The changing department store building, 1850 to 1940

Philip Steadman
Bartlett School of Environment, Energy and Resources
University College London (UCL)

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Between the 1870s and the Second World War the typical built form of the department store was radically changed. The 19th century stores were sited in the centres of cities and were punctuated by top-lit atria providing natural light and natural ventilation. From the 1940s stores moved to the suburbs and had deep artificially ventilated plans without windows, and large car parks. This essay follows the process, and identifies a series of causes: social changes especially the emancipation of women, changes in retail business practices, changes in transport technology especially the growth of car ownership, and changes in building construction notably the rise of air conditioning. Competition between the department stores and other types of retail business also played a part. It is suggested that the approach to explanation taken here may have application to processes of change in other types of building and institution.

Magnificent new premises were completed in 1874 for Au Bon Marché, then the biggest and most successful of all Parisian department stores. 1 The five-storey building, still in use today, occupies an entire block near the Jardin de Luxembourg in the centre of the city (Figure 1). It has great plate glass display windows along the four facades, cylindrical domed towers at the corners and a theatrical main entrance topped by a fifth dome on the Rue de Sèvres. The corner towers serve to make the store visible from a distance along the adjoining streets. As built, the ground, first and second floors were devoted to sales, while the third floor and the fourth mansard floor were given over to kitchens, refectories and bedrooms for the hundreds of demoiselles who served in the shop. In the basement there was warehousing and a department for receiving goods and sending parcels. The interior was punctuated with a series of glass-roofed atria (Figure 2). The architects were Alexandre Leplanche and then Louis-Charles Boileau, with some possible involvement of the engineer Gustave Eiffel. 2

In 1939 the Sears Roebuck Company built a department store on Pico Boulevard, Los Angeles. 3 The building has two sales floors and car parking on the roof (Figure 3). It has an extremely deep plan, without roof lights, and there are no windows on the upper storey. More car parking is provided out front. The architect was John Stokes Redden.

The Bon Marché building stands at the high point of 19th century department store architecture. The Sears building is an early example of the suburban store type that spread worldwide after World War II. How and why did the multi-storey top-lit atrium form first appear, and why was it transformed into the low-rise deep-

Notes:
1 The history of Au Bon Marché as a business is recounted by Miller (1981). Marrey (1979, p.59-83) describes the process of design and construction, with many illustrations. Au Bon Marché still trades in the building today. The exterior is little changed but the interior is much altered, as described below.
plan form? What were the social, commercial and technological forces that drove the process? This paper offers some explanations, with a classification of the forces of change under four headings:

1) The influence of wider external developments in society and technology, especially transport technology, and building services;

2) Changes in the nature of the activities carried on within businesses, and their consequences for built forms;

3) Competition between activities and businesses, and competition in effect between alternative built forms for the same activities, and

4) Functional failures in built forms, and their correction.

These causes can be found in combination, leading to a mutual interaction between, and ‘co-evolution’ of activity and built form types.4

Changes in society and transport technology

Let us start then with wider changes in society and transport technology. (We will come later to changes in construction technology and building services.) Department stores emerged as a new type of retail business in the mid-19th century.5 They catered in the first place to rich bourgeois and aristocratic clients, so the stores’ founders wanted to find sites in or near the districts where those clients lived, and from which they could easily travel by carriage or cab. In London this explains the concentration of stores along Oxford Street, following the westward movement of the city’s moneyminded elite towards the prestigious estates circling Hyde Park in Mayfair, Bayswater, Belgravia and Kensington.6 In Paris, the stores – several of them on Haussmann’s new boulevards – clustered in the richest quartiers to the northwest around the Champs Elysées and the centre of financial power at the Bourse (Marrey, 1979, p.249-256). In New York they followed Manhattan’s wealthy citizens up Broadway and Fifth Avenue as they moved north from the southern tip of the island, to reach Central Park by 1900 (Domosh, 1990).

In the mid-19th century ladies went shopping in pairs or groups, and might be served in their carriages by assistants rather than enter the premises themselves (Figure 4) (Adburgham, 1964, p.93). Or they might be ‘walked through’ the store to the appropriate counter by an attentive

Notes:

3 The name of Eiffel has often been associated with the design of the building, but his involvement is questioned by Robert Proctor (2003, p.231).

5 See Ferry (1960) for separate histories of many American and British businesses. Marrey (1979) provides a history of French stores up to 1939.

6 See Morrison (2003), Figure 159, p.160.
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Despite the implicit claim that omnibuses were ‘for all’, the fares were not easily affordable for the working classes, but they did allow the petit bourgeoisie to travel over longer distances to the shops. By the 1870s it had become socially acceptable for middle class women to travel unaccompanied. If the man of the family was using the carriage, his wife and children might take the bus. Figure 5 shows a happy bourgeois group going home from Au Bon Marché, an illustration used in the store’s publicity. Harry Gordon Selfridge advertised his new Oxford Street store by putting posters on buses urging people to ‘... spend the day at Selfridge’s’ (and by implication ‘Travel there by bus’) (Honeycombe, 1984, p.181).
By the middle of the century the centres of both Paris and London were ringed by mainline railway stations. The lines were not brought right into the hearts of the cities because of the price of land. So shoppers arrived at the terminals and transferred to buses or cabs; indeed these services in time became integrated with the railways in their organisation and finances. The trains brought yet more customers from the provinces to spend the day at the shops, who would take a break at midday for lunch, and perhaps would fit in a matinée at the theatre. In Britain, shoppers came to London’s department stores from as far afield as Bath and Cambridge – both cities with good shops of their own. As early as the 1870s, William Whiteley, proprietor of the west London store that bears his name, estimated that a quarter of his customers came from outside the capital (Lambert, 1938, p.73). The author Gwen Raverat described her mother, two decades later, coming home to Cambridge ‘famished and worn out’ after a day of London shopping (Raverat, 1960, p.95).

Some department stores picked locations with half an eye to this provincial clientele, including Whiteley who set up on Westbourne Grove, well to the west of the Oxford Street stores but close to the new Paddington Station. In Paris, Le Printemps and Galeries Lafayette are near the Gare St Lazare, and one of the Félix Potin stores was opposite the Gare Montparnasse. Many of the stores had large mail order operations delivering to the suburbs by van. (Au Bon Marché’s delivery vans are visible in Figure 1). The railways allowed the range of these services to be greatly extended. Shoppers who came into town from a distance could have their purchases delivered to their homes. Mail order trade was especially important in the United States and other countries with widely scattered populations. The great Chicago department store Marshall Field’s, like many of its competitors, ran a wholesale operation that until late in the century was bigger than the retailing business and supplied small shops across the middle west.

Railways were important to the stores for another reason: they transported much of the shops’ stock from provincial manufacturers. Some of the goods sold were high-priced, handicraft items. But the 19th century saw a huge growth in the mass manufacture of what had previously been expensive luxuries, but could now be brought within the price range of a much bigger customer base.

During the last quarter of the century the stores broadened their appeal among the social classes. Real incomes rose generally in Britain and France, and respectable clerks and their wives had increasing amounts to spend. Some women had earnings of their own before marriage. Half-holidays on Saturdays allowed working people to spend the afternoon shopping. The growth of international tourism, encouraged by the century’s world’s fairs, brought yet more clients: by 1900 the stores had become ‘sights’ and were featured in guidebooks.

Social, legal and financial changes occurred in this period that began to change the status of women, and gave them greater opportunities to spend their own (and their husbands’) money. The department stores were an important catalyst in this process. From the outset they cultivated a female clientele, and created for women something like the feminine equivalent of the gentleman’s club. In the stores, women shoppers could meet their friends, they could relax, eat and drink, write letters and generally feel at home – indeed for many, the stores were much grander and more comfortable than their own houses. In the days before radio and the cinema, the stores could offer an occasional escape for bored or lonely suburban housewives. Not the least important of the facilities provided were ladies’ cloakrooms and lavatories, which were rare elsewhere in public places in

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A few store proprietors like Harry Gordon Selfridge even believed that the stores contributed actively to the process of women’s emancipation (Honeycombe, 1984, p.24) – although Selfridge himself was a notorious womaniser. (It should be said that others argued the opposite: that the stores enslaved women in an acquisitive materialism.) The suffragettes were not entirely consistent in their attitude (Rappoport, 2000, p.215-217). In Newcastle they protested against their lack of the vote by smashing shop windows. But they planned their campaign in the tearooms of Fenwick’s department store (Lancaster, 1995, p.192).

Changes in the activity of shopping itself

We have looked at some of the forces in the broader social and technological ‘environment’ of the department stores – in particular the new transport technologies of the 19th century - that encouraged their emergence in the first place. My second cause of change in the built forms of the stores lies in the activity of shopping itself.

Some of the major department stores were founded as such: but others grew from modest origins as much smaller and different kinds of retail enterprise. Au Bon Marché had started in 1852 as a magasin de nouveautés with a staff of just twelve. These magasins, which appeared in Paris from the 1830s, sold fashionable clothes for women. Several other great Parisian stores had similar origins (Miller, 1981, p.21, p.25). Most department stores in Britain grew in a comparable way from drapery shops, or in a few cases from what were known as ‘bazaars’ – premises shared among many independent small traders. Draperies dealt principally in cloth, for bed linen and furnishings, as well as for making up garments. In the United States the first department stores developed from ‘dry goods stores’ – dry goods meaning textiles, ready-to-wear clothing and in general things not sold in hardware stores or groceries.9

The early growth of many of these stores in all three countries was by accretion, with successful draperies, magasins de nouveautés or dry good stores acquiring adjacent properties and opening successive new departments, perhaps in the case of draperies adding millinery (ladies’ hats), haberdashery (accessories), and so on. Whiteley’s grew by stages in this way in Bayswater, as did Harrods – starting from a grocer’s shop – in Kensington. Chicago’s Marshall Field’s started in dry goods and went through a long series of acquisitions and re-buildings.10

It has sometimes been argued that the success of the first department stores can be attributed to a series of radical innovations in business practice over their predecessors. The old-fashioned magasin or drapery, in this characterisation, was an austere, gloomy place in which the goods were kept in cupboards and little was on display. To enter the premises was a tacit commitment to make some kind of purchase. Items were brought out for individual customers to inspect. There were no fixed prices and it was customary to bargain. Every shop had its known clientele, who were afforded credit. The retailers’ margins were high.

By contrast the department stores – it was said – used elaborate window dressings and bright lights to tempt clients inside, and faced them with a cornucopia of goods on show once they entered. Shoppers could browse indefinitely without buying. All prices were fixed and shown on tickets. Payment was in cash, but some stores allowed clients to return goods if they were dissatisfied, and gave refunds. Prices might be reduced on slow-moving lines in order to speed turnover.

Notes:
9 See Ferry (1960). The term ‘dry goods’ originated in colonial New England, where merchants imported two principal commodities, rum (‘wet goods’) and calico (‘dry goods’).
10 Ferry (1960), p.124-137, and p.204-221.
There is much truth in all of this. However, as is often the case when history tries to draw sharp divisions, the transition was not so clear-cut. Some of these changes had begun a century earlier. There were draperies and fashion shops in London and Paris selling fixed-price, ticketed goods for cash from the late 18th century. The sociologist Richard Sennett explains the business reasons. These shops were growing in size and turnover. Haggling over prices wasted time, and in stores with many assistants, the owners were in any case reluctant to entrust such a delicate task to inexperienced juniors. The ‘showrooms’ and ‘warehouses’ that appeared in London at this same period selling luxury items like fine crockery, books or prints, encouraged browsing without obligation (Walsh, 1999, p.46-71). The wares were presented in elaborately decorated cases and shelves. Shopping was certainly a leisurely, pleasurable pastime for rich English and French men and women well before 1800, not least in the Parisian arcades of which the first were built in the 1780s and 1790s. As for display windows, these were limited in the 18th century by the technology of glassmaking, but by the 1830s there were English shop fronts with panes measuring four or five feet across (Eldridge, 1958, p.192-195). Draperies, ‘showrooms’ and the arcades pioneered the use of gas lighting from the 1810s.

The department stores were not then the first types of shop to have these features. They had all these things certainly: but what was distinctively new was the sheer scale of their operations, and the huge variety of goods and services they offered. The 1874 Au Bon Marché had 52,800 square metres of sales space and a staff of 2,000. Besides fabrics and readymade clothes for women, men and children, it had departments for shoes, furniture, carpets, stationery and toys. When the owner Aristide Boucicaut died in 1877 it was one of France’s most successful businesses, and ‘…probably the largest retail enterprise in the world’ (Miller, 1981, p.40).

By 1872, William Whiteley had more than 600 employees on site at Westbourne Grove and a further 2,000 elsewhere. The total was to rise to over 5,000 by the end of the century. Whiteley added food departments in the 1870s, much to the anger of local small grocers, and started to advertise his shop as ‘The Universal Provider’. In Chicago, by 1893 Marshall Field’s had grown to 100 departments served by 23 elevators and staffed by 3,000 employees (Wendt and Kogan, 1952, p.167, p.217-8).

The great volumes of business carried on by the department stores led directly to their second special characteristic: despite the shops’ luxurious image, many of the goods were cheap. This, after all, is what bon marché means in French. Au Bon Marché drew its first customers from the middle class, where other Parisian stores like Le Louvre for example served a more exclusive, richer clientele. But in all cases they offered better value for money than their smaller competitors. Because of their size the department stores were able to buy in bulk and could strike hard bargains with their suppliers. Some took to manufacturing in their own right. Volumes were high, turnover was fast and prices could be kept low, encouraging yet further growth in sales. If they were well run, the firms were cash-rich, which meant they needed to borrow less. Again, because of their size, stores were obliged to introduce modern methods of management, stock control, cash handling and staff training, all of which led to further efficiencies.

Another way in which the department stores did genuinely differ from most of their predecessors was that, besides adding ever more lines of merchandise, they branched out into a variety of services, comforts and entertainments. The 1874 Au Bon Marché had a buffet, furnished like a theatre bar, which served fruit juices and

Notes:
11 Davis (1966, p.187) gives the example of Flint and Palmer’s drapery and haberdashery, which operated on Old London Bridge in the mid-18th century. Miller (1981, p.23) says that Le Petit Dunkerque, a Parisian fashion shop, adopted a fixed pricing policy at the end of the century.
12 Sennett (1977, p.142) sees this as just one example of a general trend towards impersonal, anonymous interactions among strangers in the 19th century city.
13 For gas lighting in the arcades, see Geist (1983).
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Cakes free of charge. There was a reading room with magazines and newspapers (Figure 6), a regular programme of concerts, and an art gallery. Whiteley’s in London, at this same date, was adding an estate agency, a cleaning and dyeing service, a hairdressing salon and a restaurant. Other stores put on fashion shows and exhibitions. William Whiteley applied to the Paddington magistrates for a licence to serve alcohol, telling them that many of his customers who came up from the country needed ‘a glass of wine and a biscuit to sustain their energies’ (Lambert, 1938, p.72-73). His application was refused, on the grounds that it might lead to immorality; but he did serve some nice fish lunches. It was all these extra attractions of course, along with the shopping, that further encouraged the customers to ‘spend the day at the shops’.

Changes due to competition between the department stores and other types of shop

My third generic cause of changes in built form is competition between the businesses or institutions housed. We have already seen how the department stores took custom from smaller, older types of shop business by competition on price, as well as by their glittering decor, the great variety of goods on offer, and the range of additional services and entertainments that they provided. There is certainly evidence that dowdy, inefficient, old-fashioned competitors lost custom and were bankrupted. This is the central theme of Emile Zola’s 1883 novel Au Bonheur des Dames [Ladies’ Delight] whose setting is the fictional department store of the title, which is nevertheless modelled very closely on Au Bon Marché.15 When William Whiteley branched out into selling food, local small shopkeepers were incensed, as mentioned, and mounted a protest campaign against this unfair infringement of trade (Lambert, 1938, p.76). The department stores are also sometimes blamed for the decline in fortune of the shopping arcades, which – it is said – they out-competed in the market for luxury and fashion goods.

Once again, the reality was it seems rather more complex. Whiteley’s for example attracted large numbers of shoppers from across a wide radius who actually, as it turned out, brought extra custom to neighbouring small shops. Before the emporium’s arrival, Westbourne Grove had been known as ‘Bankruptcy Alley’ (Lambert, 1938, p.61). But the big new store turned around the street’s fortunes and attracted rather than discouraged other new shop-owners. The effect was something like that played by the department stores positioned within modern shopping centres and malls as ‘magnets’ to pull shoppers past the smaller shops.

As for shopping arcades, it is true that very few were built in Paris after the 1840s when the

Notes:

15 Zola (1883); translated in 1886 as Ladies’ Paradise and again in 1957 by April Fitzlyon as Ladies’ Delight, John Calder, London.
department stores were rising to prominence. But this was a consequence of Haussmann’s programme of reconstruction of the city and the creation of the boulevards. If we look internationally, we find that the greatest period for arcade building – but outside France – was between 1860 and 1910, coinciding exactly in time with the glory days of the department store.\textsuperscript{16} The two types of business co-existed. It was only in the 1930s that arcades went into decline worldwide, for causes that one might speculate about: the rise of car ownership, the fact that the shops in arcades were small and could not be directly supplied by truck. On the other hand, the collective business turnover of the arcades can never have been anywhere near that of the department stores.

The form of the typical top lit department store

Due to their great size, the department stores of the 1860s onwards took very different built forms from those of older types of shop. They typically occupied one or more entire city blocks, so maximising the numbers of passing pedestrians; and they rose to the \textit{de facto} height limit imposed by people’s willingness to climb stairs, of five or six storeys. In practice the sales floors were rarely on more than four floors. The plan of the 1874 \textit{Au Bon Marché} building measures some 75 x 110 metres. It was clearly out of the question to light a building of this depth naturally with windows only. There was gas lighting, but this was supplementary, for evenings and dull days. The lighting instead was from the roof, in the case of \textit{Au Bon Marché} via 15 glass-roofed atria of varying sizes (see Figure 2). As a result, no part of the shopping floors was more than three metres from either a window wall or an atrium. \textit{Le Printemps} of 1881, designed by Paul Sédille, had a single top lit atrium forming the great ‘nave’ around which the form of the whole shop was organised (Figure 7).\textsuperscript{17}
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Valuable floor area was lost to these halls. But they had a compensating virtue, of giving shoppers extensive views throughout the building, from one storey to another. As the architect Boileau said of Au Bon Marché, the three sales floors in effect ‘…created a single vessel, or to put in another way, one space surveyable at a glance.’ It has always been hard to persuade shoppers to move to upper storeys. This difficulty persists even today with the introduction of elevators, or escalators whose first application was in department stores. The designers of the department stores used the atria to give emphasis to highly visible staircases with invitingly shallow slopes (Figure 8). Even from ground level, shoppers could see something of what was on upper storeys behind the cast iron balconies. The shop-owners draped carpets and fabrics over the balustrades to tempt the clientele upstairs. Bridges crossing the atria at upper levels gave even better views.

Earlier shop types lit from the roof

These atria were of unprecedented size for shop buildings. But their construction depended on improvements to the technology of glass roofs that had been occurring over the previous hundred years. The department stores were not the first type of shop to be lit from the roof. Some of the 18th century London ‘showrooms’ and ‘warehouses’ had roof lights. This was because they occupied deep ‘terrace’ sites and were presumably unable to acquire adjoining properties on either side into which to expand. Instead they grew upwards and at the back. They could convert upper floors to sales space. Or they could build out over back yards or gardens.

This second option created deep plans, enclosed by adjacent properties, which could not have windows and so could only be day lit with roof lights. If the sales areas were on several storeys, they had galleryed light wells. One of the grandest of these buildings was ‘The Temple of the Muses’, a showroom for books opened by James Lackington in Finsbury Square in 1791 (Figure 9). It had a very large domed ‘ware room’ with galleries on four levels, lit from a cupola (Morrison, 2003, p.38).

The roof lights in these showrooms were still relatively small. Much larger glazed roofs were introduced from the 1820s into retail establishments in London and Paris known as ‘bazaars’. The commercial principle of the bazaar as mentioned was that one proprietor rented space to many small dealers. Typically the tenants were accommodated on the open ground floor and upper balconies of large top lit spaces. In effect these were market halls for fashion goods and novelties.

One example of this type, of particular architectural interest, was the Pantheon, built as ‘assembly rooms’ on Oxford Street by James Wyatt in 1772, and converted into a bazaar by Sydney Smirke in 1834 (ibid., p.92, p.95-96). It was a very large hall with a partly glazed barrel vault (Figure 10). There was an art exhibition and a toy bazaar on the galleries. Otherwise the shop sold fashion accessories and children’s clothes. Refreshments were available, and there were plants and rare birds on sale in a conservatory. It is easy to see how some British department stores grew from these bazaars, the commercial difference being
that in the stores all the goods were sold by a single organisation.

Bernard Marrey says of the Parisian bazaars:

‘Up until then, in effect, the boutique could only display its merchandise in windows lit from the street front. Top lighting made it possible to exploit square meterage in the interiors of blocks, whose commercial value was considerably less. Other things being equal, the department stores [and bazaars] paid prices for their locations which were much lower than those paid by traditional businesses. And if this lighting seems rather weak to us today, let us not forget that gas lighting was not then widespread, and that most roads and shops were still lit by candles.’

Finally, among early shop types with roof lighting there are of course the shopping arcades, which originated in Paris in the 1780s around the same time as the bazaars, and spread to London, to many cities in Europe and to America by the 1840s. (Arguably ‘bazaars’ might have been a better name for the arcades, given their formal resemblance to the linear vaulted bazaars of the Middle East.) The characteristic form of the arcade as we know it is a double row of small shops either side of a passage covered by a glass roof. The shops have shallow plans, are usually without windows on their rear facades, and obtain their light from the passage. Sometimes there are shops on several levels, the upper levels reached by balconies. In other cases there are apartments or offices on the upper floors.

In general, the arcades were a means of opening up the interiors of large blocks and so increasing the length of available frontage in densely developed commercial districts. These sites were cheaper than those on the block fronts, as Marrey explains. In Paris, some arcades were built on land confiscated from the Church or the aristocracy during the Revolution. In certain English cities, arcades occupied long thin ‘burgage plots’ – previously occupied perhaps by inns or elongated courts – inherited from medieval town planning (MacKeith, 1986, p.65-66). In all cases they tended to share party walls with other buildings, and had therefore to obtain their daylight just from the passage.

Towards the end of the 19th century, arcades were built whose size began to approach that of the department stores. In Moscow the Torgovye Ryadi complex of arcades actually became a department store (MacKeith, 1986, p.61-62). Built in 1893 to house some 200 separate premises, it was nationalised after 1917 and renamed GUM. It required only a few architectural changes, and the absorption of many small firms into one (state) enterprise, to convert arcade into store.

There was another similarity between the arcades and the department stores: they both

Notes:

21 Marrey (1979), p.20; author’s translation.

22 Geist, Arcades is the most comprehensive history (Geist, 1983). See also MacKeith (1986).

23 Glavnyi Universalthyi Magazin.
offered many kinds of diversion and entertainment besides shopping – although in the arcades these were housed not in the shops themselves but in adjacent premises under the same glass roof. In the Parisian arcades there were cafes, restaurants, bars, gambling rooms, museums, theatres, dance halls, and eventually cinemas. The passages themselves, since they were sheltered from the weather, became places for promenading, loitering and smoking in public – the classic haunt indeed of the flâneur celebrated by Baudelaire and Benjamin.

There was, however, one marked difference between the amusements of the arcades and those of the department store. The arcades were dedicated first of all to the pleasures of the male sex. Many of the shops catered to men’s tastes and desires: hats, gloves, shows, tailoring and male jewellery, books, tobacco and wines. The French passages were places of assignation and flirtation. Several, in both London and Paris, offered discreet prostitution in the upstairs rooms. The department stores on the other hand, despite the misgivings and fears of some men, were most definitely for the delight of women.

**Functional failures in construction technology and their correction**

For all these varied top lit shop types – arcades, bazaars, the department stores themselves – one crucial technical issue was the detailed construction of their glass roofs, and specifically how they kept out the rain. At first there were many problems, but by the 1870s these had all been solved. Here is the fourth of my generic causes of change in built forms: the recognition of functional failures, and their correction.

The very earliest buildings with glass roofs were of course horticultural greenhouses: glass buildings for other purposes took over existing greenhouse technology. It was not too important if a greenhouse roof leaked onto the plants, nor if moisture condensing on the under-surface of the glass dripped down again. These problems were perhaps not too serious even in the arcades. Walter Benjamin says that the Passage du Caire ‘in several places lacked glass covering’ and umbrellas were needed (Benjamin, 1999, p.33). But clearly, putting out valuable fragile goods for display and sale directly under glass roofs required something better.

Until about 1850 when cast iron came into general use, the glass was framed in timber. With both materials it was difficult to fix and waterproof the panes with putty. Timber was liable to rot. Thermal movements in iron framing caused cracks to open up, and the putty had to be replaced. The iron itself rusted. It was not easy to get access for maintenance and cleaning, and grime accumulated on the glass. In Benjamin’s words: ‘...the light that fell from above, through the panes between the iron supports, was dirty and sad’ (Benjamin, 1999, p.150). The glass roofs of the late 18th and early 19th centuries had small thin panes that were easily broken. Bigger sheets became cheaper in Britain in the 1840s but their weight could distort the frames.

Over the century these failings were progressively overcome. The bigger horticultural glasshouses had ventilation systems that stopped condensation, as did the later arcades. Joseph Paxton, designer of the Hyde Park Crystal Palace, introduced methods of carrying rainwater away down grooved channels in the (wooden) glazing bars of the roofs. In the 1870s, lead ‘cames’ – grooved strips of lead, as used in stained glass windows – were substituted for timber bars. ‘Patent glazing’ invented in the 1890s also had grooved bars, and allowed for thermal expansion by overlapping the glass panes.

The innovation in design that took glazed roofs to another level of sophistication however was...
to have two skins of glass, one over the other, separated by a large ventilation and access space. The top roof was made of clear glass to admit maximum daylight, and steeply sloped to throw off rain and snow. The lower roof could be shallow in slope, even flat, and could be treated decoratively in stained or translucent glass. The weather-resistant structure above was concealed. Only minimal amounts of dust collected on the upper surface of the lower roof. The two skins created better thermal insulation, and the space between them allowed access for maintenance.

Figure 11 shows this form of roof construction in section at Au Bon Marché. Boileau gave the lower skin a decorative pattern of squares and rectangles, and gave the outer roof a steep double pitch that over-sails the lower roof and has its own gutters. At Le Printemps, the great nave, 12 metres across, was again spanned by two separate iron structures – the lower arches carrying a stained glass barrel vault, and the upper roof supporting a pitched clear glass cover. This fully mature technology meant that the department stores’ roofs could be watertight while the atria were still naturally ventilated, and allowed ornamental treatments of the glass that were among the shops’ greatest beauties (see Figure 7).

Changes in the technology of building services

The Au Bon Marché building of 1874 was equipped throughout with gas lighting. Le Printemps of 1881 was lit entirely by electricity. This was the moment when the lighting of the great stores changed, with profound effects in due course for their built forms and internal organisation. (Au Bon Marché replaced all its gas lights with electric in 1888.)

Electric lighting was attractive to store owners for a number of reasons. Edison’s and Swan’s new incandescent bulbs could give a brighter

Notes:

26 For a discussion see Bruegmann (1978), p.151-152 and Figure 15.

27 Marrey (1979), Figures 70 to 73, p.81-3.

28 ibid., Figure 98, p.105.

29 Encyclopédie d’Architecture, Vol.IV, 1885, p.31-33.
light than standard gas fittings. They were clean and relatively cool, where gaslights produced soot and gave off carbon dioxide. And electricity was less dangerous. (Gas had been the cause of many department store fires in the 19th century.) At first electric lighting was more expensive, but this was not so important for large commercial organisations. And electricity offered possibilities for enchanting decorative displays as well as functional illumination. By 1900, electric lighting had become universal in the department stores.

Because lighting by electricity was less dirty and created less heat than gas lighting, it allowed for lower ceilings and brought about the introduction, in the United States, of the ‘horizontal style’ of department store, of which Louis Sullivan’s Schlesinger and Mayer building in Chicago (later the Carson, Pirie and Scott store) was the first (Figure 12) (Condit (1964), p.162-166). Here there were no atria and the floors had unbroken open plans.

Eric Mendelsohn had seen and admired Sullivan’s building in 1924, and in the late 1920s and 1930s designed stores in Germany for C. A. Herpich and Sons and the Schocken chain, again with low ceilings and a strong horizontal emphasis in the facades (Stephan, 1979, p.72-109). From the very first of these schemes, Mendelsohn turned the upper-floor windows into continuous high-level strips that allowed goods to be displayed against the lower parts of the walls. The horizontal glazing when illuminated at night became a dramatic means of advertising the stores.30 These buildings, however, had shallow plans and were naturally ventilated.

A kind of inertia in design thinking meant that many department stores continued to be lit naturally with central light wells on the 19th century model, even when equipped throughout with electric lighting. One reason was that the atria performed a second important function in deep plan stores, that of helping the ventilation. Warm stale air rose in the multi-storey voids and was vented through openings in the doubled glass roof structure. But if buildings with deep plans could be ventilated artificially, the atria would become redundant and could be filled in.

Stores wanted increasingly to make this change because the atria represented such a large loss of potential sales area. As Kathryn Morrison says, by the 1920s architects were faced with a clear choice. They could either ‘…create stores with spectacular wells that provided customers with dramatic views of the establishment and admitted daylight to the interiors of sales floors, or they could adopt the American ‘horizontal’ system, and build open-plan floors.’ These ‘… had the advantage of a great deal of extra floor space, something that was becoming more valuable than either natural lighting or theatrical spectacle’ (Morrison, 2003, p.173).

Sales methods were beginning to change. More of the stock was being taken out of cupboards and put on show on racks or in glass cases. Customers were being encouraged to browse more freely among the goods. All this required more space both for the merchandise and the aisles. Peripheral windows on the upper floors and in particular glass curtain walls were coming to be seen as a liability. They created glare and caused fabrics to fade. Electric lighting was more controllable. If windows were replaced – at least in part – by solid walls as in the Mendelsohn stores, more goods could be shown around the edges of the open plan. Writing in 1928, the architect Howard Robertson asked whether large windows were even desirable in stores, since ‘wall space seems to be a greater desideratum than floods of natural light’ (Robertson (1928), p.227-230).

The second technology that could make it possible to dispense with windows altogether was of course air conditioning. The first type of

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building to have air conditioning for the comfort of the occupants was the movie theatre, closely followed by the department store. By the 1920s, several American stores were fully air-conditioned including Abraham and Strauss and Macy’s in New York, and Filene’s in Boston (Leong and Weiss, 2001, p.109). In France, the established Parisian design tradition was broken for the first time by the architect Pierre Patout in an un-built scheme for Galeries Lafayette of 1932 (Marrey, 1979, p.237-241). Patout reduced the fenestration to thin vertical strips of fixed glass blocks, and planned for full air conditioning.

All these were buildings with windows, albeit in some cases small ones. By the late 1920s, however, the design press was talking about the ultimate conclusion of this trend, the windowless store. Writing in 1935, the English architect C. H. Reilly was speculating on this possibility as something well into the future. ‘If daylight electric lamps were really perfect and cheap, and artificial ventilation too, [a] logical solution might be to exclude the daylight altogether, and have blank walls on the inside on which to hang things’ (Reilly, 1935, p.218). But this was already happening in America. In 1934, Sears Roebuck built a store with no windows above the ground floor at Englewood in Chicago, and in 1939 completed the windowless store in Los Angeles illustrated at the start of this paper (Figure 3) (Longstreth, 1997, p.252-253) No other company followed Sears’ lead before World War II, but after 1945 the type was to become general in suburban and out-of-town locations.

Many of the older stores – even in Paris – filled in their grand top-lit naves, wells and rotundas. At Au Bon Marché, little is left of the former glories of the atria other than a few of Boileau’s roof lights, still visible on the third floor. The grand staircases have gone, replaced by escalators. Le Printemps survives but not its great nave. Bernard Marrey ends his book on the grands magasins with a lament for the sad fate of these spectacular interiors, victims of 20th century building services and the high price of retail floor space. ‘The great halls, which evoked by analogy the image of modern cathedrals of commerce, could not be justified any more, now that electricity could supply daylight (at a cost, it is true, that is ever more difficult to measure), and that ventilation ducts, at least in theory, could supply air to the shops.’

**Shopping by car, and a new form for the suburban department store**

The Sears Roebuck building of Figure 3 brings us back to our first theme, the effects on built form of wider changes in transport technology. It is no accident that we find this particular example of the type in Los Angeles, the place where car ownership grew faster than any other city in the United States, in the 1910s and 1920s. It was the automobile that created the unprecedented low density and dispersed morphology of LA, which has always had one weak centre in the original settlement of Los Angeles – today’s ‘downtown’ – but which otherwise was formed from an archipelago of widely scattered small towns, connected together at first by electric railways, and then by road.

There were department stores established in downtown LA in the early years of the century, whose architecture was comparable with 19th century European and East Coast store buildings. Shopping in these stores, in Richard Longstreth’s words, ‘became at once a frequent pastime and ritual indulgence among millions of consumers, especially middle-class women’ (Longstreth, 1999, p.25). By the mid 1920s, many of these women drove or were being chauffeured in their own automobiles. The streets of old Los Angeles were narrow however, and carried trams and light rail as well as car traffic. In 1920 there was a serious crisis of congestion – the first in the USA – and the City Council instituted a ban on kerbside parking.

Notes:

31 For the spatial development of Los Angeles, see Fogelson (1967). For the effects of cars on the city, see Bottles (1987).
There was a huge outcry, the takings of the stores dropped disastrously, and the ban was rescinded after just 19 days. This episode, however, marked the beginning of a process that led to branches of the downtown stores, and later the flagship stores themselves, migrating to the satellite towns of the metropolis like Hollywood and Pasadena. Here they could find large cheaper sites to which access was easier for car drivers, and where new buildings could be erected on one or two storeys so that the difficulties of getting shoppers upstairs would no longer apply.

Many of these new suburban stores retained a prestigious luxury image and catered to a rich clientele among Angelenos. Sears Roebuck, a mail order company based in Chicago, entered the retail business at this time and took a different approach. Sears had recognised how completely the car had changed shopping behaviour, and that ‘...the outlying store... with lower land values, could give parking space; with lower overhead, rent and taxes, could lower operating costs, and could with its enlarged clientele created by the automobile offer effective competition to the downtown store.’ Sears’ strategy in the 1930s was accordingly to select non-retail locations well outside established urban centres. The Pico Boulevard store is about a mile and a half away from the old township of Santa Monica. Sears built large plain buildings where the methods pioneered by chain stores, including self-service, were used to sell large quantities of basic goods at competitive prices. Sears always invested heavily in advertising, in particular through its mail order catalogue, and this in turn attracted shoppers to its retail stores.

Air conditioning and an almost total reliance on artificial lighting allowed for very deep plans. The fact that the great majority of the customers arrived by car, and there were few if any passing pedestrians, meant that traditional display windows served little purpose and could be dispensed with. Also the store could be moved back from the street line, allowing parking in front as well as at the back and sides. A tower or an illuminated sign on a pylon could make the store’s location visible to passing drivers.

Internally the new built form allowed for a radical reorganisation. Typically the services were pulled to the periphery, since it was no longer necessary or desirable for the sales areas to have windows and they could be central. The offices – and perhaps a café or restaurant – could be naturally lit on the edge of the plan, or on the roof. At the same time, delivery trucks could be driven right up to the building and unloaded directly into the ground-level stock rooms. The middle of the plan was unobstructed and the sales areas could be flexibly arranged and rearranged. Figure 13 shows a diagram by William Snaith, a post-War store designer, of ‘the proper interrelationship of trucking, bulk and impulse merchandise, entrances and parking’ in a single-storey plan of this type (Snaith, 1962, p.6). By comparison with the 19th century stores, the plan is turned inside out, and all of the design effort is transferred to the interior. Similar principles were adopted in most post-War suburban stores, and were extended and elaborated in the new out-of-town shopping malls.

Notes:
32 See Longstreth (1997), Chapters III to V.
33 ibid., p.119-120 and p.251-254.
Conclusion
Changes in the built forms associated with particular activities are historically contingent, and are brought about by many local social, economic and technical factors specific to the periods in question, as we have seen in the case of the department store. Some of the broader trends discussed here, for example developments in transport technology, and the move to air conditioning and artificial lighting, have nevertheless had comparable effects on the built forms of other types of business and institution over the same timeframe, such as offices, warehouses and factories. The rise of car ownership and the use of motor trucks have brought about similar moves towards low-rise deep-plan built forms on large suburban sites. Taking a wider view still, I have proposed a four-way categorisation of forces for change, exemplified here with the case of retail. I would suggest that this has potential as an abstract scheme for analysis of the history of many building types.35

References

Encyclopédie d’Architecture (1885), Vol. IV.

Notes:
35 For an extended discussion in relation to 19th and early 20th century hospitals, schools, offices and prisons, see Steadman (2014), Chapter 11, ‘Building types and how they change over time’.

About the author: Philip Steadman (p.steadman@ucl.ac.uk) is Emeritus Professor of Urban and Built Form Studies at the Bartlett School of Environment, Energy and Resources, University College London, and a Senior Research Associate at the UCL Energy Institute. His research interests are in the geometry of buildings and cities, and their use of energy.
He has published two books on geometry and architecture: The Geometry of Environment (with Lionel March, 1971), and Architectural Morphology (1983). His study of The Evolution of Designs: Biological Analogy in Architecture and the Applied Arts was republished in an updated edition in 2008. He has just published a book about building types, considered from both historical and geometrical points of view, with the title Building Types and Built Forms (2014).