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The Button: Not a Simple Notion

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In the article below, Paul Grebinger, who began his professional life in anthropology as an archaeologist, asks you to see a world in a button. In the early twentieth century, button makers had to adapt to changes in American culture that threatened their industry. Applying the theory of human materialism, Dr. Grebinger draws out key connections between American immigration history, politics, economy, and technology.

Paul Grebinger is a professor of anthropology in the College of Liberal Arts at Rochester Institute of Technology. He completed his undergraduate degree at Columbia University when Marvin Harris was chair, and Harris's theory of cultural materialism permeated the intellectual ether of the Department of Anthropology. On completing his Ph.D. at the University of Arizona in 1971, Grebinger specialized in prehistoric Southwestern archaeology. By the 1980s, however, he had refocused his interests on historical American material culture and technological change. He is currently conducting research into the role of horticultural industries in transforming the nineteenth-century American landscape.

The button is no mere appurtenance of costume. In the discussion that follows I treat it as a material reflection of change in American culture. It becomes a lens through which we can develop insight into dimensions of American life that otherwise might elude us. Although the manufacture of buttons is embedded in cultural contexts that are, strictly speaking, technical and economic, simple infrastructural determinism as set forth in cultural materialist research strategy does not provide satisfactory explanation of the transformations in button technology discussed here. Even an apparently "simple notion," such as the button, exhibits attributes of function *and* of style. It embodies cultural meaning that is not only technological and economic, but social and political as well.

In order to explain transformations in button technology we must explore processes of change in American culture that reach back into the nineteenth century. The locus of change described here was Rochester, New York, a national center of both menswear manufacture and button production since the second half of the nineteenth century. The change was revolutionary in that the fundamental technology of button manufacture was transformed from mechanical to chemical and was so profound that there could be no return to the previous system.

Cultural materialism (Harris 1999; 2001), with modifications suggested by Magnarella (1993) under the rubric human materialism, is my framework for analysis. As Harris (2001: xv) notes, cultural materialism "is based on the simple premise that human social life is a response to the practical problems of earthly existence." Therefore, infrastructure will take precedence in human adaptive responses to the environment. In attempting to understand change in any human cultural system, an anthropologist should first look to perturbations in the technological and economic subsytems of culture. In cultural materialist analysis, infrastructure has causal priority. There are feedback links with structure (dimensions of social and political organization) and with superstructure (dimensions of political and/or religious ideology). Investigation of these links follows from careful identification of patterns of production and reproduction.

Proponents of a cultural materialist research strategy have tended to select subjects for analysis that lie at the very boundary of human interaction with the environment. For example, there is Eric Ross's "beef with Sahlins" (Ross 1980: 183–186). Marshall Sahlins has argued that human foodways are based on the logic of object versus human subject; hence, we do not commoditize what we tend to categorize as kin, for example, one's family pet. By contrast, Ross's materialist explanation is based on the cost/benefit analysis of cattle over dogs as a protein source; the herbivore is a much more efficient converter of energy into proteins than the carnivore. In another context, Harris and Ross (1987) analyze modes of reproduction among preindustrial and developing societies. Cultural mediation of birth and death rates in response to cost/benefit analyses of child rearing, given available food supplies, is a human adaptive response to environmental change.

However, when one's research happens to focus on cultural behaviors that are not so firmly embedded in infrastructure, as are foodways and population, the cultural materialist strategy presents problems. Further, Brian Ferguson (1995: 30–33) has argued that cultural materialism is weak when it confronts short-term historical change. And indeed, for Harris and Ross (1987: 2–3), "causal relationships [in synchronic or slice-in-time analysis] dissolve into an incoherent corpus of middle-range eclectic correlations linking infrastructural, structural, and superstructural components in infinite arrays." They seem to prefer working through broad evolutionary time frames while consigning the analysis of everyday minutiae to historians. Ferguson, however, sees "no reason to abandon the quest for causal regularity in normal historical process" (1995: 31). To deny the value of synchronic studies is to throw out the baby with the bath water. Feedback relationships among infrastructure, structure, and superstructure can be understood as a function of the special nature of the cultural thing and context of events under investigation.

Paul Magnarella (1993: 1–19) and Maria Palov (1993: 144–152) offer a useful alternative model. Magnarella recognizes the dynamic relationships among infrastructure, structure, and superstructure. However, he divides infrastructure into components: material (technology), human (demography, psychology, biology), and social (leadership and power). These are in feedback relationships among themselves as well as with social structure (kin, economic, and political organization) and superstructure (ideology). In other words, Magnarella embraces complex relationships in the form of general systems analysis. These are asymmetrical, in the sense that change in infrastructure has causal priority with impacts on social structure and superstructure. Further, they are open to change from the natural and sociocultural environment. Finally, Magnarella makes a plausible case for human teleology in these systems. People in power will maximize outcomes for themselves, even when the well-being of others or long-term adjustment to the natural environment is jeopardized.

I attempt to cast the results of my research on the button in a form consistent with the nature of the material under study and the cultural contexts in which it is embedded. A descriptive account of the technologies that changed provides insight into the material infrastructure of button manufacture in early-twentieth-century Rochester, New York. This is followed by an analysis of change within the general guidelines of human materialism as described above.

Technology of Button Making: Material Infrastructure

Before 1935 buttons manufactured in Rochester were handcrafted from vegetable ivory, the fruit or nut of the Tagua palm (*Phytelephas macrocarpa*). The Tagua nut is several times larger than, but similar in shape to, the Brazil nut, and when mature exhibits the color and texture of tusk ivory, hence its generic name vegetable ivory. The process of manufacture was subtractive. Material was removed from the original matrix in a carefully ordered sequence of steps that were readily adapted to a factory system for mass production. The process included: drying to loosen the nut from a flint-like shell casing; tumbling in a barrel or "shucker" with metal weights to crack the shell casing; "scabbing" upon hand inspection in order to remove minute bits of shell; sizing or sorting according to size; sawing individual nuts into slabs the thickness of a button using circular saws that ran at a speed of six thousand revolutions per minute; further drying to remove every bit of residual moisture; immersing in steaming hot water in preparation for turning at a lathe in order to produce the basic button shape; drilling the holes; dyeing, either in a bath or by spraying to achieve a mottled effect; final polishing and finishing; and carding, where buttons were sewn onto cards for demonstration or sale (Albes 1913: 192–208).

A different operative performed each major step. The machinery employed was simple: circular saws, polishing wheels, lathes, and drills adapted to the scale of the product. Each slice of the Tagua nut was manipulated a hundred times before it was finally carded or boxed. As a result, the labor investment in producing a vegetable ivory button was high—as much as 80.5 percent in some types (Simon 1949). This was a labor-intensive process.

Between 1930 and 1935 changes in the local industry were instituted that would shift manufacturing to capital-intensive processes. The entire technological transformation dates between 1931 and the end of World War II. During this period techniques for mass producing buttons from plastic materials manipulated by automatic machines replaced the hand labor and craftsmanship employed in producing buttons from vegetable ivory. Of three major or national manufacturers of vegetable ivory buttons operating in Rochester during World War I, only one continued operations following World War II. It became the leader of the national plastic button industry.

Among plastics of that time, "beetle" (an early compound of urea), phenolics like Bakelite, and casein were satisfactory substitutes that could be fashioned into machine-made buttons at considerably less cost than vegetable ivory. The synthetic materials from which plastic buttons were produced in the 1930s were actually several times more costly than the unprocessed Tagua nuts, but the reduced labor costs offset this disadvantage (Anonymous n.d.). Casein was in fact the plastic that figured in the early drama of change in the Rochester industry.

Casein is produced from the protein of skim milk, which, when treated with formaldehyde, produces a thermosetting plastic. One hundred pounds of new skim milk produces approximately three pounds of casein powder. An especially fine grade of casein is necessary in the manufacture of buttons. This grade at the time was only available from abroad and consequently expensive (Anonymous n.d.). Neil O. Broderson, President of Rochester Button Co. and the innovator responsible for most of the technological change described in this article, determined that he would have to create his own supply of button-grade casein. He established a processing plant near one of the largest creameries in the State of Wisconsin. At that location, 10,000 gallons of skim milk per day could be converted into casein through the application of rennet (Clune 1936).

Production of buttons involved extruding chemically treated casein from machines that compacted and forced the material through nozzles from which it emerged in the form of rods. The rods were then machined to uniform or standard sizes, and then turned on to automatic screw machines that produced buttons at the rate of two hundred buttons per minute. Or, in some cases in separate operations, the rods were cut into round discs and then faced and backed on automatic lathes. A subsequent formaldehyde bath strengthened the button and imparted a varnish-like sheen that in cheaper varieties substituted for polishing and other types of surface treatment. Since dyestuffs in the form of a bath do not penetrate the surface of casein buttons, coloring agents were added to the casein at the time that it was extruded in rod form (Anonymous n.d.). The reduction in the number of steps involved in the manufacturing process and the ease with which casein plastic could be adapted to automatic machine processing made it an attractive candidate for mass production of buttons. Its chief limitation was its tendency, although thermosetting, to absorb water, swell, soften and break in a hot-water wash, and to discolor and become pliable when subjected to moderately elevated temperatures such as those produced by an iron (Masson 1959: 14–15). Other more durable plastics such as urea-formaldehyde, melamine-formaldehyde, nylon, and polyesters would eventually replace casein in button manufacture.

An Industry Transformed: Human Materialist Analysis

In the summer of 1930, with signs of business slowdown everywhere, Neil Broderson had some doubt about the future of the button business. He took more than passing interest in a letter dated 22 July 1930 (Rochester Button Company Papers) from George Baekeland of the Bakelite Corporation offering to put him in touch with a friend who might be interested in buying Rochester Button Company:

> I do not want to meddle in your affairs, but I did get the impression that you want to get out of your present business. Otherwise I should not be bothering you.

Broderson responded with the candor typical of him in a letter dated 23 July 1930 (Rochester Button Company Papers):

> Your assumption that I am not particularly fond of the button business is correct. However, I realize that which one has is the best until something better is found. The button business is most interesting, the principal criticism is the fact that the entire industry is such a small one that a bright future could not be hoped for, unless we can develop something aside from buttons.

At that moment, and barely thirty years of age, Broderson was about to embark on a remarkable career as innovator in plastics technologies and button making.

Neil Broderson was an intuitive engineer with no formal training in chemistry. However, he had a network of friends in the nascent plastics industry upon whose advice he could rely. Between 1931 and 1935 he developed and installed a successful casein button manufacturing department in his plant in Rochester. This innovation, like many others in biological and cultural evolution, follows Romer's rule, where, in effect, "the initial survival value of a favorable innovation is conservative, in that it renders possible the maintenance of a traditional way of life in the face of changed circumstances" (Hockett and Ascher 1964). Plastic substitutes had already begun to replace vegetable ivory in the manufacture of largely functional buttons such as those used to attach suspenders to men's pants and fly buttons. There was a lucrative market in such mundane items. Plastic in general was not yet of a quality that would provide satisfactory substitutes for more stylistically crucial or visible buttons. Under pressure from his salesmen to rush to plastic alternatives, Broderson in a letter dated 19 October 1934 counseled (Rochester Button Company Papers):

> The longer we can preserve our ivory button business while building up our substitutes, the better it will be for us. It will be difficult to gain the same advantageous position in substitutes that we enjoy in ivory and it cannot be done in six months or one year's time.

Technological change as it plays out in the lives of real people is often undramatic. Broderson developed a conservative but successful strategy that led him to further success in plastic button technologies. Following World War II he chaired the button division of the Society for Plastics Industries. He saved his company from the extinction that overtook a rival vegetable ivory button maker in Rochester, the Art in Buttons Company. In his business papers, however, Broderson offers no analysis of the economic, social, and political forces to which he and the industry were responding. Here then is a role for the anthropologist who wishes to write culture history.

The economic perturbations of the Great Depression were only a catalyst that precipitated technological change in the button industry. Population growth was the mechanism driving transformations described in this paper. Vegetable ivory button manufacture grew up as a subsidiary of the ready-to-wear clothing industry, which was directly linked to the population boom of the late nineteenth century in North America. Between 1881 and 1924 more than 21 million immigrants entered the United States, most of them of peasant origin from eastern and southern Europe (U.S. Bureau of the Census 1975). Immigration, not natural increase, provided a market for cheap clothing. Poor immigrants required mass produced garments of uniform and undistinguished character. Once people were suited in such attire, ethnic distinctions based on dress were obliterated. This was the "democracy of clothing" described by the historian Daniel Boorstin (1973: 91–100).

Vegetable ivory as a raw material was ideally suited for buttons on such clothing. It was collected from palm trees growing under natural conditions in Ecuador, Colombia and Panama. The raw nuts were harvested by cheap and exploited laborers, Indian Taguaros (Albes 1913). Before the properties of Tagua as vegetable ivory were discovered, the nuts were used as ship's ballast (Simon 1949). In short, the cost of the raw material was low. Further, clothing designed to suit everybody did not require buttons in a dazzling array of form and color. Consequently, the subtractive technology for transforming the nut into a button was adequate for the need. Finally, with the exception of sawing, turning, and dyeing, relatively unskilled labor was sufficient for the other steps in the process of producing a vegetable ivory button. The immigrant consumer of these symbols of mass democracy became the cheap labor that produced them. The industry expanded along with the immigrant population, and flourished in the early twentieth century. By the 1920s there were 35–40 factories producing vegetable ivory buttons in the United States (Simon 1949).

The decline of the industry, to which Neil Broderson was responding through technological innovation in the early 1930s, had already set in just after World War I. The factors involved can be traced to feedback from the structural and superstructural subsystems. First, the immigrant boom was brought to an abrupt halt as national sentiment against the flood led to quota laws in 1921, 1924, and 1929 (Schaeffer 1984, 120–122). The fall-off in immigration between 1924 and 1925 was dramatic. In 1924, 364,399 immigrants from Europe were admitted, but in 1925 there were only 148,366 (U.S. Bureau of the Census 1975). The quota laws reflected the concern of organized labor that immigrants would lower wage standards. But, probably more important were general antipathy toward Europe following the war and jingoistic fears that southern and eastern European immigrants were not assimilating culturally. A eugenics movement, with considerable influence in both academia and government, played on fears that biologically inferior immigrants would weaken the American gene pool. President Calvin Coolidge signed the 1924 quota law with this admonition (quoted in Harris 1999: 68):

> America must be kept American. Biological laws show that Nordics deteriorate when mixed with other races.

In the button industry sales volume is critical. Impacts of these changes were immediate. Second, styles in women's fashion changed dramatically in the 1920s. The flapper attired herself in dresses with a draped and pinned look. Fashions of the previous decade were festooned with buttons from shoulder to hemline. Among Rochester manufacturers, Art in Buttons produced for both the men's and women's apparel industry and was hardest hit by this downturn in demand. The president of the company, Henry T. Noyes, was an uncooperative, even unscrupulous, member of the community of vegetable ivory "button men," as they referred to themselves. His schemes to undercut and undersell competitors were an additional factor in the cost/benefit analysis that led ultimately to a strategy of technological innovation. The annoying Noyes ultimately led his company to extinction.

Third, serviceable slide fasteners were first introduced as closures for money belts in 1917. In that year the Hookless Fastener Company sold 24,000 fasteners. In 1923

B. F. Goodrich began producing galoshes with slide fasteners and originated the name "zipper." By 1934 the Hookless Fastener Company sold more than 60 million slide fasteners (Weiner 1983: 132–133). Throughout the 1930s and 1940s the slide fastener would become a substitute for fly buttons and a frequent alternative to buttons on outerwear. Although it is clear from his business papers that Neil O. Broderson was not concerned about inroads from the slide fastener in 1930–1931, by the late 1930s this competing technology was reinforcing his earlier decisions to intensify in the direction of further plastics technologies. He quickly moved to compounds of urea and by the late 1940s, with assistance from professionally trained chemists in his employ, he developed a nacreous polyester button that literally drove natural pearl buttons out of the men's shirt market.

From 1924 through to the early 1930s the button makers were under assault from forces they did not fully understand. Politically influenced population shifts, style changes in fashion, and then the economic downturn of the Great Depression put the button men under stress. They responded through a process of intensification based on cost/benefit analysis. It is important to note that technological innovation was the last strategy they employed.

Initially the effects of competition among the leading producers were dealt with by price-fixing. The first and only attempt ended when one of the industry leaders excused himself from a meeting in which new wholesale prices had been set, to pass the information on to a confederate waiting in the men's room. The confederate, of course, contacted customers with offers to fill orders at below the new market price (Zimmer, Nelson, President of Shantz Associates. 1983. Interview by Paul Grebinger). All the evidence in this case points to Henry Noyes.

More effective as an intermediate strategy was merger. In 1926 two competitors, Rochester Button Company and Shantz Button Corporation (a Rochester company), merged with a third the Superior Ivory Button Company of Newark, New Jersey. By the early 1930s the Shantz and Superior companies had been closed, with all manufacturing operations concentrated in the single Rochester Button Company plant. Broderson was the son of the owner of Superior Ivory Button Company and had become the manager of the New Jersey plant after the 1926 merger. He assumed leadership of the new company in 1928. As outlined above, the technological transformation from labor-intensive vegetable ivory to capital-intensive plastics technologies followed.

Not a Simple Notion

This research project began more than twenty years ago with an invitation from the Rochester Museum and Science Center to conduct background research for and create an exhibit on button making in Rochester (funded by the New York State Council on the Arts). Although all buttons manufactured by Rochester Button Company in the 1980s were from plastic materials, there were still individuals working for the company, and retirees living in the city who had worked as vegetable ivory button makers. Through interviews and historical research I was able to establish the outlines of button manufacture presented earlier in this paper. The technology and the button men who developed and transformed the industry were the focus of the exhibit. Describing the change from labor intensive to capital intensive was a first step in explaining it. As an historically oriented anthropologist I have been uncomfortable with the limitations of the cultural materialist research strategy as noted earlier. Brian Ferguson's critique and Paul Magnarella's revision in the form of human materialism have provided incentive and a model for thinking anew about these data.

The approach described by Magnarella (1993) has been recast in terms of general systems by Maria Palov (1993: Appendix). As she notes, "A basic tenet of the systems approach is that the whole is greater than the sum of its parts." The whole that I have attempted to define provides insight into changes in American culture in the early twentieth century. At no time between 1925 and 1945 did Neil Broderson, or others with whom he was in contact, make an analysis of change such as I have attempted here. (Broderson's letters through fifty years as president are available among the papers of the Rochester Button Company.) Further, the model has allowed me to explore the role of individual actors, such as Neil Broderson and Henry Noyes, as well as a class of people, immigrants, in conjunction with structural components (cf. Magnarella 1993: 148). In this way I have been able to preserve the textures of normal historical analysis and achieve materialist insights about transformation in technical and economic systems.

In colloquial usage a notion is a small article such as a button, also an ingenious device (Webster's Third International Dictionary). Although relegated to the subconscious in daily habitual activity, the button as material culture is affixed to garments worn by human actors engaged in social and cultural life. These actors, here the immigrants of early-twentieth-century America, were themselves subject to economic, political, and ideological forces of the time. Button men such as Neil Broderson responded to declining markets through strategies available to them, a process of intensification based on cost/benefit analysis. Their response to perturbations in ideology, society, and economy in America produced a revolution in button making. Throughout this process the button was never just a simple notion.

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Exercise

For most Americans material objects take on a life of their own. They are valued, purchased, used, and discarded as items disconnected from their sources, processes of manufacture, and