunal of Appeal, from which he had of course to step down as his own building was being discussed. The problem related to section 22 of the 1905 Amending Act, and in particular the L.C.C. requirement for screens as fire protection in corridors. It was felt by the client, a Mrs. Clark, that these would be very inconvenient, and the associated swing doors "might facilitate robberies as the doors could easily be wedged [open?] by criminals".

Mr. Izant, chief surveyor to the Phoenix Assurance Company confirmed in support that there was a more than satisfactory use of incombustible material and general lack of fire hazards throughout the rest of the hotel. The Tribunal ruled that the screens were unnecessary (135),

but that was not the end of the case. William Woodward claimed that the screens were necessary to protect the staircase shaft, and explained how he had installed them at the Piccadilly Hotel, and W.J. Ansell had also installed them at the Strand Palace Hotel for Mr. J. Lyons (136). But the L.C.C. adamantly continued to refuse to issue its final certificate of approval, and the case went higher to the Kings Bench Divisional Court in November 1911, since it was held to be still necessary for "stairs to be separated from rooms or corridors by fire resisting construction, all openings to have fire resisting doors and windows with fire resisting glazing" (137). As it reached the Court of Appeal the case was withdrawn when it was announced that Mrs. Clark and the L.C.C. had entered into discussions which might, it was hoped, lead to a settlement (138). No further reference is made to the case in the building press, and it is therefore assumed that some form of satisfactory compromise was indeed arrived at.

It should be noted here that the rulings of the Tribunal of Appeal in three cases in 1907 confirmed unofficially the abandonment of the requirement for ventilated lobbies (to prevent smoke logging) as a means of escape, provided that the requirements of the 1905 Amending Act had been fully met (139). But the need for protection to staircases and more particularly to lift shafts was more than proved by the remarkable case of the fire at Spiers and Ponds' Stores in Water Lane in 1914. Fire broke out there in the basement, ignited a hydraulic lift which was somehow, due to the effects of the fire, set in motion. The lift cage, by then burning fiercely, travelled up to the top floor where it set fire to the top landing - before it fell back down again to the basement (140).

*

Of particular building types generating new or modified legislation there were, besides the Cinematograph which eventually had its own specialised regulations under the Cinematograph Act of 1909 (141), three main categories - working class dwellings, buildings used partly for trade and partly for a dwelling, and underground inspection chambers in streets for electrical installations and equipment.

Rowton House, Newington Butts, was a 'working class dwelling', and, under section 13 and 14, it was found to be too high in relation to

the width of the street. Had it been what the magistrate called a "Rich Man's Hotel," like Gordon's Hotel, it would not have been covered by the provisions of these clauses - and the enlightened magistrate could not see, within the purposes of the London Building Act, any difference between a 'Rich Man's Hotel' and the 'Poor Man's Hotel', that is to say, Rowton House. The summons was dismissed (142) - but the L.C.C. took the case to the Queen's Bench Division, who upheld the magistrate's decision, though they interpreted it somewhat differently. Rowton House was a 'hotel' for single men only, and not a "dwelling house inhabited or adapted to be inhabited by persons of the working class" (143). The precise definition of "working class" was lacking in the Act, but in the case of L.C.C v. Hyman Davis, who built a working class dwelling less than 20'0" from the centre of the street, and higher than the width of the street, in Brick Lane, Spitalfield, the L.C.C. used the definition contained in section 75 of the Housing of the Working Classes Act of 1890, and won their case (144).

The problem of buildings partly for trade and partly for a dwelling - the notorious section 74, has already been referred to (see page 518). Certain cases in the early years went in favour of the plaintiff - the 'Rising Sun', on the corner of Windmill Street and Tottenham Court Road, had the upper living rooms opening directly off the bar, with only a $4\frac{1}{2}$ " wall at the side of the stairs. The District Surveyor maintained that this was not a proper fire-resisting construction - and won his case (145). Similarly, the Whitbread Beer House in Collier Street, Pentonville, had to have a floor of fire-resisting materials inserted (146). In the case of Carrick v. Godson and Sons in 1899 however, the Queen's Bench Division decided that public houses did not come under section 74 - and need not therefore have its dwelling part separated by fire-resisting walls and floors from the trade area. Presumably the whole premises, under one control of the resident landlord, were seen as trade premises. 'The Builder' felt that this judgement was correct (though it took the opportunity to attack the sanitary conditions of London pubs in general), but this decision completely undermined the credibility of this clause in the Building Act (147).

Inspection chambers for electricity, in street pavements, really centered on the question of whether or not the new constructions were

in fact buildings. If they were, then the District Surveyor was entitled to a fee for inspecting them. In a number of cases, the magistrate ruled that these small structures were in fact a source of danger to the public and should therefore be checked and approved by the District Surveyor - even though the London Electricity Supply Company had already, by 1907, built 12,000 of these chambers without any trouble (148). The same ruling incidentally was made to apply to covered-over water reservoirs (149).

Matters of design and regulation

The nature of the effects of the London Building Act on architectural design and construction, and the reciprocal effects of new developments in design and construction on the Act, have been mentioned during the course of this chapter. It remains now to draw together certain aspects of this topic which have not been discussed earlier. Specific and direct references to this subject, made at the time, are relatively difficult to locate, and tend to form a fragmented picture, although some overall impression may be gained from the fragments. Certainly the feeling was now deeply rooted that the 'hard and fast' rules of the Act were as restrictive as ever on the architect's freedom to design and experiment. They challenged his authority, they now demanded higher technical and scientific knowledge and they confirmed the further inroad of faceless bureaucratic control in his art.

John Slater, speaking at the R.I.B.A. in 1901 after J.J. Stevenson's paper on "Difficulties and hindrances in producing good modern architecture", still reaffirmed his objections to the 'hard and fast' rules, to the restraints on straight streets (now that the evidence of the Garden City was becoming clearly an attractive and workable alternative), but more particularly he objected to the illogicalities of the regulations. Why, for example, were bay windows restricted to only three storeys, including the basement, whilst oriel windows could rise up to any height? (150).

At the Surveyors' Institution, William Woodward, speaking in 1903, referred to the further encroachment of bureaucratic control. "The

L.C.C. was, little by little, taking upon itself too much of the detailed work of the architect" (151). The change in professional relationships was also noted - up to now surveyors had approached architects with "a little fear and trembling" - now this was all changing. But Woodward was being rather extreme when he anticipated a new style of architecture arising from "a combination of external iron fire escapes, external iron soil pipes and angles of $63\frac{1}{2}^{\circ}$ " (152). Building regulations, working in isolated and detailed areas and being the lowest common denominator of building, made little or no serious inroads in the established pattern of high architectural style and design.

J.S.Gibson, speaking on "Architectural Design and the London Building Act" at the R.I.B.A., in December 1904, made a number of constructive suggestions for improving the regulations - many of which we have already referred to earlier in this chapter. The need for greater street widths, for buildings to be related in height to the width of the street, the recognition of curtain wall construction, the use of masonry piers on the lines of the New York code and the use of fire protected steel have all been mentioned. But Gibson also continued to press for two other areas which upset the architect's freedom in design, namely the restriction on cornices, overhanging eaves and verges and also the use of large plate glass windows for shops. This latter point caused considerable heart-searching amongst architects used to the traditional appearance and concept of a building's structure being expressed in its external appearance, as load bearing walls taken down to the ground. Now, with frame construction, with larger sheets of glass being available, and the shopping trade welcoming greater window display areas, the sight of heavy loads apparently being carried on thin sheets of glass was both unnatural and unwelcome (153). If Gibson had had his way this abhorrence would have been prevented by the regulations (154).

The Presidents of the R.I.B.A. did little to reflect any modern and realistic thinking, and tended to preserve some rather quaint and conservative notions. For example, there was John Belcher, President in 1904, saying that "something should be done to regulate the amount of buildings in the suburbs - the farther away from the inner zone the wider the spaces should be and the lower the houses, so that there might

be as much air drawn towards the centre as possible" (155). Then, for a conservative opinion, there was Ernest George, President in 1908, expressing great concern over the aesthetic consequences of the slim walls which would result from the new steel regulations (156).

By 1911 however, the use of the steel frame could be seen to have had only limited opportunities to display its potential. This, it was said, was due to the conservative spirit of the legislation, with oversized steel sizes in the regulations, and with the inevitable increase in fees to the District Surveyor together with the loss of time while the additional drawings had to be checked through. It was also more costly than brick - and it came at a time when Edwardian architecture was characterised, in its commercial and higher buildings, with an emphasis on monumentality, rather than on lightness of structure. However, even at the time, it was hoped that steel would be used as a "true structural material.....with its use indicated by the form of structure.. ..the sham brick or masonry alternative is to be shunned" (157). With such sentiments of functional honesty we are anticipating a new era, still somewhat distant in English architecture, but a suitable point of optimism perhaps on which to leave these sadly critical and rather negative reflections on design and regulation at the end of this period.

This chapter has seen the return of London to a leading position in the development of building regulation in this country. By the time of the First World War it had, in the face of some considerable opposition, introduced new rules for fire escape and for the structural aspects of steel and reinforced concrete skeleton frames. In this respect it was now ahead of the Model and provincial building by-laws, although it was still closely marked by Liverpool who, as we saw in the last chapter, had obtained rules for reinforced concrete in its own legislation of 1908. London had however made what was to be in the long term a more important innovation in its inclusion of retrospective powers, for the first time, in the amending Act of 1905.

The reasons for London's return to this dominant position are basically threefold. In the first place there was the re-establishment of confidence following the new Building Act of 1894, ending as it did a

long period of inferiority on London's part. Secondly, there was the particular nature of London's building at this period. This could be seen in terms of its quantity, its height and its density. It could also be seen in terms of a rapid growth and in the consequences of commercial pressures. Thirdly, there was the effectiveness of the L.C.C., with its enlightened attitude and its acceptance of expert advice from every quarter, including the lessons of America. Higher standards, greater demands in the planning, structure and servicing of buildings, and the continual pressure for development - all these factors brought greater pressures to bear on London's buildings and as a consequence, a greater need to ensure adequate public safety in terms of building regulation.

As London itself expanded, the rivalry between central and local authority that we have seen in the rest of the country, was repeated, albeit on a smaller scale, between the local London Boroughs and the County Council. In this case the control remained firmly with the County Council. Out in the Provinces, the control was apparently vested in the local authority, but in reality they were still dependent on Whitehall for the sanction for their controls.

With the introduction of controls for structural steel and reinforced concrete, the appearance of the structural engineer created a significant change of emphasis. The architect suffered something of an eclipse in this respect, and the ascendancy of the engineer was supported by authority and respect for his position. The R.I.B.A.'s insistence on making an issue out of the need to regulate both the internal as well as the external structure of a frame building was a reflection of this, with the architect trying to maintain his authority and control in the face of evidence to the contrary. This debate showed the direct reversal of the architect's belief in the total integration and interdependence of all the elements in a structure. It was a retreat on the part of the architect back into his professional laager, in the face of the apparent invasion by the engineer. It was also a sign of the further encroachment and inspection by a precise calculable control into an imprecise and traditional area of design which had always been a part of the architects' domain. In addition to this problem there was the sign of strain between the architect in his relations with his client. The architect may have been seen to support the new controls

which, whilst being necessary in the public interest, could at the same time be at variance with the commercial motives of some of his clients, particularly those involved with development and profit. This would only serve to put the architect in a less favourable light in the eyes of such a client. The engineer, on the other hand, was often in a stronger position in the building world, for his judgements could be accounted for and at the same time he was usually one stage removed from the direct relation with the client.

But perhaps more relevant as a conclusion to the sequence of the past chapters is a note of the fact that we have come virtually full circle in one important respect. The business of the regulation of buildings for the control of the public health, the topic with which we began the first chapter in the 1840's, has now, by the time of the First World War, been largely completed. The majority of the 'health' regulations have been formulated and the majority are to remain intact until the present. In London, where the preliminary moves were made in this direction, the 'health' rules are accepted and no new or amending legislation is proposed in that direction. Their success could be seen in the improvement to the general health of the city. But in the other two areas of control with which we have been concerned, namely fire and stability - the two that preceded the health controls - there is, if anything, a greater concern than ever before. Health has been controlled in the context of building - but fire and possible collapse are to remain a constant source of danger.

NOTES TO CHAPTER X

- 1 "The requirements of the London Building Act as to light and air spaces are regarded by the Dwellings Companies as very severe and consequently unpopular" C.S.Bremner, 'London Buildings', Fortnightly Review, Vol.66, 1899, p.307.
- 2 B.Vol.69 No.2756 30 Nov 1895 p.393-8.
- 3 B.Vol.75 No.2913 3 Dec 1898 p.506.
- 4 B.Vol.68 No.2712 26 Jan 1895 p.61.
- 5 B.Vol.69 No.2756 30 Nov 1895 p.393-8.
- 6 see Chapter VII page 356.
- 7 B.Vol.69 No.2756 30 Nov 1895 p.393-8.
- 8 B.Vol.74 No.2885 21 May 1898 p.494 and No.2890 25 June 1898 p.612.
- 9 R.I.B.A. Journal, Vol.VI, No 11, 15 April 1899, p.349 and B.Vol.76 No.2927 11 March 1899 p.238 and No.2929 25 March 1899 p.292.
- 10 To their credit, the old Vestries had in many cases successfully carried out a considerable amount of new drainage work. (C.C.Knowles and P.H.Pitt, 'History of Building Regulation in London 1189-1972' London, 1973, p.95).
- 11 B.Vol.79 No.3016 24 Nov.1900 p.465.
- 12 B.Vol.84 No.3139 4 Apr 1903 p.360.
- 13 B.Vol.85 No.3172 21 Nov 1903 p.523.
- 14 B.Vol.88 No.3251 27 May 1905 p.579.
- 15 B.Vol.101 No.3594 22 Dec 1911 p.754.
- 16 Metropolis Local Management Acts Amendment Act 1862. 25 and 26 Vic.cap.102 see page 411.
- 17 see Table 13, sheet 2 and Chapter VII page 366.
- 18 18 and 19 Vic.cap.120 and B.Vol.72 No.2821 27 Feb 1897 p.201 and No.2822 6 Mar 1897 p.213-4.
- 19 B.Vol.74 No.2886 28 May 1898 p.523.
- 20 B.Vol.72 No.2824 20 Mar 1897 p.268. For example, the Medical Officer of St. James' Westminster Vestry took the following clause:
"Every person who shall erect a new building, and shall provide, in connexion with such building, a pipe or channel for the purposes of conveying to any sewer any water that may fall on the roof, shall cause such pipe or channel to discharge over a properly trapped gulley or into such gulley above the level of the water in the trap thereof"
and substituted the following:
"Rainwater shall be discharged over or into a properly trapped gulley so that sewer air shall not ascend into any rainwater pipe".
Besides being an early and apparently little heeded call for simpler English, this alternative also reflects an early attempt to state a 'performance' rather than 'specific' requirement.
- 21 61 and 62 Vic.cap.137 and B.Vol.72 No.2859 20 Nov.1897 p.421-2 and No.2863 18 Dec 1897 p.521 and No.2864 25 Dec 1897 p.544.
- 22 Significant fires included the following:
June 1896, Mare Street, 4 died.(Oilshop)
Oct 1898, Tivoli Music Hall - cinematograph caught fire (a new building function, later to be controlled by the Cinematograph Act of 1909).
Dec 1898, Clerkenwell Street, 1 died.
Nov 1901, Judd Street, 3 died.(Oilshop)
Apr 1902, Hackney Road, 7 died.(projecting shop)

- June 1902, Queen Victoria Street, 10 died.
 Nov 1902, Royal Mint Street, 3 died.
 Dec 1902, Ben Jonson Road, 6 died.(projecting shop).
 Jan 1903, Brownlow Street, 3 died.
 Oct 1903, Hackney Road, 3 died.(projecting shop).
 Feb 1904, Duke's Head Passage, 7 died.
 Oct 1904, Judd Street, 6 died.
- 23 B.Vol.74 No.2868 22 Jan 1898 p.87 and
R.I.B.A. Journal, Vol.VII, No.4, 23 Dec 1899, p.57.
- 24 B.Vol.73 No.2860 27 Nov 1897 p.450.
- 25 Ibid. p.447.
- 26 For example : In 1899 the British Fire Prevention Committee tested floors, as specified in the London Building Act of 1894 and found them to be a complete failure. (B.Vol.77 No.2968 23 Dec 1899 p.575). Further tests on doors in 1901 revealed that oak was better than deal, giving 1½ hours resistance, and Karri and Jarrah gave 1 hour resistance, but unfortunately the test doors were not well made and fire penetrated the joints prematurely. (B.Vol.81 No.3079 7 Dec 1901 p.519).
- 27 B.Vol.74 No.2881 23 Apr 1898 p.391-4.
- 28 Ibid. (and B.Vol.74 No.2883 7 May 1898 p.439 for the discussion).
- 29 For example : C.A.Daubney,"Fire Escape in American Commercial Buildings" in R.I.B.A. Journal, Vol.X, No.3, 6 Dec 1902, p.53.
- 30 see note 28 above.
- 31 B.Vol.73 No.2863 18 Dec 1897 p.524 and Vol.74 No.2865 1 Jan 1898 p.13-23.
- 32 R.I.B.A. Journal, Vol.VII, No.4, 23 Dec 1899, p.57-75.
- 33 R.I.B.A. Journal, Vol.VI, No.12, 6 May 1899, p.378.
- 34 The Times, 12 June 1902 p.11 col.e.
- 35 see note 26 above.
- 36 B.Vol.83 No.3104 2 Aug 1902 p.94.
- 37 The Times, 12 June 1902 p.11 col.e.
- 38 Ibid.
- 39 B.Vol.83 No.3118 8 Nov 1902 p.408.
- 40 B.Vol.83 No.3124 20 Dec 1902 p.570-1.
- 41 R.I.B.A. Journal, Vol.XV, No.4, 21 Dec 1907, p.121.
- 42 B.Vol.84 No.3131 7 Feb 1903 p.147 and also, for example:
 Aldergate (The Times, 12 Feb 1903 p.4 col.c.)
 Ward of Cheap (The Times, 14 Feb 1903 p.11 col.e.)
 and the general protest meeting called by the Lord Mayor at the Guildhall on March 5 1903 (The Times, 31 Jan 1903 p.8 col.a. and 21 Feb 1903 p.12 col.f)
- 43 B.Vol.84 No.3134 28 Feb 1903 p.231.
- 44 B.Vol.84 No.3129 24 Jan 1903 p.93.
- 45 The Times, 14 Feb 1903 p.11 col.e.
- 46 The Times, 2 Mar 1903 p.12 col.e; 4 Mar 1903 p.12 col.e. and B.Vol.84 No.3135 7 Mar 1903 p.244.
- 47 The Times, 10 Mar 1903 p.10 col.c.
- 48 B.Vol.84 No.3131 7 Feb 1903 p.147 see also note 22 above for fires involving oil. These were a consequence of a developing motor and engine trade.
- 49 Henry Lovegrove,"Regulations for Protection from Fire"
 B.Vol.84 No.3134 28 Feb 1903 p.226.
- 50 J.D.Mathews,"Analysis of the London Building Act (Amendment) Bill" at the R.I.B.A., 2 Mar 1903. R.I.B.A. Journal, Vol.X, No.9 7 Mar 1903, p.238.
- 51 B.Dicksee, "Fire Prevention Sections of the London Building Act" July 1903. B.Vol.85 No.3154 18 July 1903 p.69.

- 52 B.Vol.85 No.3169 31 Oct 1903 p.430. (and see note 22 above).
- 53 Carrick v. Godson, 1899 2 Q.B. 193 and Dicksee v. Hoskins 65 J.P. 612.
- 54 See Table 6, clause 27.
- 55 B.Vol.85 No.3154 18 July 1903 p.73. (Glasgow Building Regulation Act. 63 and 64 Vic.cap.150).
- 56 B.Vol.85 No.3155 25 July 1903 p.96.
- 57 The full list is given in R.I.B.A. Journal, Vol.XI, No.7. 6 Feb 1904, p.181.
- 58 B.Vol.86 No.3185 20 Feb 1904 p.185.
- 59 B.Vol.86 No.3186 27 Feb 1904 p.213.
- 60 Ibid. p.215. In essence : the collective width of piers in any wall shall be equal to 1/4th of the collective length of piers and wall together. For example, a wall 80'0" long might have 4 piers each 5'0" wide or 8 piers each 2'6" wide.
- 61 R.I.B.A. Journal, Vol.XI, No.13, 7 May 1904, p.368.
- 62 B.Vol.87 No.3223 12 Nov 1904 p.488-491 and The Times, 16 Nov 1904 p.4. col.b.
- 63 B.Vol.87 No.3224 19 Nov 1904, p.523.
- 64 The Times, 7 Feb 1905, p.4, col.f.
- 65 B.Vol.88 No.3236 11 Feb 1905, p.145.
- 66 The Times, 10 Feb 1905 p.11 col.e. and B.Vol.88 No.3237 18 Feb 1905 p.186.
- 67 The Times, 13 Feb 1905 p.2 col.f and B.Vol.88 No.3238 25 Feb 1905 p.212.
- 68 The Times, 21 Feb 1905 p.9. col.f. and 4 Mar 1905 p.7. col.a.
- 69 B.Vol.89 No.3276 18 Nov 1905 p.517 and B.Vol.89 No.3273 28 Oct 1905 p.448.
- 70 R.I.B.A. Journal, Vol.XII, No.5, 14 Jan 1905, p.173.
- 71 B.Vol.89 No.3239 5 July 1905 p.224.
- 72 The Times, 15 Mar 1905 p.12 col.e. and B.Vol.88 No.3243 1 Apr 1905 p.349.
- 73 B.Vol.88 No.3244 8 Apr 1905 p.380.
- 74 The Times, 5 Apr 1905 p.4 col.e.
- 75 B.Vol.88 No.3252 3 June 1905 p.598 and No.3253 10 June 1905 p.627.
- 76 5 Edw.7 cap.209. See Table 24.
- 77 R.I.B.A. Journal, Vol.XIII, No.3, 9 Dec 1905, p.73.
- 78 B.Vol.91 No.3313 4 Aug 1906 p.187.
- 79 B.Vol.91 No.3328 17 Nov 1906 p.561.
- 80 Ibid. p.559. Examples of fires were:-
June 24 1906, Mile End Road, 5 died;
July 1 1906, Kentish Town Road, 1 died;
July 28 1906, Tower Street. (no record).
- 81 R.I.B.A. Journal, Vol.XIII, No.3, 9 Dec 1905, p.77.
- 82 Ibid. p.74.
- 83 Ibid.
- 84 e.g. H.R.Hitchcock, "Architecture, Nineteenth and Twentieth Centuries" London, 1958, and the bibliography included with that work.
- 85 R.I.B.A. Journal, Vol.VI, No.3, 10 Dec 1898, p.62-68.
- 86 R.I.B.A. Journal, Vol.XIII, No.2, 25 Nov 1905, p.33. Also E.R. Mathews, "Building Laws of American Cities". Proceedings of the Institution of Municipal and County Engineers. Vol.33, 1906-7, p.398.
- 87 According to a letter from R.Langton Cole. Apparently the Bank of Syracuse could have been built within the terms of the London Building Act of 1894. see R.I.B.A. Journal, Vol.VI, No.8, 25 Feb 1899, p.239.

- 88 B.Vol.77 No.2957 7 Oct 1899 p.317.
- 89 R.I.B.A. Journal, Vol.XII, No.4, 24 Dec 1904, p.148.
- 90 B.Vol.85 No.3173 28 Nov 1903 p.541.
- 91 see J.S.Gibson, "Architectural Design and the London Building Act" December 1904. R.I.B.A. Journal, Vol.XII, No.4, 24 Dec 1904, p.117-135.
- 92 Ibid. (an early use of the term "curtain wall"?)
- 93 B.Vol.89 No.3262 12 Aug 1905 p.171.
- 94 B.Vol.90 No.3293 17 Mar 1906 p.289.
- 95 R.I.B.A. Journal, Vol.XVI, No.4, 19 Dec 1908, p.144-7.
- 96 B.Vol.95 No.3438 26 Dec 1908 p.698.
- 97 Letter from the President of the R.I.B.A. to the L.C.C. on March 5, 1909.
R.I.B.A. Journal, Vol.XV, No.12, 24 Apr 1909, p.442.
- 98 R.I.B.A. Journal, Vol.XV, No.13, 8 May 1909, p.466.
- 99 Ibid.
- 100 B.Vol.97 No.3465 3 July 1909 p.3-10 and No.3467 17 July 1909 p.66.
- 101 R.I.B.A. Journal, Vol.XVI, No.17, 24 July 1909, p.643.
- 102 B.Vol.97 No.3470 7 Aug 1909 p.147-9.
- 103 R.I.B.A. Journal, Vol.XVI, No.17, 24 July 1909, p.643-4.
- 104 9 Edw.7 cap.130. B.Vol.97 No.3484 13 Nov 1909 p.514.
- 105 The floors and roofs were of ferro-concrete panels on the Hennebique system with brick and stone walls considerably thinner than would have been possible before. B.Vol.101 No.3589 17 Nov 1911 p.576 and 3592 8 Dec 1911 p.675.
- 106 B.Vol.79 No.3011 20 Oct 1900 p.334.
- 107 B.Vol.87 No.3226 3 Dec 1904 p.565.
- 108 R.I.B.A. Journal, Vol.XII, No.2, 26 Nov 1904, p.59-61.
- 109 R.I.B.A. Journal, Vol.XII, No.5, 14 Jan 1905, p.176-7.
- 110 R.I.B.A. Journal, Vol.XIV, No.14, 1 June 1907, p.497 and No.15 15 June 1907, p.513.
- 111 B.Vol.94 No.3405 9 May 1908 p.545.
- 112 B.Vol.94 No.3407 23 May 1908 p.597.
- 113 R.I.B.A. Journal, Vol.XV, No.13, 9 May 1908, p.412 and B.Vol.96 No.3453 10 Apr 1909 p.427.
- 114 B.Vol.99 No.3543 31 Dec 1910, p.808 and R.I.B.A. Journal, Vol.XVIII, No.4, 24 Dec 1910, p.132.
- 115 B.Vol.101 No.3579 8 Sept 1911 p.275.
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- 118 B.Vol.105 No.3674 4 July 1913 p.1.
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- 121 B.Vol.93 No.3376 19 Oct 1907 p.417.
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- 123 R.I.B.A. Journal, Vol.XV, No.20, 17 Oct 1908, p.651-2.
- 124 B.Vol.98 No.3497 12 Feb 1910 p.174.
- 125 B.Vol.68 No.2719 16 Mar 1895 p.208.
- 126 B.Vol.80 No.3031 9 Mar 1901 p.247.
- 127 B.Vol.68 No.2725 27 Apr 1895 p.319.
- 128 B.Vol.68 No.2720 23 Mar 1895 p.229.
- 129 B.Vol.69 No.2753 9 Nov 1895 p.343 and No.2755 23 Nov 1895 p.379.
- 130 B.Vol.70 No.2762 1 Jan 1896 p.40.

- 131 B.Vol.70 No.3077 25 Jan 1902 and No.3078 1 Feb 1902 p.115.
- 132 B.Vol.95 No.3148 8 Aug 1908 p.169.
- 133 B.Vol.81 No.3066 9 Nov 1901 p.420.
- 134 B.Vol.72 No.2818 6 Feb 1897 p.133.
- 135 B.Vol.98 No.3515 18 June 1910 p.690 and No.3516 25 June 1910 p.723, and R.I.B.A. Journal, Vol.XVII, No.16, 25 June 1910, p.648.
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- 137 B.Vol.101 No.3591 1 Dec 1911 p.654-5, No.3592 8 Dec 1911 p.683.
- 138 B.Vol.101 No.3593 15 Dec 1911 p.724.
- 139 R.I.B.A. Journal, Vol.XV, No.4, 21 Dec 1907, p.124.
- 140 B.Vol.107 No.3731 7 Aug 1914, p.148.
- 141 9 Edw.VII.cap.30.
- 142 B.Vol.72 No.2835 5 June 1897 p.520.
- 143 B.Vol.73 No.2863 18 Dec 1897 p.515.
- 144 B.Vol.72 No.2825 27 Mar 1897 p.305 and R.I.B.A. Journal, Vol IV, No.11, 1 Apr 1897, p.287.
- 145 R.I.B.A. Journal, Vol.IV, No.19, 23 Sept 1897, p.476.
- 146 B.Vol.68 No.2728 18 May 1895 p.382.
- 147 B.Vol.76 No.2940 10 June 1899 p.564.
- 148 B.Vol.76 No.2922 4 Feb 1899 p.126. (Dicksee v. Coat, 1899).
B.Vol.81 No.3062 12 Oct 1901 p.323. (Crow v. Whitechapel Board of Works, 1901).
B.Vol.84. No.3147 30 May 1903 p.598-9. (Woodthorpe v. Charing Cross and Strand Electricity Supply Company, 1903).
B.Vol.93 No.3365 3 Aug 1907 p.135. (County of London Electricity Supply Company v. Perkins, 1907).
B.Vol.94 No.3393 15 Feb 1908 p.191.
- 149 R.I.B.A. Journal, Vol.XVII, No.2, 20 Nov 1909, p.84. (Moran and Son v. Marsland).
- 150 R.I.B.A. Journal, Vol.VIII, No.6, 26 Jan 1901, p.123.
- 151 B.Vol.84 No.3132 14 Feb 1903 p.163.
- 152 Ibid.
- 153 Henry H.Hill, "The Influence on Architecture of Modern Methods of Construction" (Silver Medal Essay) R.I.B.A. Journal, Vol.XVI, No.19, 25 Sept 1909, p.706-711.
- 154 R.I.B.A. Journal, Vol.XII, No.4, 24 Dec 1904, p.130.
- 155 R.I.B.A. Journal, Vol.XII, No.5, 14 Jan 1905, p.178.
- 156 R.I.B.A. Journal, Vol.XVI, No.1, 7 Nov 1908, p.5.
- 157 B.Vol.100 No.3564 26 May 1911, p.648-9.

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
3	(i) STREETS L.C.C. may serve notice to owner etc., to set back building, fence or fore-court to distance set out in Part II of 1894 Act.	T14.c14	still valid in 1914
	(ii) "boundaries and fences" now added to "structure" in wording of Sec.200 in 1894 Act.	T14.c200	
	(iii) Repeals sec.14 of 1894 Act : now to read:- "nothing to affect powers of railway companies under special Acts of Parliament".	T14.c14	
	4 Houses of the Working classes : the prescribed distance in sec 13 of 1894 Act now to read : "20'0" from the centre of the roadway".	T14.c13	
5	MISCELLANEOUS (service of summonses in relation to dangerous or neglected structures).		
6 & 7	(Sec.200 sub.sec.3e of 1894 Act amended in very minor detail).		
8	The buildings of the Stock Exchange to be "public buildings" under the London Building Acts.		
9	This Act to have no effect on the rights etc of Gas Companies.		
10	(cost of Act).		

Date 30 October 1900
 Reference in text : page 512

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
1	DRAINAGE Subsoil drainage - to be trapped before entering sewer.	T12.c59	still valid in 1914
2	Surface water drainage for yards - to be trapped.		
3	Rainwater pipe to be trapped. No sewerage or sink wastes to connect to r.w.p.	T13.c39	
4	Specified materials for drains - glazed stoneware, cast iron - sizes given - laid in 6" concrete bed - to falls - jointing specified - thickness of pipes - drains under building to be in 6" concrete all round (unless iron).	T21.c62	
5	Intercepting trap in main drain, before entering sewer.	T21.c63	
6	Access - manholes, etc.		
7	No right angled junctions.	T21.c64	
8	Ventilation of drains - two untrapped openings, one for 'inlet', one for 'outlet'; either at one end (i.e. at disconnecting trap or at far end of system at highest point) whichever is more convenient.	T21.c65	
9	No inlet to drains inside building.	T21.c66	
10	Specifies waste pipe materials, traps - waste pipes to discharge in open air.		
11	Soil pipes - outside buildings - lead or cast iron - specified sizes - joints - not to connect with rainwater pipes or waste pipes from bath etc - no traps.		
13-16	Specifies connections of pipes and drains of different materials.	new	
17	Anti-syphonage pipes required if more than one w.c. connects to soil pipe.	T18.c67B	
18	Slop sink or urinal to have syphon trap between appliance and drain.	new.	
23	By-laws not to extend to City of London.	-	

5 Edw.7.cap.209

Date : 11 August 1905

Reference in text : page 522.

CLAUSE No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
7	<p>FIRE ESCAPE <u>New buildings</u> (except dwellings with not more than one family) a) High Buildings, with upper storey over 50'0" above the ground and b) buildings with accommodation for 20 persons (sleeping) or 20 persons (employed), to have fire escapes as approved by the L.C.C.</p>	(see also T14.c63)	
9	<p><u>Old Buildings</u> all as above, but to conform by 1st January 1907.</p>		
10	<p><u>Projecting shops</u>, i.e., those projecting more than 7'0" from the main wall of a building, to have a roof of fire resisting material 5" thick min. Lantern lights and ventilating cowls allowed in such roofs if they are not less than 6'0" from the main front of the building and the side of the lantern light, etc., except that side facing away from the main wall of the building, to be of fire resisting material 2'0" high min. No lantern light, cowl, etc., to project more than 5'0" above the roof.</p>	new	
11	<p><u>No living room over store for inflammable liquid</u> unless there are adequate safeguards against the spread of fire and ready means of escape from the living room.</p>		still valid in 1914
12	<p><u>Means of access to roof</u>, to new buildings of over two storeys or over 30'0" high or with projecting shop (but not house with not more than two families):- Dormer or door to roof, or trap door (hinged, copper or zinc covered and counterbalanced) or other equally approved, with parapet or guard rail.</p>	(see also T14.c61)	
13	<p><u>Conversions</u> are now to conform to this Act.</p>		

14	<u>Means of escape are to be maintained</u>		
26	This Act not to apply to factories under sec.14 of Factory and Workshops Act 1901 or statutory controlled Common Lodging Houses.	new	still valid in 1914
28 - 33, 35 - 40	Also exempt : Inns of Court, docks, railways, electric light companies, generating stations for underground railways, gas companies, Stock Exchange, Wharfs, Royal Albert Hall, Mansion House, Old Bailey, Cattle Market, Bonded Warehouses.		
34	<u>Banks</u> in new or existing buildings, if not less than $\frac{3}{4}$ of its cubic content used for banking or insurance, or partly for one and partly for the other, by not more than two companies and the remainder used only for sleeping accommodation for the officers or servants of the company, then it can be exempt.		

List of Fire Resisting Materials

repeals all
the second
schedule of
L.B.A. 1894

1	<p>Brickwork, with good mortar, cement, etc., Granite, or other solid stone. Iron, Steel, Copper. Slate, Tile, Terra-cotta. Flagstones as floors over arches, but not exposed on the underside. Concrete - of brick, tile, stone, ballast, pumice, coke breeze, lime cement or calcined gypsum. Concrete and iron and Steel in combination,</p>		
2	<p>Doors, etc, Oak, Teak, Jarrah, Karri, etc 1$\frac{3}{4}$" min. Stairs and landings as above - treads strings and risers 1$\frac{3}{4}$" min. thick, ceiling and soffit of stairs to be plastered. Beams and posts, of woods as above or with iron (protected by plaster not less than 2" thick or timber being protected by plaster on iron lathing 1" min. thickness).</p>	T14.s12	still valid in 1914
3	<p>Floors and Roofs : Brick, tile, terra-cotta, concrete (5" min thick with iron and steel in combination). To projecting shops, floors and roofs may have concrete block pugging 5" min. thick between wood joists, with 1" square wood fillets fixed to sides of joists.</p>		
4	<p>Verandahs, Outside landings : wood, as above 1$\frac{3}{4}$" min thickness.</p>		
5	<p>Internal partitions, enclosing stairs, passages: terra-cotta, brickwork, concrete, or other incombustible material not less than 3" thick.</p>		
6	<p>Glazing for windows, doors, lantern lights: $\frac{1}{4}$" min. thick, in metal frames, melting point at 1,800°F, 16 square inches max. pane size (e.g. 4" x 4") and in panels not over 2'0" across, of fire resisting hardwood 1$\frac{3}{4}$" min thickness or of iron.</p>		
7	<p>Any other material as approved by the L.C.C.</p>		

Regulations for steel skeleton framework etc
Reference in text page : 528

Clause No.	SELECTED CLAUSES relating to building design and construction	LINKS	
		ANTE	POST
1	STRUCTURE Specifies quality of rolled steel for framework (but nothing on iron or steel which is not rolled).		
2	Skeleton to sustain whole of dead and superimposed loads. Party walls, if any, also to sustain loads.		
3	Pillars in external walls to be enclosed by brick terra-cotta, stone, tile etc 4" thick, bonded together.		
4	as above, for girders, but thickness on underside to be 2" min.		
5	Pillars and girders (not in external wall) to have 2" min casing, but on upper or lower surface of girders it may be 1". No wood fixings to be used,		
6	Compression flange of girder to be secure against buckling when length of girder = over thirty times the width of flange, and web to be secured against buckling when it exceeds sixty times its thickness.		
7	Span of girder = 24 times depth of girder max, unless the calculated deflection of girder is less than 1/400th of the span.		
8	Double girders (i.e. two adjacent to each other) to have separators spaced at distance not over five times the depth of the girders, and to be related to loads above and supports below.		
9	All girders for external walls to be at floor level of storey, or at distance not more than 5'0" above or below the floor level.	new	still valid in 1914
10	Rivets to be used when reasonable. Bolts to extend right through nuts-fixed so as not to work loose. Hole not less than its diameter from edge of member, nor closer than 3 times their diameter to each other. (no specific sizes given).		
11	a) Walls, external 8½" min.thick for top 20'0", and 13" min.thick for		

	<p>remainder below. All party walls to be as thickness as in London Building Act 1894.</p> <p>b) Other enclosing walls not supported by frame to be as per 1894 Act.</p> <p>c) all coverings (brick etc) to be properly bonded in cement mortar close up to frame with no cavity behind.</p>		
12	No steel in pillar to be less than $\frac{1}{4}$ " thick - methods of jointing, gusset plates etc.		
13	Width of cast iron pillar = 5" min, of metal $\frac{3}{4}$ " min thick (or 1/12th least width of pillar) - cap and base of pillars - joints to have 4 holes min, of bolts not less in dia, than thickness of metal (but reduced proportionately if more than 4 holes used - to a min. of $\frac{3}{4}$ " dia).		
14	Base of pillar properly bedded to transmit loads uniformly.		
15	Stress on any metal between a superimposed pillar and a pillar beneath, not to exceed stress on the superimposed pillar.	new	still valid in 1914
16	All floors and staircases with their enclosing walls to be of fire resisting materials and carried on supports of fire resisting materials.		
17	Metalwork to be clean, covered with 1 coat tar or paint before erection and 1 coat after. When encased in brick etc, a cement wash may be used.		
18	<p>a) dead load defined - actual weight of walls, floors, roofs, partitions.</p> <p>b) superimposed loads - all other loads.</p> <p>c) loads - domestic 70lbs/sq.ft. office 100lbs/sq.ft. (public 112lbs/sq.ft.) not in later</p> <p>warehouses 224lbs/sq.ft.</p> <p>roofs - 20° or over from horizontal = 28 lbs, including wind load. - all other roofs = 56 lbs inc. wind load.</p>		
19	<p>Reduction of loads for storeys below roof and top storey (except warehouses):</p> <p>a) next storey below top, reduce by 5%</p> <p>b) next storey below, reduce by 10% and by 5% for all lower storeys.</p>		

20	Horizontal wind pressure = 30 lbs/sq.ft. on upper 2/3rd of surface exposed to wind.		
21	Working stresses given in tables for cast iron mild steel pillars and for eccentric loadings.	new	still valid in 1914
22	Stress in wrought iron pillars not to exceed 2/rd of those for mild steel pillars.		
23	Limits shear on rivets.		
24	Working stresses on iron and steel (other than pillars) given in listed table.		
25	Bearing pressures of differing foundation conditions.		
26	Pressure on concrete founds not to exceed 12 tons/sq.ft.		
27	Height of brick pillar without lateral support = 6 times its width. With lateral support + 12 times its width. (never less than 13½").		
28	Pressures on differing types of brick-work (listed).		
29	Provisions for concrete, materials, proportions, as L.C.C. may prescribe.		
30	Use of skeleton frame in extensions or alterations of existing buildings.		
31	Conditions under which any new standardized structural metals may be used.		
32	Submission of drawings and calculations.		
33	D.S. to approve quality of materials.		
34	L.C.C. powers to modify or waive requirements in certain subsections (fire protection, of pillars, girders acting together, wall thickness, cleaning and painting, mortar, pillar connections, wind pressures, foundation pressure, proportions of brick pillars.		
	Appeals.		

L.C.C. REINFORCED CONCRETE REGULATIONS 1915
 made under Section 23 of the L.C.C. (General Powers)
 Act 1909
 came into force 1 Jan 1916

TABLE 26
 Sheet 1

Source: 'Concrete and Constructional Engineering Vol X,
 No.8, p.377 on.
 Reference in text page : 531

CLAUSE No.	SELECTED CLAUSES related to building design and construction (outline of coverage only given below)	LINKS	
		ANTE	POST
1-6	PART I Definitions-scope-skeleton frame-use of party walls - floors, stairs of incombustible material roof, may have wood framing - no electrical current through reinforcement - notices, plans.		
7-24	PART II Dead load-superimposed load, domestic=70, hospitals=84, offices=100, public-112, ball/drill halls=150, museums/warehouses=224 lbs per sq.ft. Stairs=120 lbs/sq.ft. Roofs as for steel regs. 1909. Rolling loads-partitions. Wind pressures (as steel), working load-weight of concrete-144lbs/cu.ft.		
25-41	Span: depth ratios; bending moments for various conditions of fixings; of beams and of slabs.		
42-54	Working stresses listed; hooks and anchors; grip; modular ratios.		
55-71	PART III Beams - bar sizes, reinforcement, shear, splays, brackets.	new (see also T12.s1 and T19.s1)	
72-79	Slabs - depths, bar sizes.		
80-93	Resistance moments-notation-formulae.		
94-125	PART IV Pillars and struts - reinforcement sizes; binding, notation, formulae.		
126-135	PART V Walls - thickness = 4" min. in r.con. - brick 8½" for top 20'0" and 13" below. Openings may be up to 2/rd of wall area per storey. Party walls of r.conc. 8" min. (13" to warehouse or steel frame building) - mortar - pressures on brickwork.		
136-7	PART VI Foundations-pressures. on plain conc. = 12 tons/sq.ft.		

138- 143	<p>PART VII Protection - cover to reinforcement - end 2", pillar 1½", beams 1", slabs ½" (and not less than dia. of bar).</p>		
144- 172	<p>PART VIII Materials and testing-quality and proportion of materials, manner of mixing and placing, compressive strengths after 1 and 4 months.</p>	new	
173-7	<p>PART IX Formwork and centering.</p>		
178- 188	<p>PART X Workmanship - as continuous as possible - protect from frost - no cutting which might reduce strength (for pipes etc) wood fixing blocks in concrete.</p>		

Conclusion

CONCLUSION

This concluding chapter examines the significance of the more important findings which this study has brought to light. These findings can be conveniently discussed in three groups, and are arranged in a sequence which runs from the general to the particular. The three groups are:

- 1) The influence on the building regulations of factors outside the world of building,
- 2) factors associated more closely with the world of building, and
- 3) factors which are directly associated with the regulations themselves.

The final pages examine the legacy of the building regulations as it has been inherited from the nineteenth century.

*

1 The first section concerns the influences which came from outside the immediate world of building. The more obvious facts that made the new controls necessary in the early nineteenth century are familiar and need only be restated briefly here. They include the growth of the towns, the increase in building in the urban areas and the dangers to public health and safety which resulted from these pressures. But behind these pressures there were more subtle and less obvious forces at work which, whilst not having direct physical manifestation, nevertheless had a permanent and marked effect on the evolution of the regulations. These were:

- a) the role of Government, changing political attitudes and the function of the machinery of Parliament,
- b) the growth of local government, and the antagonism between local and central government,
- c) the importance of London, Liverpool, and the relationship between London and the provinces, and
- d) the relationship between law and public opinion, and the influence of 'vested interests'.

*

1a Role of Government, changing political attitudes and the function of the machinery of Parliament

In the 1840's, the concept of a domestic and social legislation, which

would have been the appropriate area of legislation to include building regulation, was seen by politicians and much of society, to be quite alien to the proper role of Government. Higher matters - of financial and foreign policy - were the proper responsibilities. For the first half of the century, the emphasis was very much on the defence of the rights of the individual, the sanctity of his private property and the maintenance of his vested interests. It was for these reasons that many of the early proposals for building regulations, desirable as they may have been within the context of building, nevertheless failed to win support. One such proposal was clause 21 of Lord Normanby's first Bill of 1841 (see page 58), which was deliberately phrased to prevent the back-to-back house. This clause was rejected, for the reasons mentioned above, by the Select Committee enquiring into the Regulation of Buildings in 1842 (page 35), and again by the Royal Commission on the State of Large Towns and Populous Districts in 1844 (page 46). Had it been passed - in what was intended to be the first National Building Act - the effect on the housing form of many nineteenth century towns would have been substantially different. But as it was, Leeds continued to build back-to-backs through the nineteenth century (page 455), and under Doncaster's by-laws it was still possible to build back-to-backs in 1902 (page 468). Indeed, not until 1909, did Section 43 of the Housing and Town Planning Act prohibit, on a national basis, the building of the back-to-back house (page 475).

Besides this resistance to entertain domestic reforms, government in the first half of the century, was insecure and lacking in confidence. The caution of the Tory Ministry of Peel between 1841 and 1846 was, for example, one of the main reasons why the reforms recommended in the Reports on the Health and State of the Towns in the early 1840's failed to be achieved. Lord Normanby's first Bill for a national Building Act succumbed in 1841 as the Government fell (page 33), and the early Public Health Bill was lost as a result of Peel's resignation in 1846 (page 142).

Between 1846 and 1867, most Governments were markedly unstable. There were eight separate administrations and for much of the time, no Ministry could maintain a stable majority. Issues were confused, opinions changed quickly and the prospect for any fresh building

legislation was bleak. This coloured not only the difficult period preceding the new Building Act for London in 1855 (page 80), but also accounts for the extreme reticence and caution which was reflected in the publication of the first Form of By-laws of 1858 (page 224). After the Reform Act of 1867 however, the political scene cleared as the lines between Gladstone and Disraeli became more clearly drawn - Gladstone tending to retard domestic reform, Disraeli to encourage it. For example, Sir Charles Adderley's attempt to secure a consolidated Public Health Bill was thwarted by Gladstone's ministry in 1871 (page 246), and again in 1873 (page 248). But with the return of Disraeli and his Conservative Government in 1874, the situation eased significantly. The Public Health Act was passed in 1875 - and within it, in section 157, came the important extension of the powers to make building by-laws (page 251).

The return of Gladstone to the Premiership in 1880 and the domination of Liberal politics until 1894, marked a return to policies which had less direct effect on building regulation. Indirectly however, two statutes did have important consequences. The Franchise Act of 1884 (page 308) extended the vote to rural areas and eased the later extensions, in 1890 and 1901, of the by-laws into rural areas, and the Local Government Act of 1888 (page 309) introduced the system of county, urban and district councils. The result was an increase in their power and an improvement in their administration, facts which served to maintain and extend the scope and operation of the local building by-laws, and to diminish further any call for a National Building Act.

At the end of the century the Government was fully occupied with overseas and imperial issues and again less with domestic matters. With the Boer War of national concern in 1900, it was not surprising for the problem of the rural by-law to fade in significance (page 449), and for the gallant Building By-law Reform Association to be frustrated as a result.

Whilst political activity had these effects on the evolution of the regulations, it was also the case that the machinery of Parliament could affect its progress. The pattern of formal procedures : drafting a bill, the three successive readings in both Houses, the intervening

and often lengthy Committee and Report Stages - all served to delay and frustrate very many proposals for reforming the regulations. When the Government fell in 1841, Lord Normanby's first bill fell with it (page 33), and when Colonel Sykes valiantly attempted to introduce new measures to control fire, in his bill to amend the Metropolitan Building Act in 1862 (page 171), his efforts were in vain simply because the time in the current session of Parliament was insufficient. Again, it was at the Committee Stage that the Metropolitan Building Act amendment bill fell in 1874, assisted by the entrenched attitude of the Metropolitan Board of Works (page 182), and the conflict between the respective roles of the Commons and Lords did little to help the passage of the Building By-law Reform Association's Bill in 1906 (page 406). On the other hand, there were instances where Parliament made positive alterations to a bill - as an expression of the interests of its members rather than on the advice of its technical advisers. The House of Lords, for example, responding to commercial pressures, raised the maximum permitted height of buildings in London to 90'0" in 1890 in the formative stages of the new London Building Act (page 363), although it was subsequently modified, on the reflection of a Select Committee of the Lords, to 80'0" (page 402). But in general the evidence confirms that the operation of the Parliamentary machine was a hindrance to the passage of new building regulations. Any enthusiasm for the initial reforms was quickly dissipated, compromise was accepted as inevitable, and the final legislation weaker as a result.

1b The growth of local government and the antagonism between local and central government

The establishment of an efficient system of local government was one of the most important legislative contributions of the nineteenth century. Its sources have been charted in Chapter III and, after the passing of the Municipal Corporation Act in 1835 (page 130), it grew steadily, with increasing effectiveness, throughout the century. It was important because it provided the administrative framework which in turn resulted in a more effective operation of building regulation. It also generated, after the passing of the Local Government Act in 1858 (page 147), a controlling central body, in the Local Government Act Office, and subsequently, the Local Government Board. In London

a parallel situation occurred with the passing of the Metropolis Local Management Act in 1855 (pages 162, 169), and the establishment of the Metropolitan Board of Works, forerunner of the London County Council.

There was always an element of distrust and suspicion between local and central government, which mounted at times to almost open antagonism. This distrust - as it was seen between a local authority and the Local Government Board - did much to cloud the critical relationship between them, and consequently, the introduction and operation of the building by-law controls.

Distrust and suspicion appeared, in different guises, constantly throughout the century. Liverpool sensed it, and decided to promote its own Building Act in 1842 (page 26) rather than succumb, as it saw it, to the national Act implied by Lord Normanby's Bill of 1841. Tom Taylor sensed it when he issued the first Form of By-laws in 1858 - the Forms were, he emphasised, "solely in the way of suggestion" (page 224). It was still there at the end of the century when Russell, Parliamentary Secretary to the Local Government Board, told a deputation from the RIBA in 1899, that the business of the Board advising local authorities "was always a delicate matter, owing to the jealousy of local authorities at the interference of a central authority" (page 448). It even operated within a local authority, as the new London Boroughs sought to wrest building regulation control away from the larger L.C.C. in 1890 (page 510). These tensions go a long way to explain the sensitive nature of this aspect of legislation, and the difficulties of interpretation and implementation which still characterise the building regulations.

The local authority sought to maintain its autonomy as far as it could, but since it could not make its own legislation without recourse to Parliament, central control dominated - though to outward appearances administration rested at the local level. This fact is important and quite fundamental to building regulation both in the nineteenth century and today : whatever a local authority wished to incorporate in its regulations had to be approved by central government - that is, its agency in the Local Government Board. The approval granted by the Board to a local authority's proposed by-laws

was in fact a very tight form of control. It meant a change in the emphasis of the "Model" By-laws, from being mere suggestions to positive requirements.

Yet behind all this lay a further important factor. These regulations were largely permissive - a town did not have to make building by-laws at all, if it did not so wish. In section 157 of the Public Health Act of 1875, it stated that a local authority "may" make by-laws, not "shall". Any mandatory control would have interfered with the 'natural' forces of growth and the economic development of the towns, and might have jeopardized the elected positions of the men who represented these very towns in Parliament itself. Nevertheless, as the century progressed, many more towns did come to accept the controls embodied in the Model By-laws, in acknowledgement of the wider benefits and welfare of the town. This change of attitude was largely due to the growth of a more humanitarian concern for public welfare - ideas that go back to Jeremy Bentham and the Utilitarian movement - and also to the more obvious fact that the operation of these by-law controls could be seen to be having beneficial effects on the general state of the towns, which had adopted the Model By-laws at an early date (such as Birmingham in 1877).

The predominant concern was expressed by the urban areas. It was not until nearer the end of the century that pressures built up to extend the 'benefits' to the rural areas. Then a further reaction was encountered between central government and the local representations made by the more wealthy landowners (page 459).

1c The importance of London, Liverpool and the relationship between London and the provinces

Two cities in particular had important roles in the evolution of the building regulations: London and Liverpool. Their contribution in terms of the details of the regulations is held over until the third section of this chapter.

London held the key. Here was the seat of Government and the location of the Parliament which formulated and effectively controlled the pattern of the building regulations in the rest of the country. London had its own long and respectable history of building regulation and, as

one of the fastest growing cities, it generated and resolved a number of building problems well before the rest of the country. To a lesser extent, Liverpool faced many similar problems as a result of the Irish immigration in the 1840's and the growth of the seaport and trade. It also had a history of its own building regulations.

The lead set by both cities and the precedents they established in their own regulations, (both jealously maintaining their local acts throughout the century), were used as a model for the formulation of much of the subsequent provincial legislation. Yet their influence was not constant throughout the century. Both had an influence in the first half of the period, when the use of the statute was seen to be the preferred method of building regulation. They were then eclipsed in the 1870's by the emergence of the By-law as the favoured means of control - and London, for example, fell back significantly as it attempted time and time again to secure a major alteration to the weighty Building Act - in the long period between 1855 and 1894. At the end of the century however, the achievement of the London Building Act of 1894 and, to a lesser extent, the Liverpool Improvement Act of 1888, came back to the fore as sources of new controls in the Model By-laws. (The details of these influences are discussed in section 3 below).

Rather as the local authorities were suspicious of central control, so they were equally suspicious of the power, privilege and position of London. Its special treatment - its exclusion from the Public Health Acts of 1848 and 1875 for example - could only serve to reinforce that view. Furthermore, any form of national building act which took London's Acts as a model - as did Lord Normanby's Bill in 1841 - must have been viewed with distrust by the provincial towns. The reasons for this lie in further examples of attitudes which characterise this country - a preference for the small scale, the local and parochial, a jealous guarding of local independence and a rejection of distant large scale legislative intervention. Seen from the provincial towns, any proposal for a national measure emanating in fact from Parliament was identified - and rejected - as being synonymous with London and all it stood for.

1d The relationship between law and public opinion and the influence of 'vested interests'.

There is in this country a feeling for conservatism, for maintaining established forms. We prefer our new legislation to conform to the traditions of the old. We tend to prefer piecemeal legislation, counselling caution at every step. This conservatism was a fundamental attitude held by the public, influencing particularly its opinion of the law in the nineteenth century. Then, as now, we prefer to deal with the particular and identifiable problem, rather than with the broader issues which may lie beneath the problem. We prefer to use precedent whenever possible. The implications of this latter point will become more clear when the internal nature of the regulations is considered later.

These basic factors go a long way towards accounting for the slow evolution and the multiplicity of the early building regulations. There is, of course, some truth in the counter argument that such an approach ensures a sounder and more well formulated legislation, despite the delays and frustrations involved. But in relation to building where, particularly in the nineteenth century, the demands for safety were many and varied, the need for a quicker and bolder approach to legislation became painfully apparent. The machinery of legislation was correspondingly laborious and lethargic. The simple extension of the enabling Act which would allow the by-laws to control the construction of hearths, for example, took 15 years - from the Public Health Act of 1875 to its amendment in 1890. Yet the hearth was virtually universal, and, in relation to the potential fire danger from its proximity to floor timbers, one of the most critical areas requiring control.

Dicey argues(1) that the law makers of the nineteenth century were older men, and they tended to implement the ideas which had been current in their youth. This helps to explain why those who prepared the Public Health measures in the 1870's were, in a sense, not only consolidating existing legislation but also basing their new ideas on those of the 1840's - and again on the ideas of Jeremy Bentham. Disraeli himself, supporting the vision of "Young England" in the 1840's, was to emerge at the head of the reforming administration in the 1870's. The first half of the period, from 1840 to 1875 can be

seen therefore as a gradual move towards the implementation of the Benthamite ideal of "the greatest good of the greatest number", and the second half, from 1875 to 1914, as a move towards what Dicey called the "collectivist tendency" - that is, the move towards socialism and the intervention of the State for the benefit of all. Such changes in opinion are reflected in the pattern of the evolving building regulations. For example, the triumph of the Public Health Act in 1875 could be seen as the culmination of the earlier tentative movement towards the idea of public health originating in the Reports of the 1840's; then, as an example of the "collectivist tendency", the gradual domination of the Local Government Board after 1875 as it rose in power and influence, co-ordinating, as the agent of the State, the standards of the various local building by-laws. This in turn led to a reaction, marked by organised protest in defence of the individual, in, for example, the Building By-law Reform Association of 1902 (page 459). A further factor which had an important and persistent effect on the evolution of the regulations was the protesting voice of the groups who represented various 'vested interests'. These groups were drawn mainly from the new middle class (whose effectiveness increased after the extension of the franchise in their direction in the Reform Act of 1832), and their interests were principally the results of the expansion of trade and industry in the nineteenth century. Any building regulations which threatened to interfere with their business activity were therefore liable to be resisted strongly.

It was, for example, the boiler manufacturers, needing larger factories unrestricted by fire compartment walls, who succeeded in 1860 in securing an amendment to just that effect in the Metropolitan Building Act (page 170) ; it was the representatives of the timber trade who successfully resisted any controls on timber stacks in London (page 172); and it was the warehouse men who claimed larger compartment sizes, even though they were fiercely opposed by the Fire and Insurance offices (pages 173-5). In 1841 it was the builders and surveyors of London, Birmingham and Leeds who feared the loss of 'useful' land if the back-to-back house was prevented (page 43); in the 1890's it was the hotel trade and office developers who protested against the 45° and 63½° 'shaving clause' and the controls on lightwells in tall buildings (pages 402, 405, 411), and it was the 'City' who feared the effect of the retrospective measures proposed in the fire

escape clauses of the London Building Act (Amendment) Act of 1905 (page 521). Even the upper classes began to protest, as their 'vested interest' in the provision of cheap cottages for their agricultural labourers began to suffer as the building by-laws were extended into the rural areas at the end of the century (page 459).

Above all, however, it was the shopkeeper who made the most persistent complaints. He objected to the open "area", required to give air to a cellar, being in front of his ground floor shop window (page 38), hence the incorporation of the grating in the relevant clause in the Metropolitan Building Act of 1844 (Table 4, sheet 1) (page 73). He objected to having to put steps up into his shop (pages 41, 282), as a result of having to raise the floor above the damp proof level - hence the involved solution proposed by the architect to the Local Government Board in 1890 (Table 9, sheet 2) (page 291). He objected to the requirement for a yard at the rear of his premises to remain open - since he preferred to extend the full depth of his site for the largest shop area (page 82) and hence the allowance in the Metropolitan Building Act of 1844, and again in the Act of 1894, for the open area to be measured above the level of the ground storey (Table 4, sheet 7 and Table 14, sheet 1). He objected to a building line, when he wanted to extend his shop into the front garden, beyond the 'general line of fronts' (page 165). He objected to the rules made in 1905 to control the construction of the roof of his shop when it projected in front of the upper storeys (page 523), and he persisted in seeking the widest possible spans for his shop window, with the minimum of interference by way of supporting structure, to leave no impediment to the insertion of the newly developed plate glass shop window (page 539).

These, and many similar instances of demands from the 'vested interests' were always carefully heeded. Their total effect, throughout the nineteenth century, was often more immediate and effective, because of their closer relation to the electorate, than the more learned deliberation of the professions. But even there, vested interests were at work. Had not the R.I.B.A., in considering the Steel Frame regulations in 1909, insisted on its traditional right to design the interior structure, independent of the external structure, for fear

of losing its control to the engineers and surveyors? (page 527).

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2 In this second section, the factors considered are those concerned more directly with the building world. They may be summarized as follows:-

- a) the nature of the building industry,
- b) new developments in building - new types of building, new materials, structure and services,
- c) advances in a more scientific understanding of building matters,
- d) the effect of building disasters on the regulations,
- e) influences from abroad,
- f) influence of the professions,
- g) influences from the changes in architectural style,
- h) influence of building journals and other publications.

2a Nature of the building industry

The nineteenth century witnessed the emergence of the general building contractor, with a proper concern for organized business. Some firms, such as that of Thomas Cubitt, Holland and Hannen and the Lucas Brothers, achieved well established positions. But seen against the total quantity of building and builders they were a minority. Most building, particularly that at the speculative housing level (to which the building regulations were primarily addressed), was undertaken by small firms employing only a handful of men or relying heavily on sub-contracting (2). And they continued to build in the traditional methods inherited from the previous century.

Building regulations have to reflect the general building practice of the time. They cannot be ahead of it, nor must they maintain the worst practices of the 'jerry builder'. They are slow to respond to innovation. The London Building Act 1894, for example, still required the inner leaf of a cavity wall to be the same as the full thickness stipulated in the traditional wall thickness schedule (Table 14, Schedule 1 cl.5), and yet Knight's Annotated Model By-laws had

included a reasonable clause for cavity walls in 1890 (Table 10, sheet 1). Again, the Model By-laws of 1912 gave only cautious encouragement to a steel frame structure - "The Board have not included any provision allowing walls to be constructed of steel framing, but would be prepared to consider a proviso allowing this form of construction" (Table 21, sheet 1, cl.14) - and yet the L.C.C. General Powers Act 1909 had specifically dealt with regulations for steel skeleton framework (Table 25).

These inconsistencies clearly reflect the confusion and contradiction which resulted from the combination of the two factors - a fear of innovation and a desire to maintain traditional building technique. The level at which the regulations was pitched was critical. In building, which lacked accurate scientific accountability and relied on empirical method for its progress, the incorporation of innovations into the legislation obviously had to be considered with caution. Equally, since the regulations had to be understood universally even by the least educated builders, the regulations had to be phrased (albeit in their own legal terminology) to correspond to the generally accepted techniques understood by the majority of builders. This was the dilemma - the nature of building and the nature of legislation were fundamentally incompatible.

2b New developments in building - new types of building, new materials, structure and services

The changes in the regulations to respond to these factors are numerous, but they are all characterized by the length of time between being first raised and finally accepted by the legislation. Just occasionally the gap was relatively short - in the case of hollow bricks, for example, it took just two years between the Official Referees' ruling in the test case in Clerkenwell in 1853 (page 93) and the rewording of the Metropolitan Building Act in 1855, replacing "sound" and "solid work" (which had legally prevented hollow bricks) with "hard and incombustible" and "solidly put together" (page 94). But that was an exception - usually the interval was considerably longer. Concrete walls for example took nearly 20 years, between Joseph Tall's experiments in 1867 (page 191) and the By-laws made in London in 1886 to permit the general use of concrete (page 352).

Reinforced concrete was foreseen in the L.C.C. General Powers Act of 1909 - but the controlling regulations did not come into operation until 1916.

In connection with materials it is important to realise that their increased availability, as a result of the extension of the railway system, influenced the evolution of the by-laws. (The acres of Welsh slate on the roofs of the 'by-law' houses in many industrial towns is evidence of that availability). The consequence for the building regulations was that they could now be drafted by the Local Government Board in the knowledge that nearly all towns could readily obtain the same range of materials, and that therefore the pressures from local authorities to use local materials would be eased. This was a further reason why the extension of the urban based by-laws into the rural areas - away from the direct transport routes - caused so much concern at the end of the century.

The development of services within a building caused a number of minor changes to the regulations, in response to the more intensive use of heating and lighting. At a minor level one might note the increases made in the width of chases in the party wall, in the Metropolitan Building Act of 1855 (page 167), in response to an increase in the amount of plumbing work: and an alteration to the rule controlling the distance of hot pipes from timber, according to the relative heat of the pipes containing air, steam or hot water, again in the same Act (Table 6, clause 21). Rather more serious was the omission of rules to control gas lighting, which came into more general use in the latter half of the century, and which caused a fire hazard unanticipated by the Metropolitan Building Act of 1855 (page 184). No rules were made to cover this danger - which is surprising considering that rules were made for hot water pipes, relatively a less hazardous source of fire.

The house and warehouse were the two original areas of building regulation control. From the house form there evolved two further types - the shop and the office. The consequences for the regulations from the development of the shop have already been noted in 1(d) above. For offices, or 'chambers' as they were originally termed, commercial pressures succeeded in removing the threat of the $6\frac{1}{2}$ ¹⁰

"shaving clause" (page 411) and the clause regulating the central light well in tall blocks, from the London Building Act of 1894. Fire-resisting construction for stairs and floors in premises over 2,500 sq.ft.were, however, maintained (page 409). From the warehouse regulations came the principle of 'compartmentation,' subdividing a large space to prevent the spread of fire. In London, commercial pressures again succeeded in increasing the volume of the compartment - from 200,000 cu.ft. in 1844, to 216,000 cu.ft. in 1855 and to 250,000 cu.ft. in 1894. Liverpool retained similar controls but, because of the limits of the Public Health Acts, no such controls were incorporated in the Model By-laws.

The early regulations had not anticipated the multiple use of a building and the dangers, particularly from fire, which could result from parts of one building being occupied by separate tenants. Living rooms of flats above public houses, or over separately tenanted shops, became more common. Living "over the shop" gradually changed as people were prepared to live further away from their place of work. For the regulations, the consequences can be seen in clause 74 of the London Building Act 1894 (Table 14, sheet 8), where the 'horizontal party floor' was introduced to separate domestic and trade areas in buildings over 1000 sq.ft.in area (page 409).

Tenement blocks, again with many sub-tenants, had a similar fire risk, and fire-resisting construction for stairs and floors in buildings over 125,000 cu. ft. and party walls in tenement blocks over 3,600 sq. ft. in area were stipulated in the Metropolitan Building Act of 1855 (Table 6, sheet 6). Hotels, as a new building type, broke through the constraints of the domestic regulations and, in London, were treated separately as 'public buildings'. Other new building types, such as Exhibition buildings and railway systems, both exempt from the London regulations, established useful precedents for later legislation by demonstrating more ambitious structures in iron, glass and concrete (page 529). Finally, the increase in building height (as a result of economic forces, the development of the skeleton frame structure and the development of the lift) brought further legislation, in three important areas: first, the relationship between building height and the width of the street (page 411), secondly, an attempt to secure adequate ventilation and daylight to the lowest rooms in the taller

buildings (page 372) and finally, to achieve adequate means of escape in case of fire (page 522).

2c Advances in a more scientific understanding of building matters

Although the nineteenth century saw significant advances in experiment, invention and scientific analysis, they made little impact on building, and what results there were filtered through only very slowly into the building regulations. Traditional beliefs and methods, the result of the latent conservatism noted earlier, were the reasons for this. Changes were due to empirical deduction of the observed phenomena, rather than to any rational analysis. But what is interesting is the fact that there was an obvious realisation that such rational and justifiable explanations were required. Many curious patent systems for drainage and ventilation were supported by a pseudo-scientific explanation. Listeners to Mr. Collins' talk at the Institute of Health Exhibition in 1884 would have been impressed to hear of the mysterious analysis of "ground air" by Dr. Pettenkofer in Munich (page 298). Others could debate endless theories of daylight or the thickness of a wall or floor timber, seeking support in the authority of Rondelet (page 97). Others could propose absurd heights of nonsense for the rules proposed in Sir William Molesworth's Bill of 1855 (page 97).

Looking more closely at the problem of the wall thickness as an example, one can see the embodiment of traditional thinking running right through the century despite the obvious desire for a more rational approach. Up to 1851, the thickness of a wall was determined simply by the "rate" of the building - that is, its type and area (pages 98, 165). Then, after 1851, the proposal was made for a finer distinction, based on the length, height and number of storeys and, in an effort to simplify, the same rules were made to apply to both party and external walls. These were then incorporated in the Metropolitan Building Act of 1855 and subsequently transferred and incorporated in the Model By-laws of 1877.

It was Joseph Boult from Liverpool who, in 1886, pointed out the obvious fact that party and external walls had very different functions, external walls being subject to weather and reduced in strength by window openings, party walls generally receiving extra

support from floor joists and cross walls. But, except for extending the wall thickness schedule up to 120'0" in height, the scale of dimensions in the London Building Act of 1894 followed very closely that of the Model By-laws of 1877 (compare Table 8 sheet 11 with Table 14 sheet 14).

Only at the very end of the period did evidence of a more scientific analysis enter the field of building regulation. Two examples are obvious - one, the increasing intervention of the structural engineer in calculating the forces, (dead and live loads for instance), that would determine the sizes of a steel or concrete framed structure (page 524), and second, the work of the British Fire Prevention Committee (page 513). The results of their early, and admittedly crude, tests on doors under fire conditions at their Fire Testing Station in Bayswater in 1899, revealed alarming misconceptions which had been incorporated in the London Building Act of 1894, and led to their correction in the amendment Act of 1905 (pages 513-515).

2d The effect of building disasters on the regulations

In certain cases it is possible to correlate a building disaster with an alteration in the regulations. Liverpool, for example, amended its Building Act following the major fire in Formby St. in 1841, introducing as a result, stricter controls on the cubic size of warehouses and the extension of their party walls to 5'0" above the roof. The fire at the Mercer's Hall in London in 1853 was due, so it was claimed, to the proximity of hot pipes to the woodwork. As a result, a revised clause was inserted in the Metropolitan Building Act in 1855 (pages 90, 168, 187). In the health field, the notorious Peel Grove case had the almost immediate result in the passing of a special national statute to deal with the problem of building over disused burial grounds (pages 298, 352).

In general however, the pattern of cause and effect was less direct and obvious, and the interval between a disaster and the subsequent legislation to prevent its occurrence was often lengthy. Consider, for example, the succession of fires in London in the middle of the century - at Gilbert Street in 1858 (page 171), or at Tooley Street in 1861 (p 171), which resulted in major public enquiries and reports calling for an amendment to the Building Act. Bills to achieve this

were proposed, such as that of Colonel Sykes in 1862 (page 171), but with no success. Again, there were a succession of fires in London between 1897, at Cripplegate (see page 512), and 1902, at Queen Victoria Street (page 515), which resulted in only a small amendment to the Building Act's list of fire-resisting materials and, in 1905, the addition of further provisions for fire escape (page 515). The reasons for these delays can be accounted for, once again, in the familiar combination of the legislature's caution, the workings of Parliament and the pressures of the 'vested interests'.

2e Influences from abroad

The two countries that provided the most useful lessons were France and America. It was France's methods of concrete construction, of fire-resisting construction and their control of the relationship between building height and grander street widths that were admired, but there is no evidence of any direct influence on the contents of the regulations, with the exception perhaps of the L.C.C. reinforced concrete regulations of 1916 owing something to the principles of the Hennebique Ferro-concrete system, since it was used in the London General Post Office extension (page 529). For much of the century however, the general English suspicion of French techniques seems to have prevented their adoption in this country.

Looking to America however, the lessons were taken with more enthusiasm. The New York Code of 1899 was a direct influence on the R.I.B.A. when they prepared their Bill of 1904 to control frame structures (page 526), and the subsequent L.C.C. General Powers Act of 1909 incorporated steel frame regulations that were the result of direct studies of American practice made by the L.C.C. (page 527). Even Montreal's By-laws of 1901 (page 517), which controlled the distance between roofs and windows had an influence on the clause controlling shop roofs which projected in front of upper storey windows, in the London Building Act Amendment Act of 1905.

2f The influence of the professions

Taking the professions in order of seniority, the first is the legal profession. Here, it must be admitted, any positive contributions are difficult to identify. The impression gained is of the maintenance of a dead hand, apparent in the lethargic and tedious drafting of the

legislation. It is also clear that, as the century progressed, and as the technicalities of building increased, the problems of interpretation of the regulations became more difficult, reflecting the lawyers lack of knowledge of building. This would have done little to endear the building regulations to the legal profession - and in turn, the legal profession will have done little to advance this branch of legislation. This may be inferred from the remark associated with the Metropolitan Board of Works new Bill of 1874. They wished to keep the old style of language of the existing legislation "to avoid new questions arising" (page 176).

In contrast, the medical profession played a very significant role in the early years of the building regulations, between 1840 and 1875. It was then that nearly all the new 'health' rules - for space about building, heights and drainage - were added to the older existing rules for fire and stability. The strength of their cause was maintained partly by the mystery of their science (and in some critical matters, such as the transmittance of certain diseases by air, it was dangerously wrong), which could not be challenged, and partly by the force of their spokesmen - Dr. Duncan, Sir John Simon and Dr. Liddle, for example. Many of the dimensional standards for the 'health' regulations were decidedly weak, lacking any precise foundation, but given the authoritative backing of the medical profession, they were unquestioned and written into the regulations from an early date.

The architectural profession was less involved in the early formative years of the regulations, whilst the medical profession were to the fore. It was younger and smaller and whilst there were some architects, such as John Hansom (page 68) and George Godwin (page 86), who foresaw the implications for architecture from the development of the regulations, for the majority of architects the gulf between the art of architecture and the regulation of insanitary slums was wide enough to cause them little concern. They were generally conservative in their discussions of building regulation matters - as their desire to retain the old "rating" system to determine wall thicknesses, as late as 1851, reveals (page 98). But they later came to regret this conservatism and rather distant stance of these early years - for it was then that the 'health' regulations were introduced, and it was the 'health' regulations which were to cause the greatest controversy in

later years - for example, the conflict between high ceilings required by the regulations and the low rooms required by a revival of the vernacular style of architecture at the end of the century .

After 1875, the architectural profession assumed the leading position in all discussions on the building regulations. "The medical profession have had a little too much their own way in framing these clauses" said J. Mathews at the RIBA Conference in 1878 (page 270) - a conference which, significantly, was largely devoted to discussing papers on the Model By-laws and a General Building Act. The profession maintained this position for the rest of the century, ably represented by men like Mathews, Thomas Blashill, Arthur Cates and Lacy Ridge. Only occasionally were there any lapses - such as when the over-dominance of the R.I.B.A. by its London members revealed itself in their proposals to extend the party wall controls (from the London Building Acts) to the Rural By-laws of 1901 (page 447), and when it reacted to the implications of the frame structure regulations in 1909 (page 528), which apparently threatened the autonomy of the architect in structural design.

It is at this point, at the very end of the period, that the structural engineer assumed an important position, alongside that of the architect. The steel and reinforced concrete frame regulations that followed the L.C.C. (General Powers) Act of 1909 really mark this event. They imply, in the complexity of the technical regulations themselves, a division of knowledge and responsibilities and the clearer separation of the two professions.

Finally, mention must be made of the emergence of the municipal engineer and surveyor, parallel to the growth of local government, yet often desparate in his attempts to implement the building regulations. The voices of Ellice-Clarke and Lewis Angell (page 287) confirm that desparation. More particularly, there was the distinctive and positive contribution of the London District Surveyor - an architect by training and more autocratic than his provincial counterpart. He had, as it were, a foot in both the architectural and regulation camps, and the influence of his opinions - from men like Alfred Bartholomew and George Godwin, through to F. Banister-Fletcher and Bernard Dicksee, was important throughout the period (3).

2g Influences from changes in architectural style

Direct correlation between changes in architectural style and changes in the building regulations in the nineteenth century is difficult to define precisely, but there are a number of instances where the inference may be drawn with a reasonable degree of certainty.

The London Building Act of 1894 included clauses to allow the freer use of oriel and bay windows, wooden bargeboards, and to permit door and window frames to be once again fixed flush with the outside face of an external wall (pages 399, 407). This corresponds very closely to the return of the 'Queen Anne' style in London's building after 1880, a style characterised by its informality, asymmetry and free interpretation of eighteenth century forms. To a revival of interest in a grander, almost Baroque, Renaissance style at the end of the century, one can attribute the changes made in the same act to free wooden cornices from an incombustible covering (page 408), and more significantly, to allow cornices to project more freely, the only restrictions being to cornices which projected over the public way (page 408).

The influence of the French Renaissance style, very much in fashion after the new Louvre of 1852, and, with its mansard roof, very suitable for including additional storeys in the roof, had an influence on the London regulations. The style and form were particularly appropriate to hotels - such as The Grosvenor and Langham, and set the pattern for a number of buildings which sought additional floors above the legal limit of the maximum wall height. The number of storeys in a roof had been controlled in the Metropolitan Building Act of 1844, at one storey only, but then the clause was omitted from the 1855 Act (page 195). Liverpool had tried to retain a single storey in the roof in its Bill of 1869 (page 239). By 1894, the pressures for using this device had, in London, resulted in two storeys being permitted (Table 14, sheet 4).

Further examples include the desire to break away from the Georgian tradition of a proportion of approximately 50% between the solid and void in an external wall. Desparate attempts to secure greater and less formal fenestration, particularly for shop windows, had led to

the otherwise unnecessary adjustment of the extent of the parapet or basement walls, simply to balance the proportion as required by the regulations. The 1874 Bill to amend the Metropolitan Building Act had sought to use brick piers, to compensate for the reduction in actual wall area (page 194), and by 1894, the London Building Act went some way towards accepting these pressures by excluding the ground floor storey (which might be all shop window) from this half void/half solid rule.

A related topic was the prospect of the building regulations actually regulating building design. To the older, and possibly more adamant and established architect, such aesthetic control did not seem undesirable. (page 364). To Alfred Waterhouse for example, it would only improve the appearance of London and confirm the acceptability of the art of architecture. But in 1876 the R.I.B.A. had objected strongly to the idea of submitting elevations as part of the building regulation submission (page 274). In 1889, Thomas Blashill spoke out against legislation controlling design, since he was afraid that any such legislation would kill a new style of architecture before it could become established - and the desire for a new style, a national style, was constant in all architectural circles (page 358). Furthermore, when Dr. Longstaff of the L.C.C. sought advice from the R.I.B.A. in 1893 on the best proportions for street widths and building heights, (page 399), he received only a negative reply. Many architects feared any form of regulation which would in any way impinge on their art of architectural design. There is a parallel here with the contemporary movement in the profession which objected to any form of examination of architectural design. Many, and particularly those who supported Norman Shaw and Thomas Jackson in their memorial "Architecture, a Profession or an Art", of 1892, would have felt the same way about the danger of aesthetic assessment in both architectural examination and building regulation.

Finally, it is important to note the gradual assembly of a number of topics which were to be later re-assembled and incorporated in the new discipline of town planning. The layout of streets in relation to gradients, sunlight, and direction (pages 277, 360, 349, 397), the call for public open space (page 397), the problem of co-ordinating buildings in relation to a building line, and the relationship between

built height and form and the spaces between building - these were all anticipated in the building regulation field, but found their appropriate realisation in later town planning practice or legislation.

2h The influence of building journals and other publications

The coincidence in the growth of the weekly building journals, particularly 'The Builder', and the development of the regulations is significant. Here was a controversial subject which affected nearly all its readers and, in the earliest period before illustrations became easier to produce, the very detailed language of the regulations could be fully covered in print. The early issues would print the text of a proposed bill in full, with comment and explanation often occupying the editorial and correspondence columns for a number of successive weeks. A full analysis, such as the "Cyclopaedia of the Metropolitan Building Act of 1844" was published as a supplement to 'The Builder' by Bartholomew in 1844 (4), and again, there was a supplement giving a full account of the later Act in 1855 (5).

But later issues would refrain from printing the full text, partly because of the length of the later regulations, and partly because of the lack of space in the journal as the range of interests, and illustrations, increased. It was also assumed that the interested reader would have bought his own copy of the published Act. In the analysis of the London Building Act of 1894, for example, 'The Builder' did not print the full text of the Act itself.

The popularity of an illustrated annotated explanatory book - such as Knight's Annotated Model By-laws (see Bibliography) was confirmed by the rapid succession of editions, and the increase in the detailed commentary within each volume - and it reflected, of course, the growing complexity of the original Model By-law document itself. It also acted as a medium for unofficially confirming various changes in the by-laws, changes which the Local Government Board would accept, but which had not been incorporated in a revised official set. (The regulations of 1883 and 1890, Tables 9 and 10 respectively, are examples of these unofficial "Model" by-laws).

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3 This third section moves closer to the pattern and content of the building regulations themselves and examines the significant factors under the following broad headings:

- a) precedent, standardization, the pattern of linkages between the regulation and highlights within that pattern,
- b) respective merits of the by-law and statute as a means of control,
- c) the grouping of the regulations in topics,
- d) direct controls, and interrelated or variable controls, and
- e) exceptions, restrictions and omissions.

3a Precedent, standardization, pattern of linkages between the regulations and highlights within that pattern

Precedent was used whenever possible in the evolution of the building regulations. The reasons for this have already been discussed - they include the benefit of experience gained by application of the earlier rules, and desire to ease the work of the legislature, to ease their introduction, avoid controversy and facilitate their implementation in practice.

In a similar way, standardization was used whenever possible. Chapter III discussed the "Normal" Act, the Preliminary Enquiries Act, the role of Parliamentary Committees in rationalising proposed bills and gave examples of individual towns copying each others regulations. The focus of these trends was the Clauses Acts, and in the case of building regulation, it was the Towns Improvement Clauses Act of 1847 which was therefore the key statute in this respect. It was a Model - it contained model clauses for insertion in any local improvement act, establishing a precedent for local by-laws to insert Model By-laws some thirty years later.

The importance of London and Liverpool has already been mentioned in the first part of this concluding chapter. In terms the Acts and regulations themselves, their relationship with the evolving pattern of the provincial by-laws was very important. Taking London first, with a history of building regulation dating back to 1189 (6), the links came through the London Building Act of 1774 (where many basic regulations can be traced, including roof coverings, rainwater

disposal off roofs and party walls) and on into the basic framework of Lord Normanby's Bills of 1841. The Health of Towns Report of 1840 had recognised the need to maintain the traditional matters of the earlier Building Acts whilst the new health measures were incorporated (page 27). The 1774 Act and Lord Normanby's Bills of 1841 became the basis for the major Metropolitan Building Act of 1844, and that, in turn, the basis for the Metropolitan Building Act of 1855. Three years later, the first Form of By-laws in 1858 bore striking similarities to both the Metropolitan Building Act of 1855 and the Towns Improvement Clauses Act of 1847. Finally, the Metropolitan Building Act 1855 and the Form of By-laws 1858 formed the basis for the 'first' Model By-laws of 1877.

Liverpool, marking its rejection of Lord Normanby's Bills, produced its own Building Act in 1842 - based again on the precedents of its earlier Acts of 1825, 1835 and 1839. They are important for their early inclusion of regulations to control the sizes of floor and roof timbers, though their direct influence was not felt in the provincial and Model By-laws until 1890 (see below). Liverpool's Amendment Act of 1843 (page 185) was important both for its compartmentation of warehouses and also for its use of retrospective powers - well before the only other example discovered, that of the London Building Act (Amendment) Act of 1905. It played an important part also in 1864 when the Bill to amend the Metropolitan Building Act of 1855 was being discussed in relation to the fire-resisting construction of warehouses (page 180).

Towards the end of the century, Liverpool's influence returned. The Improvement Act of 1882 dealt with hearths, concrete walls and supports to openings in external walls, ahead of the Model by-laws (page 293) and the Improvement Act of 1888, which still retained the timber controls in almost exactly the same form as those of 1842, was used as the basis for the timber controls in the Model By-laws of 1890. The 45° angle for determining the relationship between building height and open space at the rear was formulated by the Surveyor, Goldstraw, in 1890, and it acted as the basis for a similar rule in the London Building Act of 1894, although it was modified to $63\frac{1}{2}^{\circ}$ (page 304). The use of reinforced concrete was recognised in the Liverpool General Powers Act of 1908 (page 471), just ahead of London, although it must

be noted that reinforced concrete did obtain a fleeting mention in the Intermediate Model By-laws of 1905.

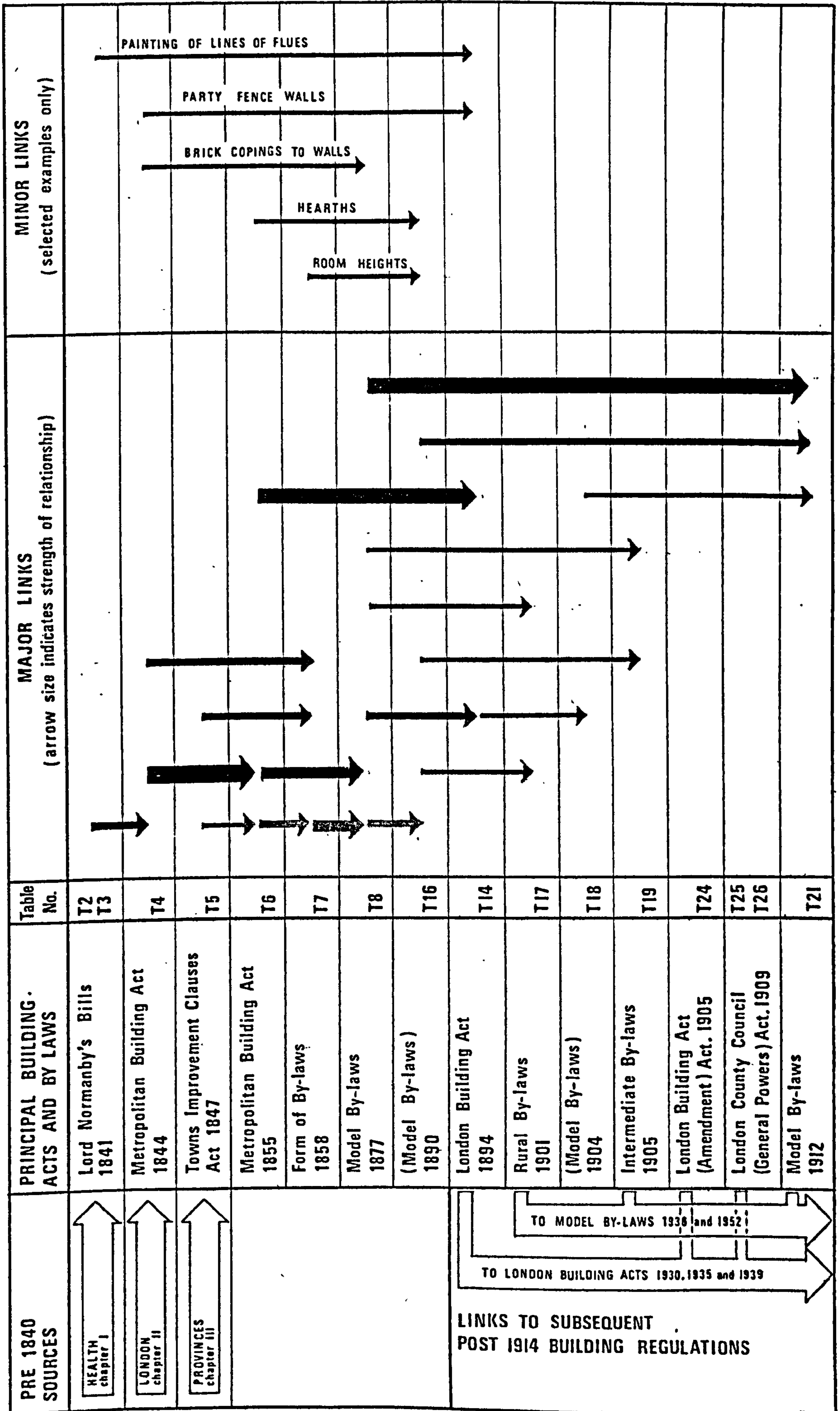
Finally, London resumed its dominant position at the end of the century. The Building Act of 1894 drew, naturally, on its predecessor of 1855, and also, more interestingly, on the Model By-Laws of 1877. At the very end of the period, the fire escape provisions in the amending Act of 1905 and the steel and reinforced concrete provisions of 1909 and 1916 respectively, confirmed London's leading position.

The diagram on the following page is a simplified summary listing the more significant Acts and By-laws, bringing out the major links between them and, as a contrast, examples of minor topics which link across from one set of regulations to another.

Whilst the diagram is over simplified, it does help to show the importance of the Form of By-laws of 1858, as the focus of much of the preceding legislation and as the direct precursor of the Model By-laws of 1877. The link to the Metropolitan Building Act of 1855 is revealing - it marks the first effective link (unlike the abortive bills of Lord Normanby) between London's legislation and a set of provincial 'Model' by-laws.

The 1858 Form of By-laws was however, far from perfect. The range of its regulations was erratic and inconsistent (pages 225-7). One suspects that Tom Taylor and his assistants in the Local Government Act office were unsure how far they could go in producing a non-mandatory model document. The tone of the covering letter would seem to confirm that the clauses were to be confined to "points of general application" and that they were issued "solely in the way of suggestion" (page 224). Nevertheless, despite that caution, the Form was used as a model - Doncaster and Bradford both followed it for example (page 230) - but equally, it was to prove to be something of a false dawn, as its objectives were later frustrated by the discovery of legal limitations in the wording of the Local Government Act of 1858 (page 233).

3b Respective merits of the by-law and statute in building regulation
The merits of the two main types of regulation - statutory act or



by-laws made under powers contained in a statute - may be summarized as follows: The Act could be specially tailored to suit the requirements of a particular town, but it was expensive to obtain, difficult to compose legally (though the use of model clauses was an aid) and very difficult and expensive to alter, since it necessitated recourse to Parliament for a fresh amendment Act. The by-law on the other hand was relatively easier to produce, using the Model as a guide, and, although it could in theory be altered to suit local conditions it was, as noted earlier, constrained both by the Local Government Board and the Statute under which it was made. The Board were reluctant to admit many variations from their model, and the wording of the main Act could be a severe restriction. A clear case of this was the wording of the critical section 157 of the Public Health Act 1875 - noted at the time by the architect Arthur Cates (page 275) - which prevented by-laws being made for hearths, and a vertical damp proof course in a basement wall, since they were not legally part of the 'structure'.

The pattern that emerges is of the early domination of the Local Act, or Improvement Act, often based on the Towns Improvement Clauses Act, and holding its own from 1840 to the mid century (although some towns, notably London and Liverpool, and also Leicester and Bristol) continued to operate their own 'local' Building Acts throughout most of the century. After the 1850's, the local by-law becomes the main medium for building regulation. Even London introduced by-laws for streets in 1857 and for aspects of building in 1877 (page 345), in spite of some anxiety amongst the London architects at the possible misuse of power by the Metropolitan Board of Works, as they drafted and implemented the by-laws without recourse to Parliament. In London and Liverpool however, the apparent rigidity of the Building Act was to some extent tempered by the powers of the District Surveyor - which were more independent and liberal than the powers possessed by his counterpart in the provincial towns operating the by-laws.

The important turning point in the move from local Act to local by-law is marked by the Report of the Royal Sanitary Commission of 1871 (page 245), who came out in favour of the by-law rather than the Act as the best means of building regulation - and this was largely due to the evidence given by Robert Rawlinson, Chief Inspector of the

Local Government Act office, in 1870 (page 253).

3c The Grouping of the regulations in topics

Throughout the period, the regulations in both the Acts and the by-laws were always grouped under general topic headings - relating to streets, wall structure, space about buildings, drainage etc. This was obviously convenient in that it gave order to the regulations and no doubt was appreciated by the legislature, both in drafting the regulations and identifying and implementing them in the courts. But from the builder and architects' point of view it had one drawback. It bore no relation to the sequence of design and construction or inspection, and only rarely to the actual interaction which occurs between the many component parts of a building. This is even more apparent today - but its sources can be seen in the nineteenth century. Roof and soil drainage came within separate groups for example - indeed, in London, they came under separate Acts for a period (the Metropolitan Building Act 1855 for roofs, the Metropolis Local Management Act of the same year for soil drainage).

3d Direct controls, and interrelated or variable controls

The move in the nature of the building regulations from direct, one-to-one controls to more variable and interrelated controls is one of the more interesting and important developments in the nineteenth century. It marks, albeit in still simple terms, a move towards a more sophisticated technique of control.

Wall thicknesses had a limited variable control at the opening of the period. In the Metropolitan Building Act of 1844, domestic buildings were classed in four 'rates', according to heights, area and number of storeys - and the wall thicknesses were determined accordingly. By 1855, this had altered and eased, the wall thicknesses now having a wider scale of permutations, reflected not only to the height and number of storeys, but also to the length of the wall. Furthermore, recognition was now given to the additional support offered by floor joists and cross walls, and the schedule of thicknesses could be modified further in the light of these additional supports.

The size of open yards to houses was set in the Metropolitan Building Acts at 100 sq.ft, regardless of the height of the adjoining

properties. By 1858, the Form of By-laws introduced the important concept of relating the distance across the yard to the number of storeys in the adjacent house. By the time of the Model By-laws of 1877, it was determined by the height of the house. In London in 1882 the open space increased in area according to the length of the frontage of the house (Table 12, sheet 1); by 1890, the Model By-laws were prepared to permit the shape of the yard to be adjusted to suit actual site conditions (Table 10, sheet 5), and by 1894, the London Building Act introduced the $6\frac{1}{2}$ ' 'shaving clause' to control the form of the adjacent building in relation to the yard.

The Metropolitan Building Act of 1844 controlled the size of footings under walls by specifying the size of the projections to either side of the base of the wall (Table 4, sheet 10). By the time of the next Act, in 1855, a general formula had been introduced (Table 6, sheet 9), and this general formula, relating the size of the footings to the thickness of the wall and in turn facilitating the calculation of the footings for the wider range of wall thicknesses (see above), was taken on and incorporated in the Model By-laws of 1877 (Table 8, sheet 14).

3e Exceptions, Restrictions and Omissions

There are a number of miscellaneous and minor points which can be conveniently brought together here - all characterised by their negative properties.

Legislative restrictions included the following: There was not - and indeed there never has been - an adequate legal definition of a "building" - yet that was the object of the legislation. There was always a fringe area of doubt. Was a building on wheels, with no foundations in the ground, actually a building? Was a framework erected to support a stack of timber, an obvious fire hazard of some size, yet without walls, floor or roof, legally a building?

There was also a difficulty in interpretation. The definition of 'structure' as shown already, prevented the making of by-laws for hearths and vertical damp proof courses, or 'sound and solid' prevented the use of otherwise suitable hollow bricks. More fundamental was the problem of defining "rebuilding". Warehouses that burnt almost to the ground could apparently be rebuilt on their old foundations

without proper party walls between them (page 194).

And then there was the restriction of the legislature's language, the unacceptable idea of using a diagram rather than words in a legal document, the resistance to any retrospective legislation, and the tendency for regulations to become fossilized within a succession of acts or by-laws. Many regulations, admirable when first introduced, long outstayed their welcome and were difficult to remove. The rule relating the size of an openable window area to the floor area (not cubic content of room) remained until 1965. The controls on ash-pits survived until 1976.

The regulations were always basically negative - they assumed the provision of all the common ingredients in a building and then proceeded to control a selection which came within their terms of potential danger, from health, fire or stability. But, as was noted in 1881, the regulations never said that a new house need actually have a floor, or a door, or a window, or plumbing (page 287), and there were therefore anomalies and unexplained omissions. Room heights may have been controlled, but (except for Liverpool and other towns at the end of the period) never room areas. Roof coverings were always controlled, to ensure the restriction of the spread of fire, but not (except in Liverpool and the Model By-laws after 1890) the actual construction of the roof structure underneath that covering.

Finally, a number of building types were outside the building regulations altogether. Royal Palaces, gaols and session houses may have had some justification for exclusion on grounds of security - but it is hard to accept that lunatic asylums, railway and dock buildings, exhibition buildings, schools and government offices "authorized by the Secretary of State" did not have as much potential danger to the public as the house, warehouse, shop or office. There was however an indirect benefit from the exclusion of certain buildings. The London railway terminals and the Crystal Palace of 1851 both demonstrated structural feats in iron and glass beyond the restraints of the regulations (page 170), and the Admiralty, War Office and G.P.O. extension offered an opportunity for the potential of reinforced concrete to be more fully exploited (pages 72, 163, 218, 95).

The legacy from the nineteenth century

The preceding sections have identified and discussed the implications of the more significant factors which influenced the evolution of the building regulations in the nineteenth century. These final pages review the principal elements which constitute the legacy we have inherited.

By 1914, all the main building regulations that were considered essential for the safety of the general public had been established - even though they were not in one document and nor were they in operation everywhere. The regulations relating to fire and stability, inherited from the eighteenth century, had been brought up to date and the regulations concerning matters of health had been incorporated. Over this period of 75 years, the regulations had developed from the primitive level of the 1840's to a degree of sophistication which was revealed in the steel and reinforced concrete regulations of 1909 and 1916. Despite their many shortcomings, it must be acknowledged that this represented a substantial achievement.

The consequences of this important period in the history of the building regulations are summarized in the following paragraphs - the first three reflecting on the more beneficial aspects, the last three on those that were more deleterious.

First, to their credit, the nineteenth century building regulations did achieve their initial aim-that is, they achieved a satisfactory level of control over the health of the public in relation to buildings. It may require an effort of the imagination to accept this, as the state of many parts of our present towns is by no means perfect. But remembering the grim state of the towns, as revealed in the Report on the state of Health of Towns in 1840 for example, it has to be acknowledged that without the building regulations and their basic achievements in securing a modicum of space about buildings and effective drainage, the dangers of disease would not have been averted.

Secondly, by their very precise terminology, and with the support of explanatory books, such as those of Charles Knight, the nineteenth century building regulations must be credited with achieving and maintaining a basic yet acceptable level of sound building construction.

Backed by the force of law the regulations acted as a mechanism to tighten and maintain standards. This is confirmed by the inclusion of many of the regulation requirements in building construction text books of the time (7).

Thirdly, although they were not to become the appropriate medium, the building regulations of the nineteenth century paved the way for the easier introduction of town planning controls. There was an area of overlap here - many of the regulations relating to space about buildings, building height, street widths and building lines are now seen to be more appropriately a part of the town planning legislation. But by facing a number of the indirect pressures at a much earlier stage - such as the problem of interference with private property and the power of the 'vested interest' as described in the first part of this chapter - the early building regulations did a service for the future of town planning in helping to break down much of the initial resistance and inertia.

On the debit side, the nineteenth century regulations had the following less beneficial consequences. The first was the well known phenomena termed 'By-law housing'. The minimum standards of the regulations became, in the eyes of the speculative builder, synonymous with the maximum. It was inevitable, given the motives of maximum density and profit, and the lack of planning controls, but it was never the direct intention of the by-laws to promote the monotonous grid layouts of the by-law street housing estates. The regulations did not say that the street had to be straight, nor laid out regardless of contour or aspect, nor that the houses should be identical and repeated in long terraces. They were 'healthy' and adequately built, but bleak and drab in appearance. Yet they served, in turn, the useful purpose as the target against which the more liberal and imaginative ideas of the garden city movement could be aimed.

Secondly, the slow and piecemeal process of growth, on an unscientific basis and under the control of a legal profession which was not over-familiar with the world or practice of building, left a legacy of many rigid, complicated and often archaic regulations. Embodied firmly in the legislation, they were repeated again and again in successive editions, yet often with very little amendment. Many

clauses remained virtually intact from the Model By-laws of 1877 to well into the present century. Model By-law No 53 of 1877 required an open space 24'0" wide in front of a house, except for erections up to 7'0" in height - precisely the same requirements were repeated in Model By-law No 68 in 1953.

Finally, for the reasons already discussed, the nineteenth century failed to achieve a national Building Act - something which even now is only just in sight. In an age which was concerned with promoting a national image, and in architecture the idea of a new national style was desperately sought, it is revealing to see how far back and at times how near this country came to achieving a national Building Act. There was a call for a 'General Building Act' in the Health of Towns Report of 1840 and Lord Normanby's first Bill of 1841 was intended to apply to the whole country, but the tension between local and central control was always sufficiently strong to prevent any national measure succeeding. That mood of the nineteenth century left a permanent mark on the present century and explains why it took until 1965 for a national set of Building Regulations to be achieved - but even then tradition was maintained and London was allowed to continue with the operation of its own Building Acts.

NOTES TO CONCLUSION

1. A.V. Dicey, "The Relation between Law and Public Opinion in England during the Nineteenth Century", London, 1905, Second edition 1934. p.34.
2. D.J. Olsen, "The Growth of Victorian London", London, 1976. p.155.
3. C.C. Knowles and P.H. Pitt, "The History of Building Regulations in London 1189-1972", London 1972. pp 152-154, for the full list of names of the London District Surveyors in the nineteenth century.
(The names of the following may be selected on account of their wider significance in the history of Victorian architecture: Alfred Bartholomew, Charles Fowler, George Godwin, Edward l'Anson, F. Banister-Fletcher, Thomas Blashill, Robert Kerr, T. Roger Smith and Rowland Plumbe).
4. Supplement to 'The Builder'.
B.Vol.2 No.92 9 Nov. 1844 (20 pages)
5. Supplement to 'The Builder'
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6. C.C. Knowles and P.H. Pitt, op.cit.
7. For example: Rivington's Series of Notes on Building Construction.
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