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Space – the final frontier: Sustainability & housing standards

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Introduction
This paper briefly describes how building control and ultimately housing standards developed in England from the twelfth up to the mid-twentieth century. It argues that once the medical and technical problems of human settlement were solved and standards began to be based on purely spatial considerations they became unsustainable, particularly with the mass ownership of private cars and low density urban sprawl.

The early London Building Acts
These Acts[1] are of interest because London experienced many of the growing pains associated with industrial expansion long before the Industrial Revolution.

From mediaeval times, construction in London was regulated in the interests of protecting property rights, safety from fire, structural stability and public health. Fitz Alwyne's Assize of 1189 dealt with shared walls. Thatch was banned at an early date. An Act of 1212 required workshops and bake-houses to be whitewashed and plastered inside. Forms of construction and materials found to be wanting were forbidden and good practice prescribed or encouraged. The judgement as to what was good or bad was based on normal building practice and on people's experience as well as on the occasional disaster.

Urban sprawl had become a problem as early as 1592 when an Act of Elizabeth forbade any new building within three miles of the city. In 1602 new buildings were forbidden except on old foundations. A proclamation of James VI and I in 1605 required all persons, "to build their forefront and windows either in brick and stone as well for decency as by reason all great and well-grown woods are much spent and wasted, so as timber for shipping

[1] Unless otherwise referenced the information in this section is taken from Davidge (1914)

waxed scarce." An Act of 1656 laid down a fine for any building on new foundations unless it had four acres (1.6 Hectares) of land (Knowles and Pitt, 1972).

The Metropolitan Building Act of 1844 extended the area of London covered by legislation. It laid down a width for new streets of forty feet (12m) or the height of the buildings, if greater. It also dealt with open space about buildings, requiring a minimum of one hundred square feet (9sq.m.) for dwelling houses. Every building had to have some roadway access to it wide enough for the scavenger's cart for waste removal. Under the 1894 London Building Act working class dwellings were to be set back to increase the width of the street to be equal to the height of the new buildings.

Disease and public health

In 1357 Edward III having, "beheld dung and laystalls and other filth accumulated in divers places in the said City upon the bank of the said river ... also perceived fumes and other abominable stenches arising therefrom ... ," ordered that no more rubbish or filth be thrown into the Thames or Flete Rivers or into the Fosses around the walls of the city, but all must be taken out of the city by carts (quoted in Simon, 1890). Edward III was also actively involved with the isolation and exclusion of lepers, from 1346 onwards (ibid.). In response to the recurrent outbreaks of the plague during the later Middle Ages there gradually evolved a public policy whose area of control ranged from movement of people between towns to quarantine of shipping and the closing of burial grounds. These attempts to combat the plague are the first example of the organisation of scientific knowledge by government. Paving Acts were passed in 1532 and earlier, and Henry VIII was responsible for Water Acts in 1581 (Davidge, 1914). It was from Henry VIII that the Royal College of Surgeons received its charter which protected the public to some extent from unqualified medical practitioners.

Hospitals originating in monastic foundations provided the opportunity for the comparative study of disease and the regular collection of statistics which began during the Stuart period (Simon). This was linked to the beginnings of life insurance. The first table for the calculation of annuities appears in an early Philosophical Transactions of the Royal Society in 1693 (Lazarsfeld, 1961). However the miasma theory was not ousted and disease shown to be a natural phenomenon until Pasteur discovered germs in the middle of the nineteenth century and provided a rational explanation. This marks the beginning of preventive as distinct from curative medicine.

With the rapid growth of the industrial towns and the development of ideas about hygiene and sanitation the state began to play more positive role. This consisted of the setting up of commissions to discover what health conditions actually were like, compulsory registration of births, marriages and deaths and eventually the large scale public works of roads, water and sewers of the late nineteenth century.

Standards and the growth of scientific knowledge

Acute public health and civic order problems had been the original reasons for government intervention and by the end of the nineteenth century there was a desire to measure the effectiveness of government programmes, so that statistical comparisons led to the identification of standards of achievement as a means of assessment. This was in the context of the commercial and manufacturing world of the late nineteenth century where

standardization was taking place at an ever-increasing rate and everywhere associated with the idea of progress. Its power is perhaps best summed up by the famous dictum of Lord Kelvin concerning knowledge and number: "When you cannot express it in numbers your knowledge is of a meagre and unsatisfactory kind." (quoted in Kuhn, 1961). The efforts of the industrial philanthropists and in particular of the charitable housing associations had focussed attention on the relation between the quantity and cost of housing and therefore inevitably on standardization.

The growth of scientific knowledge has been characterised by Weaver (1958) as having had three distinguishable phases. The first was the handling of *simple, two variable problems.* Early science provided explanations: "The early city planners could properly consider that solutions to problems stood in direct one-to-one relation to demonstrated causes − typhoid to a water-carried salmonella, traffic breakdowns to unpaved muddy streets, rodent infestations to accumulated garbage, and so on." (Webber, 1969, 1974). The next stage which began roughly in 1900 consisted of handling many-variable problems of *disorganised complexity.* To this stage belong thermodynamics and statistics which grew out of the pioneering work of William Farr[2] and others. The third phase dealt with *organised complexity,* where numerous variables were seen to be in organised relationships to each other. Medicine and biology are typical of this most recent stage.

According to Shryock (1961), the advance of medicine in the second half of the nineteenth century was largely due to the taking over of quantification from the physical sciences. Thus problems previously considered immeasurable were gradually reduced to measurement. The success of clinical medicine had a profound effect on public health:

"In a word, vital statistics and calculations not only provided means of observation in public hygiene − as they had done since the late 1600s − but also had much to do with the direction taken by such hygiene after 1820. Curiously enough, the resulting sanitary program was quite non-specific − it was directed against no diseases in particular − at the very time when pathology was becoming engrossed with disease specificity. In consequence, public health almost ceased to be a medical field − sanitary programs could be, and often were, directed by statisticians and engineers, rather than by physicians." (Shryock).

When standard procedures or *'measures'* could be laid down, their implementation required merely that there be in the words of Wilks (1961) an "operationally definable process" which incorporated an adequate level of response to the problem. As Webber observed, most of the technical problems of cities had been solved during the nineteenth century. Therefore when in1889 Camillo Sitte published *Der Städte-Bau nach seinen*

[2] William Farr was the first Registrar of Births, Marriages and Deaths. His work on these 'vital statistics' included early attempts to fit equations to data. His work followed a long tradition of earlier investigators. "As early as 1602, Sully established a bureau of statistics in Paris; and from about 1660 on, the subject began to be taught in German universities. Pioneering studies of both economic and mortality data were published in England at about the same time by William Petty and John Graunt. … Data on French cities, for example, were complete enough by the 1820's to enable Villermé to calculate the relative life expectancy of workers as compared to that of the upper classes." (Shryock).

künstlerischen Grundsätzen (City Planning according to Artistic Principles) − moving the focus away from health to visual matters − it had a profound effect, especially on Raymond Unwin, who drew heavily on it for his seminal 'Town Planning in Practice' which first appeared in 1909 (Collins & Collins, 1965). It was natural then, that housing standards would deal with such non-technical matters as spacing and sunshine. Land was cheap and seemed to be in virtually unlimited supply. The future problems of suburban sprawl and mass ownership of private cars were not envisaged at the time.

The Garden City dream

It had often been observed that while it was very difficult to deal with the existing problems of bad housing and overcrowding, they might be prevented in future by more stringent control over new building (Ashworth, 1954). The first edition of Ebenezer Howard's (1899) book, 'Tomorrow – a peaceful path to real reform,' argued for the adoption of Town Planning. Significantly, the title of later editions was changed to 'Garden Cities of Tomorrow.' According to Creese (1964) Raymond Unwin copied the following from William Morris in his last notes: 'We must turn this land from the grimy backyard of a workshop into a garden. If that seems difficult, I cannot help it: I only know that it is necessary.'

The bye-law method of control became discredited because it had not been able to cope with the favoured new suburban type of development (Unwin, 1909) and because it took no account the new 'scientific' theories of light, air and sun (Herbert Lewis, 19l8). The two most significant pressure groups of the time were the Town Planning and Garden City movements. Town Planning provided the conceptual methodological apparatus, the latter the ideology and formal image for the new type of development. (Collins & Collins). The 1909 Housing and Town Planning Act brought these ideas within the mandate of local authorities, giving them the power to make wide ranging provision in Town Planning schemes. The explicit inclusion of 'amenity' and 'convenience' as objectives of the Act was highly significant since it marked a move away from purely hygienic considerations in housing standards.

Webber provides keen insights into early American and British planning ideas. The city was thought to be unnatural and inherently unhealthy and immoral. In order to counteract its intrinsically evil character, it had to be remoulded to resemble the country town that had preceded it. The middle- and upper-class supporters of city planning were confident they knew what was best, both for the migrants to the city and for society at large. There was a belief that people could be changed by changing their environment. The central strategy for turning immigrants into middle-class stable citizens therefore was to provide them with a middle-class physical environment. At the time many city governments had become corrupt. The reformers were, therefore, determined to keep their programmes out of politics. They found that technical professionalism was an effective way of keeping politics out of government (Webber).

This was achieved by pretending that housing standards were technical, whereas in reality they were political statements about how people should live.

Housing layout standards

It is not clear when the word began to be used, but *de facto* standards began to be applied as soon as numerical measures began to be used. The mindset was that of the 'two-variable problem' described above. The Tudor Walters Report (1919) contains explicit standards. The 'standards' recommended in the report were incorporated into the 1919 Housing, Town Planning, etc. Act as minimum standards and this package, as expressed in the 1919 Housing Manual (Local Government Board, 1919), complete with diagrams and plans became the essential shaper of most subsequent housing estates.

The 12 to the acre rule appears here. This had previously been given official approval in a Local Government circular of 1918. The 70 foot spacing rule appears here too (paragraph 23). Paragraph 25 states that the "width of the carriageways and footways should be determined by the probable traffic they will be required to carry," and that "adequate distance between the houses should be secured irrespective of the width of the roadway." In Appendix 4 it states that "the self-contained two-storey cottage type should be principally adopted." The document repeatedly stresses the importance of gardens, of open space, and of economy through simplification.

Of course this package of standards and examples was intended to be more than simply a better system for regulating building. It was an image of a new, healthier life style for the working class which was to change the face of the country. The impact on the private sector of the first house-building programmes under the 1919 and subsequent housing Acts was considerable. These ensured that private developers had to build in the garden suburb manner in order to compete, irrespective of whether they received a government subsidy. This became the established builders' vernacular whether controlled by a Town Planning Scheme or not, as Ashworth notes.

The beginnings of the housing density standard, can be found in William Farr's (1844) statement, " ... if the population be the same in other respects, an increase of density implies an increase of mortality; and ... the ratio of increase in the mortality is as certain roots of the density." Twelve houses per acre (30 per Hectare) produced the favoured Garden City environment. Density continued to be used in development control even though the public health aspect has been irrelevant for more than a hundred years and the food production aspect was soon forgotten when the breadwinner became a commuter.

The 'privacy' spacing standard seems to have arisen as follows. The discovery of germs was soon followed by the discovery that they could be killed by sunshine. This led to advice that houses should receive sunshine. The Tudor Walters Report (1919) stated: "Medical opinion is agreed" that houses should be no closer than 70ft. (21m). The 1919 Housing Manual which was closely modelled on that report merely states: "Sunlight is very rapidly obscured if the houses face one another at less distance than 70 feet (21m)." Already, the medical reasons are not mentioned. The resulting 21m spacing standard, soon made obsolete by antibiotics, was the ultimate result. By 1952 all the science has been forgotten and it has now become 'privacy' spacing. Up to the present day 'privacy' requirements have exerted a huge influence on housing layouts in the UK. As far as the author has

been able to ascertain, this notion first appears in print in 1952: “The windows of one dwelling should not directly face those of another unless there is a reasonable space between them. A dimension of 70ft. (21m) seems to be generally agreed as the minimum between rows of houses to secure privacy in this respect.” (Ministry of Housing and Local Government, 1952).

From problem to ritual

Housing remained under the control of the UK Ministry of Health for many years, although most medical and technical problems had been solved so that the original reasons for many standards no longer applied. Post hoc justifications began to appear. Theoretical controls were studied from 1935 to 1952. Some were influenced by Walter Gropius’ study which asserted that height limits were “superannuated” and should be replaced by standards controlling building bulk by sunlight and daylight. Major housing manuals published in 1944, 1949 and 1952. The government continued a programme of housing publications up to 1968.

Over time and with continuing government involvement, and increasing concern with cost control, the process became more bureaucratic. Experienced, practical, problem-solving builders like Raymond Unwin were supplanted by officials without the correct, or perhaps any, skills. Development control became increasingly paper-based and removed from reality. Eventually, standards were being applied without any knowledge of the reasons for their original purpose.

After 1968 there was a shift of responsibility for control of development to local authorities. Many began to issue their own guidance starting with the Essex Design Guide in 1973, which was widely imitated by other authorities. Exterior spacing standards remain and in some cases have become more onerous, e.g. a 35m ‘privacy’ spacing requirement in Essex, which lacked any scientific justification whatsoever.

A government research report noted, “… a tendency for advisory standards to harden into mandatory ones at local level.” (Woodford, Williams, Hill, 1976). That is to say, subtle, carefully qualified statements of central government advice were used locally as crude templates in development control.

Space − the final frontier

Negenter (1998) and other anthropologists have painted a convincing picture of the evolution of the human brain, based on study of the behaviour of the Great Apes. Nest-building on the ground and the associated need to stand upright over many millennia have made a major contribution to the evolution of construction and its impact on brain size. They suggest that this activity, carried out every night, has had far more impact than tool use. Other important aspects of this anthropological dimension are “fibroconstructive” territorial demarcation, the evolution of food control and sedentarisation:

“Regarding the parameter ‘social organisation of settlement’, it has to be noted here that nestbuilding, at least among gorillas and chimpanzees is recorded as a matter of groups. The nests of the group form a night camp of a distinct spatial organisation (value centrality and access-place scheme). … We have therefore ‘arguments’ for the assumption that ‘constructivity’ was from its early conditions related to social grouping and that this

produced some sort of spatial organisation, particularly in the case of dominantly terrestric nests." (Negenter)

It is difficult to escape the conclusion that there is a deep need for control over space, both for the individual and for the ruling elite. Use of words strongly suggests connection with territoriality and food control. Unwin (1909) made this connection, perhaps more explicitly that he himself realised:

"Twelve houses to the net acre of building land, excluding all roads, has been proved to be about the right number to give gardens of sufficient size to be of commercial value to the tenants − large enough, that is, to be worth cultivating seriously for the sake of the profits, and not too large to be worked by an ordinary labourer and his family."

Unwin's formula fitted well with what might be called the 'principle of separation' which had been employed to solve the problems of public health, such as control of the plague and leprosy, since mediaeval times. This universal solution had separated water supply from waste by providing piped, clean water, and also enclosed underground sewers thereby ensuring that the latter could not pollute the former. In a similar way it was known from experience that spread of disease could be controlled if not eliminated by keeping people apart from each other as much as possible. Contamination could be localised and contained if buildings were deliberately spread out to simulate rural conditions.

However, this "solution" eventually became unworkable when it became clear, in the words of a City Manager, of Lowell, Massachusetts, when he said, "We live in a finite space." (Anon., c. 1969). The food supply domain is no longer contiguous with the space occupied by the "tribe": food is now secured by commuting. But commuting actually is in conflict with food provision because it consumes the very land formerly used for food production. The rural idyll of low-density development has exacerbated this trend with its associated traffic congestion, pollution and consumption of agricultural land. Once the medical and technical problems of human settlement were solved and standards began to be based for purely spatial considerations they became unsustainable.

Ironically, the package of housing standards inspired by the ideal of healthy and sanitary living has led to the modern commuter life-style which, with relatively little walking or other physical exercise, has now become a danger to health. "Solutions are problems" (Zeisel, 1980).

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