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PLAYING WITH CONCRETE

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SUMMARY

Castos and Lego both appeared on the market in 1947 but whereas Castos was a toy that gave a realistic version of how to make miniature buildings in concrete and Lego snap together bricks have never made it on to a construction site, the former, despite a number of adult endorsements of its value as a toy, was a flop and the latter a success. This paper discusses precursors to both toys and looks at the kind of buildings and structures that could be made with a Castos set.

INTRODUCTION

Despite the popularity of modern computer games Lego, the plastic building toy that has been around since 1947, is still a mainstay of many birthday and Christmas lists. The question is, 'what does it teach children about building?' The probably answer is 'not a lot' as the interlocking bricks are only held together by the friction fit between the plastic holes and studs. Lego is very poor in tension and has a whole system of special parts to overcome this. It is also, being plastic, very light and lacks the weight that used to be associated with toy building sets of stacking bricks. These old fashioned toys taught much about the role of gravity in making structures, and the usefulness of the pyramid principal (having more at the bottom than the top) when it came to building tall. This raises the issue of whether experiencing how the world is put together in miniature through play is a vital skill that modern children may be missing. This paper looks at a number of construction toys that provided this miniaturised building experience, with a particular focus on Castos. First appearing in 1947, the same year as Lego, this was a toy that let children build miniature structures in reinforced concrete.

STACKING BRICKS

Whatever the material used for stacking bricks they teach about gravity and how mass can be used to stabilise a structure as mediaeval builders would have used a stone crocket sitting on a flying buttress. They also teach that if you want to build tall having a good foundation is a must, and that certain shapes like pyramids are more stable than others.

In 1693 the philosopher John Locke suggested that learning might best be done through play, and that children could learn their alphabet from having dice (wooden blocks) with letters on these (Locke, 1693: 85-86). In 1811 the Edgeworths wrote that young children "...should be provided with the means of amusing themselves, not with painted or gilt toys, but with pieces of wood of various shapes and sizes, which they may build up and pull down, and put in a variety of different forms and positions..." (Edgeworth and Edgeworth,1811). In 1837 Froebel further linked the wooden block to the history of architecture and buildings with the production of a set of wooden blocks, spheres and cylinders known as "Gifts" (Froebel, 2015), a set of

which was given to the architect Frank Lloyd Wright. Wright claimed these influenced his architecture (Wright, 1957:18-19).

At the end of the 19th century blocks of artificial stone appeared that were more like building in the 'real thing'. In 1880 in Germany Friedrich Richter, who had a pharmaceutical factory, introduced his Anker-Steinbaukasten. These are a German success story and are still made today (Anker, n.d.). In part this is due to Richter's promotion of the product but also because of the buildings you can make with the stacked blocks. The blocks are made from a mixture of chalk, sand, and colouring in a linseed oil varnish matrix in imitation of stone. This means they are self-coloured (cream, red and blue), and also heavier than a wooden brick of corresponding size so are more stable when stacked higher. Richter has been credited with producing the first ever systematic set of building toys, where a child could be given a small set and extension sets could be added later to make the equivalent of a larger set (Hardy, 2014).

Richter's blocks were marketed worldwide but World War I saw the English equivalent artificial stone Lott's Bricks appear in toy shops. During WWI toys imported from Germany disappeared and this led to both increases in manufacture of existing British toys and the development of new local products Brown, 2007:40-41). Lott's Bricks were not only the local equivalent of Richter Blocks but were the dream of their creator, Ernest Lott, for a simpler set of stone blocks that would make English buildings (Salter, 2011:13). There were 11 different Lott's bricks compared to the 359 different Richter blocks in the first series of sets from 1884 (CVA, 1999:1/110-1/122).

Despite the wealth of buildings that can be made with stacking blocks many other construction toys tried to imitate not just the finished building but the building process, among which is the Castos set with which children could make miniature reinforced concrete structures. However, before describing Castos in detail two other toys that gave the experience of a building process are introduced briefly—notched logs and bricks and mortar.

NOTCHED LOGS

In 1916 John Wright, the son of Frank Lloyd Wright, filed a patent for a wooden building toy he called Lincoln Logs, although over 50 years before the Vermont Novelty Company sold something similar known as "Lincoln's Logs" (Armstrong and Jackson, 1990:62). Wright's Lincoln Logs, now manufactured in plastic, make miniature log cabins from interlocking notched wooden "logs", with gaps left for doors and windows. Thin wooden slats sitting on shaped gable end pieces form the pitched roof. The interlocking components gave a realistic, stable structure since this was a direct imitation of how American pioneers had built full size log cabins.

Despite the fact Lincoln Logs best make one room log cabins, like the birth place of the American most people have heard of—Abraham Lincoln (Thayer, 1896), the popularity of the toy was probably more related to the chance to play at 'Cowboys and Indians'. Evidence comes from that fact that two New Zealand manufacturers produced versions of the notched log toy, despite the fact this technique was rarely found in New Zealand. was born in a one room log cabin in Kentucky and what Lincoln Logs make best is a simple one room log cabin. Logge and Timba was a very near copy of Lincoln Logs, despite the latter's patent, and came with instructions for making Abraham Lincoln's birthplace, a pioneer cabin, ranch house, school house and block house. The other set by Jomax, has rectangular notched logs, some of which are grooved to hold the edges of the printed cardboard doors and curtained windows. Instructions are included for making cabins named "Lew Wetzel", "Daniel Boone" and (of course) "Davy Crockett".

BRICKPLAYER

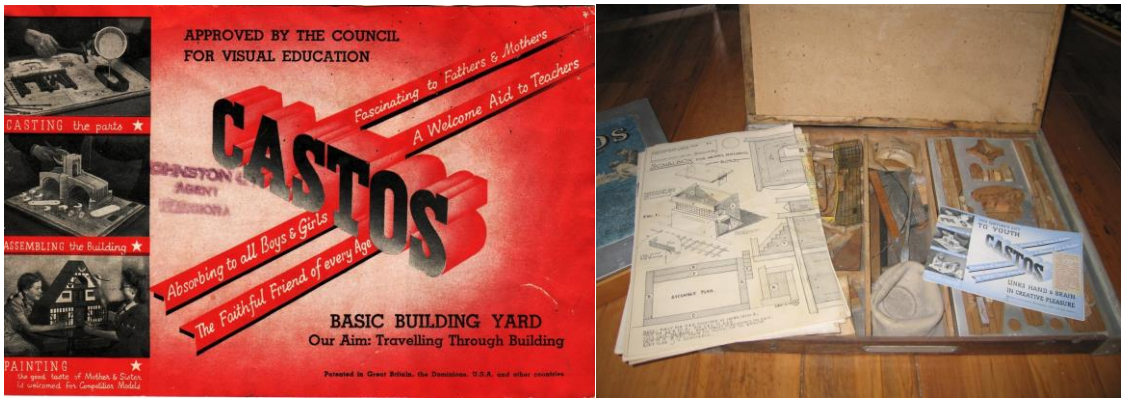
Manufactured by J W Spears and Sons in 1936 (Meesam, 2017) Brickplayer has all the fun of building in brick but so it can be recycled. Using flour, chalk, and water paste the three standard sized ceramic bricks could be built up in stretcher bond, but soaking the walls released the bricks for reuse. The original sets had metal doors and windows to set into the openings, which were later made in plastic. With roofs of printed cardboard supported on wooden beams, the sets came with instructions for a range of small houses with pitched roofs as wells as garages, railway stations and fire stations. In the 1950s Brickplayer was updated with flat roofs, as being more modern, if less waterproof. Although advertised as “Build the real way—with real bricks and mortar”, not all real buildings would have been constructed using improvised mortar from porridge, glacé icing, and toothpaste (Brighton Toy and Model Museum, 2016), but then improvisation is perhaps the essence of play.

CASTOS

If building in miniature bricks and mortar seems both a fiddly and potentially messy toy, building in miniature reinforced concrete is even more so. Appearing in 1947 (Architoys, n.d.), Castos was also a toy that sought world peace through concrete, by providing examples of “the finest specimens [of architecture] known to ancient and modern civilisations…[Castos]…widens understanding of other countries and helps to destroy the barriers of ignorance which lead to disputes and strife between the nations.” Its international credentials are evidenced from it being “Patented in Great Britain, the Dominions, U.S.A. and other countries” (Castos, 1947?) and in November 1948 was advertised in *Hobbies Illustrated* in Australia (Connolly J G Pty Ltd., 1948). Precisely a year later it was on special offer in Australia with the price reduced by 23% (Connolly J G Pty Ltd., 1949) so may not have been the global success hoped for, although maybe it was just too messy. The leaflet provided with the set refers to its creation by “a famous engineer” in the odd moments when he was not either “building houses by the thousands for the League of Nations and other organisations, erecting towers or constructing bridges…” Who this engineer was remains a frustrating mystery.

According to both the Australian advertisement, and the pencilled price on one of the two Castos sets we own, both discovered in New Zealand, the set cost £4/15/6, which was big money for a toy in 1947. To give an idea of the present cost, according to the Reserve Bank of New Zealand’s Inflation Calculator (Reserve Bank of New Zealand, n.d.) £4/15/6 in the last quarter of 1947 would currently be worth NZ$383, making it equivalent to buying a very large Lego set (eg. Lego City: Cargo train No.60052). Castos was not a cheap toy (Figure 1).

Figure 1 Castos Instruction Book and set



The big problem with concrete construction, whether at home or on the building site, is that you have to make your building three times. Embracing the brave new material of concrete(and

despite its use by the Romans concrete is often stated to be a new material (Yorke, 1943:10) means you have to start by building a life-size hollow wooden model of your building. This formwork then needs to be filled with steel as a skeletal building, and finally the steel-filled mould is filled with concrete, but you need someone who knows what they are doing and who can wield the vibrator so as to make sure that your concrete is not full of holes. Once the concrete has cured properly, the wooden mould is removed and often thrown away. Castos reproduced the laborious process in miniature. The set contained a number of beautifully clear plans, whimsically coloured, and an acetate sheet to go over so they were not ruined during the casting. A little rubber bowl was supplied for mixing the “Castos building powder” with water before pouring. The Castos builder makes moulds by nailing shaped pieces of wood on the fibreboard back of the aluminium box lid, which forms the “working table”). These pre-cut wooden formers that make the plans provided come in the set. The Castos builder is always referred to as “he”. Girls are encouraged to play a part in the great Castos project, at least at the stage of painting the finished concrete models when “he may have the enthusiastic help of sister or mother” (Castos, 1947?). Having made his moulds he then adds reinforcement, pours the “concrete” to form the pieces, and then, when set, glues them together into a building. This makes Castos most like tilt-slab construction (Figure 2).

Figure 2 Setting up a Castos mould and Mother helping, both from the instruction booklet

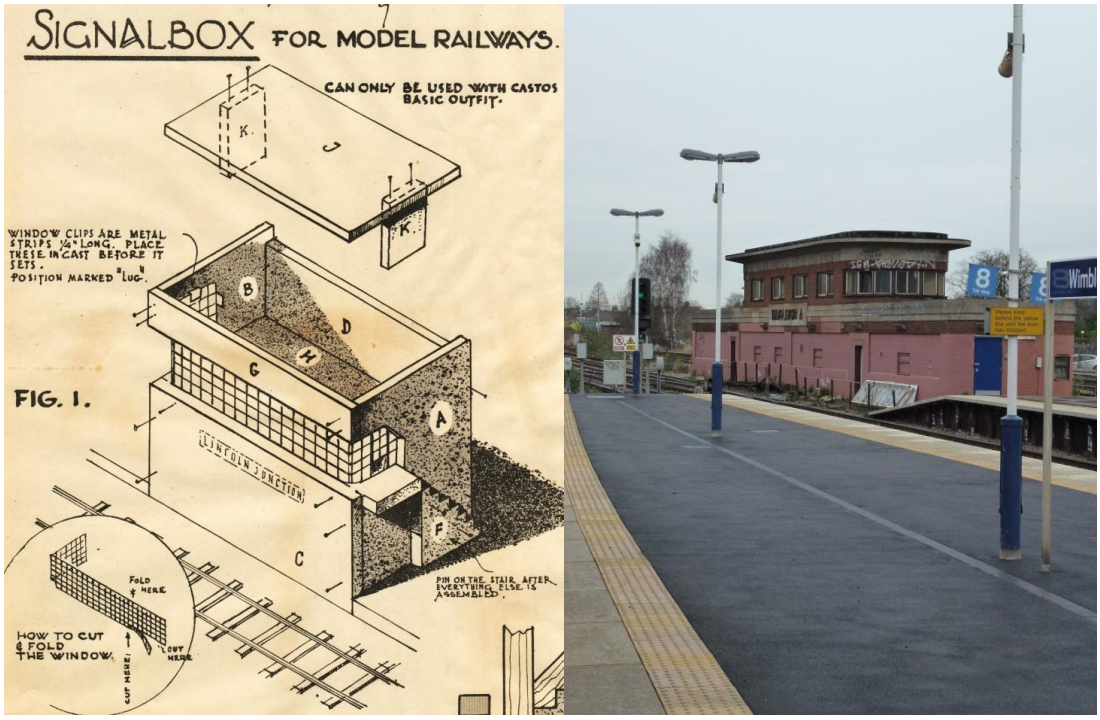
Concrete, as even New Zealanders have discovered (Curtis, 2015:13), works really well for ground floor slabs, which can use the ground as one side of the slab, while the top surface can be levelled off with a trowel, or its power operated equivalent. The only formwork you need is round the edges. This may explain the appearance quite early on in the development of reinforced concrete of tilt-up slab construction, which is the way to make a Castos concrete building. It seems accepted that tilt-slab construction, where concrete walls are cast on the ground and then tilted up (hence the name) to form the building, was invented by Robert Aiken, a contractor in Illinois early in the 20thcentury (Foley, 2006). One of Aiken’s early examples of this technique was the Mess Hall at Camp Perry Military Reservation on the shore of Lake Eire in Ohio (Johnson, 2002). Aiken’s tilt-up Mess Hall was damaged by high winds in 1998 and subsequently demolished in 2001, sadly, as it was one of very few remaining early tilt-up structures left in the United States. There is a similarity between tilt-up construction and traditional timber building techniques in which the frames are assembled on the ground and then raised into place. Aiken’s early buildings were cast on a bed of sand, but he then moved to the use of a flat wooden formwork on steel supports, but still near the ground. The walls for the Mess Hall were tilted up with the use of an engine. In the best traditions of new technology, the building was late in completion, and finally had to be completed by the state after the contractor went bankrupt. The final cost was $42,000 rather than the tender price of $16,000 (Johnson, 2002). Since this shaky, at least financially, beginning tilt-up slab construction has

gone on to be widely used, especially after the introduction of mobile cranes in the 1940s. Tilt-up construction is now used for over 15% of industrial buildings in the United States and nearly 75% of commercial buildings in Texas (Bob Moore Construction, 2017).

CASTOS BUILDINGS

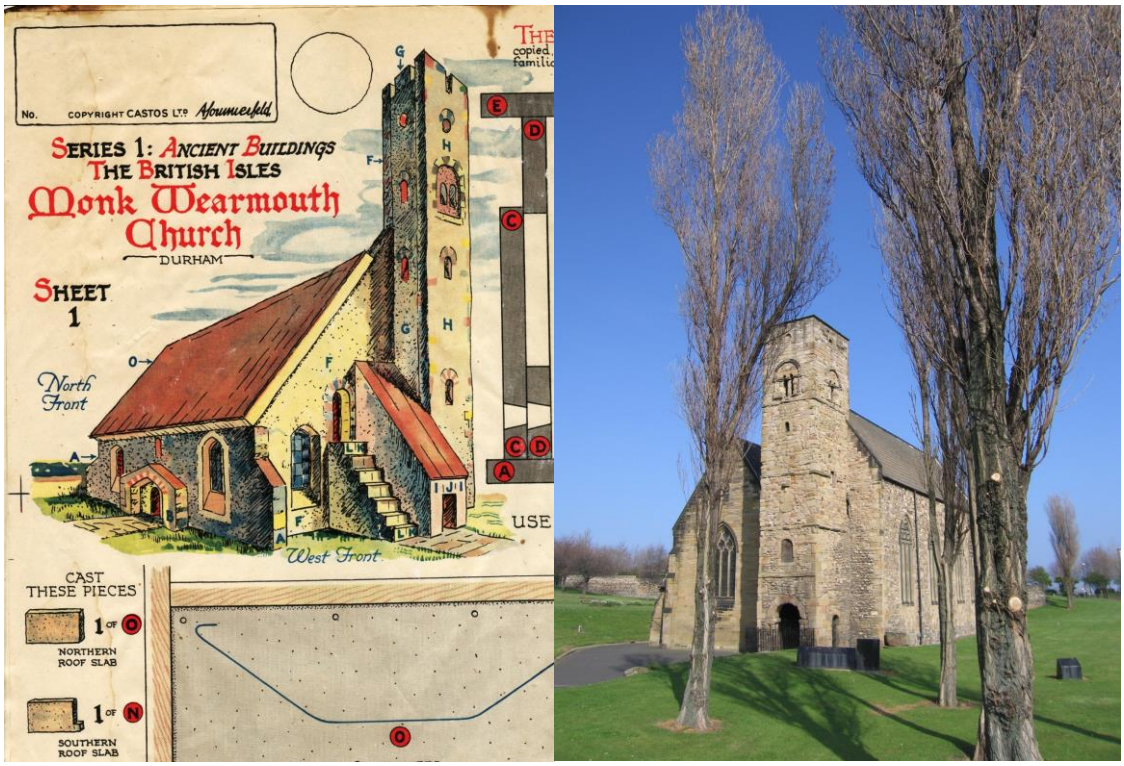
The coloured plans that came with Castos were nothing if not eclectic. They consisted of a concrete signal box, a railway bridge, a concrete canopy, a hydroelectric dam (see Fig, 1), and a historic stone church and bridge. The railway collection are approximately O scale so might have been used on a model railway layout. The modernist concrete signal box is in the tradition of those found in the UK, such as Surbiton and Wimbledon (figure 3), and nearer home that of Petone.

Figure 3 Concrete signal box and signal box at Wimbeldon, UK



The concrete canopies have a Nervi-like appearance but are also reminiscent of those of the Chessington Branch in south London, which opened in 1938. These platform canopies were a Chisarc and Shell D Ltd. thin shell structure, 3in (75mm) thick (Anon, 1938). The canopies, along with other stations on the line, were designed by James Rob Scott, chief architect of the Southern Railway, who also designed the 1937 concrete modernist Surbiton Station. More curious in the Castos plans is the inclusion of a stone church (Figure 4) and stone bridge to be modelled in concrete.

Figure 4 Monk Wearmouth (sic) Church in Castos and Monkwearmouth Church in stone



Plans are provided for a model of the original Monk Wearmouth (sic) Church in Tyne and Wear, founded in 665AD. At first sight this could be a mistake for nearby Roker Church. This 1907 Arts and Crafts church was designed by Edward Schroeder Prior. The structure is a mixture of reinforced concrete and stone and at one point the nave walls were to have been bare concrete, like the dome, chancel walls and purlins with their visible shuttering marks (Granham, 1996:15-16). However, the Castos instruction book also includes plans for the 1272 stone Monnow Bridge with its central gate tower in Monmouth (Figure 1). Essentially, this was teaching that concrete was a replacement for stone in the brave new modern world, paving the way for what was to become for specifying architects 'art stone' (Emmitt and Gorse, 2010:248). This is a long way from the Modernist view of materials having their own fundamental characteristics that architecture needs to express.

In many ways Castos represents the hidden nature of concrete in the construction industry, especially in England. Although concrete is ubiquitous, few early Modernist buildings celebrate it as a material. In Britain the white cubic forms of Modernism were usually rendered brick walls that needed regular painting to achieve the Modern look. The Midland Hotel in Morecambe is a good example (Guise and Brook, 2009). A small number of architects, such as Berthold Lubetkin's practice Tecton, did make real concrete buildings, including the iconic Penguin Pool at London Zoo, and a painted concrete house at Gidea Park (Figure 5) with reinforced concrete walls, steel windows and a concrete staircase (Allan, 1992:170-172). This house, which is painted, was showing signs of staining when visited in April 2007, in spite of a recent refurbishment, demonstrating the difficulty of maintaining the pristine appearance that such designs require.

Figure 5 The Tecton house at Gidea Park 1933-34 and Tawa Dell 1939

Castos could be seen as entirely rational in its approach, as there is no reason a concrete house has to look Modern. We live in a small 1939 concrete house called Tawa Dell, and designed by the New Zealand architect James Walter Chapman Taylor (Siers, 2007); it has reinforced concrete walls, steel windows and a concrete staircase. Both the date and list of materials imply a Modern house in the manner of Tecton, but Tawa Dell, like all Chapman Taylor's houses is an Arts and Crafts cottage, with exposed timber beams and doors made of adzed boards. There is nothing formally deterministic about using concrete, as shown in the plans offered with the Castos set.

Although not a success as a toy Castos lives on, in spirit at least, in a more modern tilt-up slab model building system called Linka (Linka World, 2016). Linka was first produced in 1979 by the Scottish-based firm of Thomas Salter, a manufacturer of chemistry sets and other toys. Just as the demise of traditional Meccano has been blamed for the decline of engineering skills (Nobel Media AB, 2017), the demise of the traditional and sometimes excitingly dangerous chemistry set and its replacement by totally safe (and totally boring) experiments has been blamed for a decline in people taking up a career in chemistry (Nicolls, 2007).

Linka used a series of reusable rubber moulds to cast accurately textured plaster wall and roof panels which could then be stuck together to make OO-scale (1:76) buildings. The buildings you can make with Linka are like Castos, there are brick ones, stone ones, wood clad ones and even log ones, but, perhaps unsurprisingly, there are no examples of concrete modernism.

CASTOS AND PLAY

The depiction of the neatly dressed Castos family is more like the tie wearing Meccano boy, rather than the stocky budding bricklayer featured on the Brickplayer box. Castos was about teaching the child to be an engineer not a concrete worker. It must have taught patience in going from plan to finished and painted structure (unless you could rope in Mum to do the latter), as the rewards of seeing the finished structure were a long way from what could be achieved with stacking bricks.

Certainly Castos was keen to reinforce the value of the engineering training the lucky child would receive. The back of the instruction book that comes with the set carries endorsements from "Leading Authorities" comprising a "Public School Headmaster" who praises it for being "a boy's introduction to the Muses"; a "Government Architect" who enthuses over how a child will develop his "appreciation of good proportion" while "enjoying every minute of the process";

and a “Museum Curator” who points out how “reading, making, art, architecture, handiwork and history are all involved” in playing with Castos (as well as some rather messy processes). Both the Museum curator and Government Architect suggest that adults will not be able to keep their hands off the Castos set, possible as a means of minimising the damage to the living room carpet. The only named ‘Leading Authority” is Sir Charles Reilly O.B.E. “the famous British architect” who says, rather chillingly “What started as a toy to do something for architecture may, in the end, train a new race of architects to design and build the new world and create a race of sociologists to conceive for it new and happier and more efficient social relationships.” The suggestion here is that a world made of concrete is going to mean a whole lot of people trying to find ways of living in it without society disintegrating. Whether concrete is associated with roads or tower blocks traditional social interactions are threatened:

“Busy roads cut communities in half and block access to friends and shops, especially for young, elderly, and disabled people. Where traffic is heavy in residential streets social interactions are reduced. The health divide is deepened not because cars protect or promote health in those who have them but because of their negative effect on those who don't” (Godlee, 1992).

Reilly’s prophetic vision came from someone who was a Professor of Architecture at Liverpool University and the first chairman of the RIBA board of architectural education. He became converted to Modernism in the late 1930s after a career espousing a more classical approach to design. He was both a charismatic figure and an inspirational teacher who, according to his biography, endorsed Castos a year before his death in 1948.

This raises a paradox. Here was a toy that taught how concrete worked but that was dramatically unsuccessful as a play thing. At the same time we live in a built environment dominated by concrete (Crow, 2008). Given the success of plastic Lego (McVeigh, 2014), perhaps at least the future built environment will not be a plastic one…

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