# BUILDING BOYS: CONSTRUCTION TOYS & TOY COMPANIES, 1890-1920

Paula Petrik
Department of History
University of Maine
Orono, Maine 04469
petrik@maine.edu
www.archiva.net

In 1958, my brother and I understood, as only children can understand without being told, that Christmas that year would be austere. Santa Claus (we still believed, although we had our suspicions) would not bring much, if he came at all. We deliberately kept our lists small, hoping that a show of humility and lack of materialism would impress Claus and win the day. Christmas morning arrived. My brother, soon to be eight years-old, received an A. C. Gilbert Erector set, and I, ten years-old that day, received a miniature set of cleaning implements complete with small boxes of cleaning products—Tide, Dutch cleanser, and so forth. I remember being initially fascinated with the small boxes and the fact that looked exactly like their counterparts in the stores; I tested the broom, mop, and carpet sweeper. In the end, I was disappointed. My brother was engrossed in trying to organize the parts from his erector set, and the process looked much more interesting than fiddling around with cleaning equipment. I quietly and carefully put the cleaning equipment and its accessories back in the box, rewrapped it, and placed it on the front porch in the hope that Claus might reclaim it on his swing back to the North Pole and provide something as interesting as an erector set. My brother, in a rare display of generosity, allowed me to join in, and we spent the rest of the early morning wrestling with the staples that held the parts; still later in the day with Dad's help, we built an operating crane to our great joy.

At the heart of this memory was the A. C. Gilbert Erector. In our experience with this toy we were the most recent in a long line, beginning in 1913, of children who had been captivated by Alfred Carleton Gilbert's toy. The erector was, itself, was the product of an equally long tradition of construction toys and the result of a compromise between parents' and toymakers' ideas about education. Most important, Gilbert's erector offered one solution to the long-lived problem of appropriate toys for boys. And although the Gilbert Erector seemingly proffered an answer to a pressing problem among toymakers and parents alike, in the end it shifted construction toys' appeal away from both sexes and confirmed the association of boys with engineering and science toys.

By the mid-nineteenth century in the US, most parents and domestic advisors agreed that a "good toy" was educational. By educational, they generally agreed that the toy should impart some intellectual skill (concentration or manual dexterity) or factual

knowledge (biographical facts of famous people's lives, the identification of plants and birds, European capitals, and so forth) conducive to children's upward or forward progress. In addition to applauding educational toys, parents and observes advocated safe, durable toys and preferred toys that children made themselves to commercial products. While dolls and doll accessories apparently solved the problem of toys for girls, locating toys for boys was a different and difficult matter, and advisors puzzled over the problem of boys and toys. "[T]here seems to be," one writer baldly wrote, "a paucity of toys suitable for, or rather interesting to, boys."[1] Although authors like Maria Edgeworth and Theodore Dwight suggested the standard, useful remedies—field trips, building models, gardening and carpentry—boys' toys continued to perplex writers, contradicting their thinking about toys as engendering skills for adult life.[2] But as they refined their illustrations and opinions, Dwight and company conceded that toys which promoted mechanic skills no longer applied to the sons of the middle class. In the end, they retreated to advocating manual skills as a hedge against financial misfortune or as an engaging hobby for later life.[3]

Nineteenth-century toy manufacturers who thought about the topic, in contrast, followed a more liberal interpretation of education that coincided with the aims of their business. More in the tradition of Friedrich Froebel, who pioneered the kindergarten movement, toymakers like Milton Bradley saw play and toys as valuable in and of themselves. Still toy manufacturers wrestled with making toys for boys; the difficult task of finding boys' toys remained intractable during the nineteenth century. Manufacturers increasingly elaborated the realism of girls' domestic toys, and toys designed for girls continued to teach domestic skills. Toymakers also took preliminary steps to familiarize boys with the skills and values appropriate to business or professional life through games such as *Banking, The Checkered Game of Life, Telegraph Messenger*, and *Office Boy*. These games offered a partial solution to the problem of creating amusement that interested boys by furnishing products based on finance, business, and upwardly-mobile career development. More important than introducing boys to the skills involved in capitalism, these games were also laced games generously with advice on appropriate values for advancement in the business world. Despite these promising solutions, the fact of the matter was that toys could no longer prepare the middle-class boy for his career or simulate the skills he would need for business or the professions—at least not in the sense that girls' toys offered concrete training. A train set was not a railroad and cardboard models of papermills neither fully resembled the factories nor taught necessary engineering or architectural talents to construct them.

American toy manufacturers, despite their allegiance to liberal education, attempted to balance parental desire for toys with obvious cognitive benefits with profit. One of their earliest solutions, continuing a European tradition, was alphabet blocks packaged in sets. In 1858, the S. L. Hill Company patented a set of alphabet blocks which were simply flat square blocks painted on one side with a letter and on the obverse with word of one syllable.[4] With the advent of chromolithography, block manufacturers pasted paper squares containing the pictures, letters, and words on the several faces. This advance allowed the greater use of color and reduced manufacturing costs. Another solution, also a continuation of European toy manufacture, was building blocks. Joel Ellis of Springfield, Vermont, invented a precursor to the later Lincoln Logs with his Log Cabin Playhouse between 1860 and 1870. The play house set contained various house parts, including long and short logs, roofing pieces, a chimney ridgepole, and other cabin elements.[5] The R. Bliss Manufacturing company of Pawtucket, Rhode Island, probably the most notable of all block manufacturers, introduced varied sets of the Improved Architectural Building Blocks. The No. 248 set, for example, although it contained the smallest assortment of building elements, still offered columns, turned balusters and finials, triangular, rectangular, and square solids to children.[6] At one and the same time, alphabet and picture block sets satisfied the demands of nineteenth-century parents by introducing the child to the basics of the language and toy manufacturers' more liberal view of education and their need to sell as many of their wares as possible.

But toymakers were not satisfied with the simple alphabet or even the more varied building blocks. In 1867 Charles M. Crandall of Montrose, Pennsylvania, hit on the idea of a more complex set of building blocks. He recalled:

> I was working in my small factory on the then new game of croquet and conceived the idea of locking the corners of the boxes by means of grooves and tongues instead of nailing, as had been my custom. a simple machine was constructed for the purpose and in testing it, short pieces of then wood were used. My two infant boys were convalescing from scarlet fever, and I carried some of the blocks home for the amusement. A house, bridge, fence, and other structures were built from them. In the evening our physician called, saw and admired the blocks, and ordered a small quantity made for his own use. This was the first sale of the

famous Crandall's Building blocks.[7]

Crandall followed up on his invention with variations on the tongue and groove principle. In a marketing ploy, the American Agriculturalist initiated a contest for the most novel structure built with Crandall's blocks. The winning designs appeared in subsequent Crandall advertisements and, in 1870, an ad featured a velocipede built entirely with Crandall's product, illustrating the signal advantage of Crandall's toy—its interlocking system.[8] First, the velocipede demonstrated that it was possible to make machines in addition to architectural structures and, second, that the interlocking system created a sturdy structure capable of being moved all of a piece.

Later in the century, manufacturers experimented with different materials, manufacturing processes, and styles of block construction sets. The Albany Embossing Company applied the embossing process, a method of pressing a design into blocks, to blocks, and Anchor Blocks, an early German firm with an office in New York, used a stone material to provide the elements for constructing ramparts, walls, and towers. Around 1895 the W. S. Reed Company introduced motion to the construction set with the World's Tower, a kit consisting of materials for building a five-foot tower. The set included a pulley system for raising an elevator and a mechanism for rotating two sets of flags in opposite directions.[9] Whatever the material, toy manufacturers, pitched their blocks and construction kits in their labeling and advertising to both boys and girls.[10] As blocks became a nursery standard, they established the concept of the set firmly among toymakers' strategies and pointed the direction for future construction sets. Innovative construction sets would take advantage of an interlocking system, utilize new materials, and include motion.

By the early twentieth century, although public schools embraced the administrative Progressive rationalization of education advocated by Edward L. Thorndike, increasingly, the pedagogical Progressive ideal articulated by John Dewey and his predecessors, Froebel and Montessori, gained ground. At the center of each of these educators' programs was the idea that play in and of itself was educational. Play was a child's way of processing the world, and toys were the tools that promoted the skills and fostered the creativity needed to deal with the world as the child matured. Given the right toys and the right environment, children would learn and learning would be fun.[11]

Into this milieu stepped A. C. Gilbert. Born February 15, 1884, in Salem, Oregon, Gilbert quickly forsook the West for opportunities in the East. His athletic abilities caught the attention of members

of the Yale athletic department, and his own interest inclined him to a career as an athletic director and trainer. His advisors suggested that a medical degree would outfit him best for the position. Because Yale had an undergraduate medical program, Gilbert chose to pursue medicine. While he was at Yale he continued his interest in magic and became proficient enough to earn money from local performances of his legerdemain. Others became interested in his skill and plied him with requests for instruction and materials. Gilbert remembered: "I learned right away that almost none of them would really practice and have the patience to perfect sleight-of-hand manipulations. They wanted tricks that they could master in half hour or so, to fool their roommates or friends. There weren't many such tricks available on the market then, so I decided I would have have them made."[12] Joining with a local mechanic and magic hobbyist, Gilbert and his friend "worked out a few tricks, got them made, and boxed them." He sold them to his magic students, charging five dollars a lesson with the tricks included. His students came back for more boxed tricks to take home as presents, and others simply bought the boxes without the lessons. By 1909, Gilbert and friend had founded the Mysto Manufacturing Company in Westfield, Connecticut, a firm that "put out three different boxes priced at twenty-five cents, fifty cents, and a dollar. Each box contained several tricks—cards, coins, rings, vanishing apparatus—with instructions on how to use them."[13]

His success with Mysto Manufacturing led him to abandon his medical career in favor of one in business. Shortly, a new idea induced him to forsake Mysto Manufacturing to concentrate fully on development of the Erector, an engineering set. He recalled:

> [In 1911] I was riding [the train] back and forth from New Haven to New York a good deal—the section being electrified by the New York, New Haven & Hartford Railroad. I looked out the window and saw steel girder after steel girder being erected to carry the power lines. I found it interesting to watch their progress from week to week, and most other travelers did too. It seems the most natural thing in the world that I should think about how fascinated boys might be in building things out of girders.[14]

Gilbert was not the first to have been captivated by girders and beams. Roger Hornby, the British inventor of Meccano, sold a similar product, but Gilbert made some telling additions to the Erector. First, he designed a girder with a kind of lip along the edge the piece. This innovation provided for the construction of square girders and added an extra measure of stability to Erector

projects. Second, he added a axles, gears, and pinions which imparted motion to Erector projects. Third, he devised a small electric motor that replaced the small hand-cranked gear box in more expensive sets, adding an extra dimension to the toy.[15] And fourth, he employed the same metal that the large-scale constructions used to add verisimilitude to his toy. Gilbert, in short, combined an interlocking system fabricated from realistic material with sophisticated motion into a convenient set. Introduced at the Toy Fair in 1913, a year before TinkerToys, the Gilbert Erector was in immediate hit.[16]

Gilbert followed up his initial success with his construction toy with others in the science and technology line. Following closely on the heels of the erector, the A. C. Gilbert Company introduced its line of chemistry sets in 1917, and electricity, wireless, telegraph and telephone kits in subsequent years. Later, the company brought out Hydraulic and Pneumatic Engineering, Magnetic Fun and Facts, Sound Experiments, Civil Engineering, Weather Bureau Sets, and other kits involving astronomy, mineralogy, and glass blowing. Just before WW II, the famous microscope set debuted, only to be topped off by the not-entirely-successful Gilbert Atomic Energy Laboratory in 1950.[17]

Besides the A. C. Gilbert Company's obviously emphasis on technological and science toys was its restrictive masculine orientation. A man out of the Theodore Roosevelt mould, Gilbert valued the sturdy manliness and pursuits exemplified by the robust president. An Olympic gold-medalist in the pole vault, himself, Gilbert applauded athleticism; a big game hunter, he valued the hunt and kill; and a patriot, he valued manly courage in war. Above all else he allied his scientific and engineering toys with sturdy boyhood. The A. C. Gilbert advertising reflected these inclinations. For years, almost every Gilbert ad carried the slogan, "Hello, boys! Make Lots of Toys!" and another read "I built Erector because I know what boys like." The Gilbert library also emphasized masculine endeavors with titles like, "Boy Engineering" which contained the articles, "How to Become a Footfall Star," "My First Flying Over German Lines," by Eddy Rickenbacker and Johnny Mack's "How a Boy Should Train to Become a Champion Athlete," in addition to an essay by Thomas Edison.[18] When the A. C. Gilbert publicists pictured girls at all, they peered over their brother's shoulder at an Erector marvel. The Erector's capacity to build machines and foster engineering, in addition to the company's science products, moved girls both literally and figuratively out of the picture. Science and engineering became more closely identified with boys and the kind of play associated with the toys as appropriate choices for boys.

At first glance, one might not expect that girls fared well in these adult marketing schemes. But because little girls seemingly were consistently educated for the roles of housewife and mother by dolls and toys which simulated various household technologies and because little boys were apparently encouraged to be scientists and engineers, among other professions, with chemistry sets, Erector sets, various vehicles, and tools,[19] does not necessarily mean that children automatically fell into line. As many parents have observed, children have not always followed their elders' precepts. Often they have subverted the intentions of toy manufacturers and parents, destroyed their toys, or crossed the line separating girls' toys from boys' toys. 20 As one writer has argued, from the 1890s to the 1960s, the preferred play of girls has become more like that of boys, while "boys have been steadily lowering their preference for games that have anything to do with girls' play. So that it is by implication much more deviant behavior for a modern boy to play at, say Dolls, Hopscotch, Jacks, Schools, Cooking, Jump rope, Musical Chairs, Simon says, and Singing games than it was for a boy to play at these things in earlier historical periods." [21] It is reasonable to assume that girls and Gilbert construction toys were no exception. Girls crossed the gender line to become, at the least, knowledgeable about nuts and bolts or, at the most, clever erector set engineers.

The Gilbert Erector's and its fellow construction toys influence most certainly affected boys' career choices. Each year the A. C. Gilbert Company received letters from engineers testifying to A. C. Gilbert products' influence on their career choices, and a Harvard chemistry professor attributed the increased enrollment in his chemistry classes to students' interest in chemistry sets. [22] Architects, too, credited their vocation to their early experience with blocks and other building apparatus. [23] One architectural commentator has recently observed the extent of this influence: "Buildings in the style known as High Tech often look like giant Erector sets. The neoclassical designs of postmodern architects, who celebrate engineering not at all, have a Froebelian, toylike quality, as they were made of wooden block—colored cubes, cylinders, and pyramids."[24]

Gilbert's Erector and other toys in the A. C. Gilbert line-up were more than simply an engaging and successful pitches to boys to take up engineers or science. The Erector propagated a particular kind of thinking. Recently, Henry Petroski in *The Pencil*, illustrates this principle with an example from the engineering of the pencil. Suppose, he writes, in the quest for a suitable pencil lead, an experimenter confronts a box of flat, black matte marbles of different materials, ranging from wood through metal to, perhaps, one of nitroglycerine. By trial and error, the experimenter could

exclude the different materials until, let's say, he or she injudiciously dropped the nitro marble, ending the test, or happened on the lead marble. The lead marble would, in fact, produce a dark line and be serviceable enough for writing or drawing. Satisfied, the experimenter might stop the search, thinking that nothing else might be as useful. Or the investigator might reason that, having found a good material, there might be some better black marble in the box. After a further search, the experimenter might happen on the graphite marble and its superior properties. If, however, the box contained no graphite marble, not even infinite and patient experimentation would produce a marble superior to the lead marble, although the exhausted and intrepid experimenter might imagine that a better material might exist elsewhere outside the box.[25] Petronski ends his example: "In short, whether one finds or invents something as good as one hopes to when setting out on a quest, whether one is satisfied with what one does come up with, and whether one continues a quest at all *really depend not only on whether a suitable material exists but also on what one believes to be possible*."[26] [emphasis mine]

The Gilbert Erector functioned like the box without the graphite marble, limiting what children might believe to be possible. Even as the Erector and toys modeled on it made good on their claims of scientific education and fun, they also reinforced a particular view of the world and its processes as analytic, mechanistic, and reductionist. Because the elements came boxed, the set brought together a predetermined set of elements and principles in a confining format. The parts of the Erector (and the same can be said of all sets and kits), moreover, had fixed properties. Although Gilbert had expanded the possibilities of the construction set, the possibilities were not infinite. A young erector engineer could exhaust these without too much trouble. Ironically, the Erector supported thinking and activities that contrasted starkly with Gilbert's own tendency to combine disparate elements into a creative and innovative product. His enormously successful marketing contest which offered prizes for the best original models built with the Erector expressly forbade adding elements from outside the set.[27]

Seymour Papert, an American mathematician and Piagetian educational psychologist, has suggested that play imparts the ideas children use to construct their images of how the world is constituted and how it works. Functioning as the analogical foundations of subsequent learning and thinking, these images are likely to be applied in contexts far removed from those in which they were originally acquired.[28] That girls more often cross the gender line in play perhaps suggests that they are more experienced with different modes of thinking and, as a result, are more tentative or inclusive in

approaching both moral and intellectual problems.[29]

The A. C. Gilbert Company did not survive the death of its founder by many years. Like many family companies, the second generation did not possess the same energy and ingenuity of the first. In 1967, A. C. Gilbert Company declared bankruptcy, and Gabriel Toys bought some of the defunct company's designs and marketed its products in a cheaper format.[30] Gone were the metal cases from the Erector line and the range of materials from its chemistry and microscope sets. In time, Gabriel, too, passed from the business landscape. Currently, Toys R Us, the nation's largest toy retailer and discounter, sells Legos and Legos only, and Kay-Bees, a mall toy merchandiser, adds a few Tyco products and Fisher Price Contrux boxes to the Lego line on its shelves. Toys R Us carries no science toys, and KayBees only stocks a few Tasco items. There are other interesting construction and science sets available, but the mass retailers and consumers are apparently willing to settle for a limited selection. [31]

As for my brother and me, we enjoyed the Erector set until we were teenagers when such things became declasse. Along the way, we pooled our resources, twelve dollars at one point, and bought extra girders and the centerpiece, the electric motor, with which we made even more complex machines. I became proficient with the screwdriver and wrench and learned the difference between a nut and a bolt, and my brother learned patience enough to read directions. The Christmas of 1959 was much more satisfactory. Under the tree was an A. C. Gilbert Microscope Set and in another parcel a book, *The Gopher Reader, A Young Person's History of Minnesota*. Perhaps this coincidence explains, in part, why I am a historian by vocation and a software designer by avocation. Then again, perhaps it does not.

Endnotes

[1]*Mother's Journal*, May 1846, 142; see also *Mother's Monthly Journal*, April 1839, 56.

[2]E. Landells, *The Boys' Own Toymaker: A Practical Illustrated Guide to the Useful Employment of Leisure Hours* (London: Griffith and Farran, 1860), vii.

[3]Paula Petrik, "The Paraphernalia of Childhood: Advice on Toys," Playthings for the Republic's Children: American Culture, Toys, and the Business of Play, unpublished manuscript.

[4]Blair Whitton, *The Knopf Collectors Guide to American Antiques: Toys* (New York: Alfred A. Knopf, 1984): 24.

[5]*Ibid.*, 16. The Log Cabin Playhouse is an outstanding example of construction toy manufacturers' nonsexist packaging, but it may also be one of the first deceptive toy advertisements. Although the toy is very small, the box label shows a structure as big as the little girl who is building it. Such deceptions in scale were commonplace on Saturday programming until recent regulations halted their most egregious use.

[6]*Ibid.*, 17.

[7]Quoted in Inez and Marshall McClintock, Toys in America, (Washington, D. C.: Public Affairs Press, 1961): 156-157.

[8]*Ibid.*

[9]Whitton, *The Knopf Collectors Guide to American Antiques: Toys*: 15.

[10]*Ibid.*, 11-17; Blair Whitton, ed., *Bliss Toys and Dollhouses* (New York: Dover publication, Inc., 1979): 2, 6, 25.

[11]John Dewey, *Democracy and Education* (New York: Macmillan, 1916): 194-206.

[12]A. C. Gilbert with Marshall McClintock, *The Man Who Lives in Paradise*, (New York: Rhinehart & Company, 1954): 83.

[13]*Ibid.*, 104.

[14]*Ibid.*, 119-123.

[15]Interestingly enough, the greater availability of electricity in the US added to the erector's success in beating the competition at Meccano. Because fewer British homes had electricity, Hornby decided against using an electric motor, and his US sales declined accordingly.

[16]*Ibid.*, 127.

[17]*Ibid.*, 173-174; 333

[18]*Ibid.*, 130, 175.

[19]Pursell, Carroll W, Jr., "Toys, Technology and Sex Roles in America, 1920-1940," in *Dynamos and Virgins Revisited: Women and Technological Change in History* Trescott, Martha Moore, ed. (Metuchen, N.J.: Scarecrow Pr., 1979): 252-267.

[20]Bernard Mergen, "Toys and American Culture: Objects as Hypotheses," *Journal of American Culture*, 3(1980): 744.

[21]Brian Sutton-Smith and B.G. Rosenberg, "Sixty Years of Historical Change in the Game Preferences of American Children," *Journal*

*of American Folklore* 74(1961): 17-46; See also *Buy Me! Buy Me! The Bank Street Guide to Choosing Toys for Children* (New York: Pantheon, 1987): 270-271 It is worthy of note that while the language preserves the word, "tomboy," to describe girls' boyish play, there is no direct cognate for boys' cross-gender play. The opposite terms for "tomboy" tend to be much more pejorative.

[22]A. C. Gilbert, *The Man Who Lives in Paradise*: 144; 283

[23]Nora Richter Greer, "The Lasting Influence of Architectural Toys," *Architecture-The AIA Journal*, 78(no. 2, 1989): 68-71.

[24]Witold Rybczynski, *The Most Beautiful House in the World* (New York: Viking, 1989): 36.

[25]Henry Petroski, *The Pencil: A History of Design and Circumstance* (New York: Alfred A. Knopf, 1990): 18-19.

[26]*Ibid.*, 19-20.

[27]The idea of kits and sets, moreover, pervaded society and also found their way into children's literature in much the same manner as thinking about toys in the nineteenth century turned up in children's books. L. Frank Baum's stock older characters invariably provide the slick solution to a problem. In Baum's *Road to Oz* [1909], for example, Johnny Dooit uses a kit or set to construct the sledge to carry the party across the Dreadful Desert on their return to Oz. See Roger Sale, *Fairy Tales and After: From Snow White to E. B. White*, (Cambridge, MA: Harvard University Press, 1978): 228.

[28]Seymour Papert, *Mindstorms* (New York: Basic books, 1980): 19-37.

[29]For discussion of women's intellectual and moral development, see Carol Gilligan, *In A Different Voice: Psychological Theory and Women's Development*, (Cambridge, MA: Harvard University Press, 1982); Mary Field Belenky et al., *Women's Ways of Knowing: The Development of Self, Voice, and Mind*, (New York: Basic Books, Inc., 1986).

[30]"Hello Boys! Make Lots of Toys! A. C. Gilbert, America's Toymaker," *American History Illustrated*, 15(no. 8, 1980): 42.

[31]The direct heir in both appearance and design to Gilbert's Erector is BRIO Scanditoy's Mech. Made of wooden girders with plastic "nails," nuts and bolts, and pulley mechanisms, Mech is designed for a younger group and available, like other upscale construction toys, at speciality toy shops and museum stores.