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Levittown, New York: Suburban Dream or Nightmare?[1]

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After the Second World War developers built suburbs throughout the United States, in part, to accommodate a booming population and to satisfy veterans' demands for housing. Levitt & Sons built the most famous of these suburbs, just outside of New York City, on Long Island. The suburb, however, predates the postwar boom by more than a century and, as an idealized way of life, the suburb embodies certain important attributes. This article considers the essence of the suburb in American history and examines whether Levittown, as a postwar suburb, has embodied those attributes to fulfill a dream or to create a nightmare.

Key Words: Levitt, Levittown, suburb

Introduction

One of the major events in U.S. history during the years after World War II is suburban development throughout the country. Generally this event is accorded

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[1] I made a conference presentation on this topic, entitled "Levittown and the American Dream: Suburban Sprawl from Mall to Mall" at the Humanities and Technology Association (HTA) Conference in Terre Haute, Indiana on 6 October 2007.

a place of prominence in American history textbooks, some of which even devote an entire chapter to postwar suburban development (Nash and Jeffrey, 2001, pp. 838-871). Millions of persons in that period and still many people since then believe that the sprawl of suburban communities across the land provides the fulfillment of the American Dream. During the postwar period, which historians often denote as 1946-1963, many movies and TV shows highlighted life in the suburbs as a dream fulfillment. For example, in *Miracle on 34th Street,* released by Twentieth Century Fox in 1947, the movie concludes happily on Long Island where the main characters receive as their Christmas present a one-family house in a newly built suburb. Critics of America's postwar suburbs have not found a picturesque environment that includes a tree swing in the backyard, as shown in *Miracle on 34th Street,* but instead they see a seemingly endless sprawl from mall to mall where the alienated suburbanite becomes part of "The Lonely Crowd" (Mumford, 1961, pp. 509, 512, 543). For David Halberstam life in the postwar suburb is a nightmare that is horrifyingly captured in *Invasion of the Body Snatchers.* In this movie "neighbors whose lives had so lost their distinctiveness . . . could be taken over by alien vegetable pods *and no one would know the difference"* (Ferrer and Navarra, 1997, p. 16). More than any other location in the United States, Levittown, NY on Long Island became the embodiment of the postwar suburb and, as such, it has been one of the primary recipients of the aforementioned praise and criticism.

This article considers whether suburban Levittown has been the fulfillment of the American Dream in the

LEVITTOWN, NEW YORK

Levittown Veterans Memorial Park, just off Hempstead Turnpike[2]

No. 1

second half of the twentieth century or an ongoing nightmare since its construction. This consideration is based on the following materials: some historians' studies of suburbia, comments by persons who have lived in Levittown, and my own insights on the matter based on three visits to Long Island made during the summer of 2009. Two historians, whose works are important for this paper, are Robert Fishman and Kenneth T. Jackson. Their historical analyses of the origin and the development of the suburb furnish an understanding of its essence in modern history. According to Fishman and Jackson, suburbia's essence consists of three attributes: picturesqueness, geographical

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[2] All photographs were taken by George Sochan on August 9, 2009. Photographs will be cited in the text by number (No.).

separation from the city, and exclusivity. While much of this article is based on their two books, as well as the work of other historians and sociologists, I have included the self-expressions of Levittowners because, as residents, they have gained an intimacy with this suburb. Many of these self-expressions I discovered through archival research in the Levittown library. Finally, I have included in the article my personal observations of Levittown derived from three trips made to Long Island on July 11, July 31, and August 9, 2009. Some of these observations are supported by photographs that I took while at Levittown. During the time that I spent at Levittown I not only did research at the library, I drove on or walked down many of the streets and visited many locations on both sides of Hempstead Turnpike.

An Historical Overview of the Development of the Suburb

Fishman in *Bourgeois Utopias: The Rise and Fall of Suburbia* and Jackson in *Crabgrass Frontier: The Suburbanization of the United States* see the development of the suburb to have occurred in the nineteenth century. Both agree that the following attributes comprise the essence of the suburb: a picturesque environment landscaped with one-family dwellings, a location that is separate from the city so that persons can reside in the suburb while still working in the city, and exclusiveness based on class (Fishman, 1987, p. 6 and Jackson, 1985, pp. 6, 11).

A human environment can be recognized as a suburb because its geography is apart from the city center and this deliberately separated community consists of single-

family houses that are generally owned and not rented. Moreover, this human environment that is located away from the city center consists primarily of one class of persons; again and again, Fishman, Jackson and other authors refer to members of the middle class.

Fishman argues that in contrast to most of the world, the suburb is distinctly Anglo-American and he traces its origins to eighteenth century London (Fishman, 1987, pp. 26-38). According to Fishman, merchants began relocating their residences outside of London beginning in the middle of the eighteenth century because they wanted to escape the squalor. Moreover, having established homes outside the city center, these merchants would be able to separate their work routines from their personal lives as they sought to privatize their personal life in a new environment that they would build for themselves. The new environment was carefully carved out of nature by landscape architects, like William Kent, Lancelot "Capability" Brown, and Humphrey Repton, in order to preserve a picturesque quality for the merchant and his family to enjoy. The most famous of these eighteenth century London suburbs is Clapham, which, when Henry Thorton, William Wilberforce, and other evangelicals began building their homes there, was completely apart from London even though the location was only three miles from London Bridge. Being so close to London, each workday of the week they could ride in their carriages to the city for their business, whether it was at the bank for Thorton or at Parliament for Wilberforce; two generations later these middle class suburbanites would ride the train into the city as they moved further and further away.

During the late eighteenth and early nineteenth centuries Clapham became a sanctified preserve for its upper middle class residents, or, as Fishman calls it, a "bourgeois utopia." Here the evangelicals would be able to keep their private life and their families secure from the sin and squalor of London while they regularly conducted their business in the city. The adult female of the family stayed at home to foster a wholesome, Christ-like abode for her husband and her children. This enclave of houses, clustered on a park in the center of Clapham, exuded "the feminine/natural/emotional world of the family" (Fishman, 1987, p. 62). In this world children were at the hub because in the suburb the long hours of work had been removed from their daily lives and the carefully crafted natural domain had been expunged of true danger so the children could play without fear. Upon his return from the city and on weekends, the father could join the children in delightful play in the spacious yard or for family-centered worship and home-schooled lessons in the large family room. Fishman states that the suburban ideal was transmitted to the United States through Catherine Beecher, herself an evangelical who propagated in her writings the virtues practiced by the Clapham evangelicals in England; Andrew Jackson Downing, an American architect, who promoted English housing and landscaping designs; and Calvert Vaux, an English architect who came to the United States and first influenced Downing and then Frederick Law Olmstead (pp. 121-125). While Jackson does not put nearly the emphasis on the English connection that Fishman does, Jackson does agree with the latter historian that the aforementioned three persons were significantly influential in promoting the suburban

style of life. Moreover, both view Olmstead as important in realizing that style of life in the late nineteenth century.

Llewellyn Park in the foothills of Orange, New Jersey and Riverside in Illinois, just nine miles west of State Street in Chicago, are two examples of picturesque enclaves built during the 1850s and the 1860s. After he had completed his work on Central Park in New York City, Olmstead designed the layout for Riverside with the lot size measured at 100 x 225 feet and the lots set around a park that was fashioned along the Des Plaines River. In her book, *Building Suburbia,* Hayden cites Riverside as one of the American utopian communities of the mid nineteenth century because even though some personal expression was allowed in house design, social harmony was stressed through communal rituals (Hayden, 2003, pp. 62-66). Furthermore, Riverside combined both country and city because Olmstead supplemented the suburb's railroad connection to Chicago with a scenic road.

While picturesque enclaves, like Riverside, may have been "blatantly elitist" (Jackson, 1985, p. 86) because residence in such suburbs was possible only for the few in the upper middle class, late nineteenth century rail transportation, especially the trolley, opened up more areas for suburban development at prices that others in the lower classes could afford. Prior to the late nineteenth century, transportation costs alone had often prohibited most persons from becoming suburbanites. They would not have been able to afford the cost of the trip from a residence in the suburb to a place of work in the city, whether it was by private carriage from Clapham to London or by train from Chestnut Hill to

Philadelphia. At the same time that the railroad suburbs around Philadelphia were being built, developers were building the trolley suburbs outside of Boston. The cost of the fare, including transfers from one line to another, was only five cents, which meant that millions of Americans throughout the United States could regularly ride the street car whereas only thousands could afford the daily jaunt by train (p. 118). Land prices away from the city center dropped lower than those within the city so developers quickly moved to the periphery to turn the countryside into street car suburbs. American home builders had already adopted the "balloon-frame" technique of construction, which used inexpensive, wooden 2x4s to erect the structure quickly and at lower costs to the consumer. Within decades, from the end of the nineteenth century to the beginning of the twentieth, many residences had been pulled out of the city to zones a few miles from the center. These enclaves generally were strung along the trolley tracks, looking like finger tips radiating from the city center that acted like the palm of the hand. In the time before the car, residents in these suburbs had to walk to a street car stop; therefore, they could not live too far from the tracks. Los Angeles' sprawling development in this time period, which included 1200 miles of track in 1915, represents the classic street car suburb with housing, sometimes as rentals, affordable for the lower classes (Jackson, 1985, pp. 136-138 and Hayden, 2003, p. 98).

Beginning in the early twentieth century, both trucks and cars have had the following twofold impact on regional urban development: the shift of many businesses as well as residences from the city to peripheral regions that sometimes did not become a suburb of the original

city center and, secondly, the location of residences and businesses in the surrounding region away from any form of public transportation. An aerial photograph of Los Angeles in the 1930s in *Bourgeois Utopias* (Fishman, 1987, pp. 116-117) shows how extensive the suburban sprawl had become when highways and major thoroughfares were added to the county to supplement and even compete with the street cars. Starting in the 1920s, much of the United States began to become paved over with asphalt and concrete. The pavement was not only for cars, which many Americans had begun to use for pleasure riding, the so-called Sunday drive, and some other persons for regional commuting in place of train travel, but the newly paved roads also accommodated trucks, which served to transport heavy goods to locales that did not have a railroad depot. In fact, during the interwar period many businesses moved from the industrial areas of the city to the periphery so that urban factory employment in cities with a population greater than 100,000 started to decline (Jackson, 1985, p. 183). Housing and business development away from the nineteenth century railroad tracks and trolley lines became the late twentieth century regional sprawl, which has been linked together by paved roads and expressways.

What the aerial photograph of Los Angeles reveals of southern California in the 1930s was typical of the growth emanating from other large cities, like New York. In 1933 *National Geographic Magazine* stated the following about New York City: "Long Island is built up for half its length to accommodate those who make New York the metropolis of America" (Jackson, 1985, p. 176). New York City's sprawl also included Connecticut

to the north and New Jersey to the west as well as Long Island to the east. Just prior to the turn of the century, New York City, centered on Manhattan Island, had annexed two cities, Brooklyn and Queens, located across the East River from Manhattan and situated on the western end of Long Island. After World War II the sprawl from these two New York boroughs would pervasively spread eastward across Long Island. Even before the Second World War, critics of the suburban sprawl surfaced. As urban developer Robert Moses built bridges from one New York borough to another and paved parkways from the boroughs to western Long Island, Clay McShane lodged the complaint that twentieth century development was destroying "the living environments of nineteenth-century neighborhoods by converting their gathering places into traffic jams, their playgrounds into motorways, and their shopping places into elongated parking lots." For his conclusion, McShane asserted, "These paving decisions effectively [have] made obsolete many of urban America's older neighborhoods" (p. 168).

As McShane's observation indicates, extensive twentieth century regional expansion did raise the question whether or not this rapid development fulfilled or contravened the essence of suburbia. Housing developments and business districts spread far beyond the city's boundaries in an immense, regional sprawl that was both seemingly unplanned and never annexed by the older cities, like Philadelphia and New York. The most famous suburb within this postwar expansion is Levittown on Long Island to the east of Brooklyn and Queens. Levittown was built between 1947 and 1951 primarily to provide housing for veterans, and this

suburb soon became the emblem of the postwar housing boom.

Levittown and the Postwar Housing Boom

When the news of the Japanese surrender on board the battleship *Missouri* reached the United States, celebrations erupted throughout the country. Like the sailor and the nurse in the famous photograph in Times Square, New York City, Americans were overjoyed that the war had ended. However, many Americans did not want to return to prewar conditions, which would have meant for millions of Americans a deprivation of good housing. During the wartime economic boom many Americans had relocated to industrial centers, sometimes fairly new ones, in order to obtain a job. The government, however, had not provided for adequate housing; war workers lived in shacks or in cars or doubled-up with others, expanding a trend that had begun during the hard years of the Depression. Just after the war, in Chicago, 250 former trolleys sold as homes (Jackson, 1985, p. 232). While during the 1930s the country's birthrate had been low, during the years of the Second World War a baby boom had already started. Added to these numbers of inadequately housed Americans would be those of the returning GIs, numbering more than ten million, as the Truman Administration quickly sought to demobilize the armed services in 1945-46. While housing starts lagged during the war years and the immediate postwar years, American magazines, like *Ladies Home Journal*, advertized the "dream house," which was the single-family home in the suburb. Sometimes the

advertisements contained assurances that these new houses, away from the clutter of the city, would be filled with the needed and longed-for appliances. In a General Electric advertisement, called "It's a promise!," a GI and his sweetheart sit together on a bench as he uses a twig to sketch their appliance-filled dream house in the dirt (Hayden, 2003. p. 8).

In the years just after the Second World War the company to step forward to fulfill such promises, including installing General Electric appliances inside affordable suburban housing, was Levitt & Sons. This company had been formed in 1929 by Abraham Levitt who brought in his two sons, Alfred, who became the architect, and William who was the driving force within the company and eventually became its president. Since the early 1930s Levitt & Sons had been building houses, many of them on Long Island, such as Strathmore in Manhasset. During the early war years Levitt & Sons got a government contract to build defense plant employee housing in Norfolk, Virginia. This gave the company its first taste in building on a larger scale, which Levitt & Sons would escalate as its signature mark when it returned to Long Island to build houses during the postwar years. The location of the company's big development was Island Trees in Nassau County, which in 1948 was renamed Levittown. In 1946, the year before construction began, this underdeveloped area of potato farms would soon be transformed into a subdivision, part of which is shown in the photograph with the Levittown welcome sign on Hempstead Turnpike just off Wantagh Parkway (No. 2). In 1950, during the midst of the company's expeditious construction of Cape Cods and Ranches in western Long

Island, a *Time* magazine article asserted: "Levittown is largely known for one reason: it epitomizes the revolution which has brought mass production to the housing industry" (House builder*,* 3 July 1950, p. 67). By 1948, after about two years of construction, Levitt & Sons had built six thousand houses (Larrabie, September 1948, p. 79), and in 1951, the year that the company stopped construction at Levittown, more than seventeen thousand homes had been built (Ferrer and Navarra, 1997, p. 34). Housing construction by Levitt & Sons was just the most publicized part of the postwar boom. While in 1944 there had been only 114,000 housing starts, in 1946 there were 937,000 and in 1948 there were 1,183,000 and in 1950 there were 1,692,000 (Jackson, 1985, p. 234). With each passing year more and more house construction in the United States was taken on by the big developers like Levitt & Sons.

Levittown: Hempstead Turnpike off Wantagh Parkway

No. 2

The fame of Levitt & Sons resided in the company's ability to construct houses quickly and the name of Levitt has often been compared to that of Henry Ford. "[William] Levitt takes advantage of whatever economies mechanization can give him. The site of the houses becomes one vast assembly line, with trucks dropping off at each house the exact materials for the crew then moving up" (Larrabie, September 1948, p. 83). Levitt divided the stages of work into twenty-seven steps and, whereas Ford moved his cars along an assembly line to the designated work crews, Levitt moved his teams of workmen from house to house where they would readily complete their assigned task. Since the company did not build basements for its houses at Levittown, the foundation slabs were quickly dug and the concrete swiftly poured. Once the concrete had set, the teams of workmen assembled the pre-cut lumber and the prefabricated parts of the house, like stair cases and plumbing fixtures. As much as possible Levitt & Sons resisted union labor because unions had rules that retarded the pace of work. For example, union rules required that brushes be used to paint houses, but William Levitt had the workmen spray the paint because this technique was faster (Jackson, 1985, p. 235). As a result of such production techniques, by 1950, Levitt & Sons had transformed fields where potatoes once sprouted into a subdivision with "10,600 homes inhabited by more than 40,000 people." The *Time* magazine writer continues by asserting that three-year-old Levittown was "almost as big as 96-year-old Poughkeepsie, N.Y., Plainfield, N.J., or Chelsea, Mass" (House builder*,* 3 July 1950, p. 67).

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The prompt completion of houses by Levitt & Sons, as well as by other companies that adopted mass production techniques in construction, was good news for house-hungry Americans. When the first three hundred houses opened up for rental—originally, the Levitt houses were rentals with option to buy, but soon all the houses became ones for purchase—people waited in line for the opportunity to get one. In *Levittown: The First 50 Years* two pictures show the determined demand for housing on western Long Island: In the first photograph World War II veterans are sleeping outside the Levitt office waiting for it to open in the morning and in the second Levitt sales representatives, organized at five big tables, sell houses to a crowd of customers (Ferrer and Navarra, 1997, pp. 16 and 17.). What the purchasers acquired was either a Cape Cod at $6,990 or a Ranch at $7,990, both having four rooms on one floor; the small house was nestled on a plot of 60 x 100 feet. The houses did not have a garage, but later the Ranch model had a carport. Both models had an unfinished attic that could eventually be expanded with a dormer or

A dormer is being added to a Cape Cod

No. 3

two and refinished on the inside for upstairs bedrooms. Remodeling by the owner was called "sweat equity" and was encouraged by Levitt & Sons. Using Cold War rhetoric, William Levitt concluded: "No man who has a house and lot can be a Communist. He has too much to do" (Hayden, 2003, p. 135).

The rapid expansion of American suburbs during the late 1940s and the 1950s was facilitated by the Servicemen's Readjustment Act of 1944, which is more familiarly known as the GI Bill of Rights. This law created a Veterans Administration mortgage program wherein veterans could get a thirty-year mortgage on a house with no down payment. On a Levitt Ranch or a Levitt Cape Cod this monthly installment initially totaled as little as $56 (House builder, 3 July 1950, p. 68). Persons who were not veterans could get the thirty-year mortgage with a five percent down payment. This government-funded opportunity to acquire a home ignited a surge of migrants from New York City, particularly Brooklyn and Queens, to Long Island. In a lengthy article on Long Island, published in *National Geographic Magazine* in 1951, Howell Walker noted: "Along with the popular eastward migration goes industry. Home seekers want space for their families, business need space for its plants. . . . transplanted factories find available labor in the growing suburbs, and residents find jobs close to home" (Walker and Stewart, March 1951, p. 283). In 1950 Nassau County, where Levittown is located, had a population of 672,765, but in 1960 the county's population had nearly doubled to 1,300,171 and in 1970 that population had further expanded to 1,428,838 (Jansen, 1998, p. 323). While some saw Levittown as a postwar suburb that "makes

real the ex-GI's dream of a home of his own" (Walker, March 1951, p. 281), others condemned Levittown as "degraded in conception and impoverished in form," seeing only rows of "repetitious houses" on "cookie-cutter lots" (Jackson, 1985, pp. 236-237). Since its construction by Levitt & Sons, Levittown has been at the center of the debate over America's postwar suburbs.

Levittown and the Suburban Ideal

During the second half of the twentieth century much has been said, written, and illustrated about Levittown as the representation of the postwar suburb. Some of this commentary has been critical and many Levittowners are familiar with the negative assessment of their community. In their book that commemorates the first fifty years of the town's history, Levittowners Margaret Lundrigan Ferrer and Tova Navarra include some strong statements by Lewis Mumford. He described Levittown as "a multitude of uniform, unidentifiable houses, lined up inflexibly on uniform roads, in a treeless . . . waste." As for the residents, he judged them to be "conforming in every outward and inward respect to a common mold manufactured in the same central metropolis." He did not see much hope in the future, neither for Levittown nor the rest of postwar America because "the ultimate effect of suburban escape in our time is, ironically, a low-grade uniform environment from which escape is impossible" (Ferrer and Navarra, 1997, p. 15). It may be that such criticism has been made by persons who have had no intimate connection with Levittown or any other suburb. Certainly many Levittowners have felt this way about

their critics. In a short essay in *Harper's Magazine*, James Gallagher, a resident of Levittown, calls them "amateur sociologists" who have written their stories "from the Savarin Bar in Penn Station in Manhattan" based on aerial photographs taken in 1951. Writing in 1958, Gallagher insists that much has changed in the community since Levitt & Sons built houses on a potato field. "Today," he insists, "the urge to non-conformity has created many streets where no two houses are alike on the outside" (Gallagher, February 1958, p. 80).

An Assessment of Levittown: Dream or Nightmare?

As stated in the introduction, my evaluation of Levittown uses scholarly academic assessments as well as some self-expressions by the residents and my own observations. The format of the evaluation in this section of the article is set up topically according to the three attributes of suburbia's essence: picturesqueness, separateness from the city, and exclusivity.

Picturesqueness

Regarding communities that exude picturesque qualities in the United States, Fishman, as well as Jackson and Hayden, refers to Riverside, Illinois. This suburb, like Clapham outside London, was built so that the houses would be enveloped with a carefully landscaped environment. Levittown, however, was mass-produced by a developer who built identical houses of two model types on a potato farm. An aerial photograph in *Levittown: The First Fifty Years* mostly shows row upon row of identical-looking houses as if they appear to be the little green houses on a Monopoly

board (Ferrer and Navarra, 1997, p. 29). Similar representations of "repetitious houses" on curving streets can be found at the ground level in the same book (pp. 32, 36, and 42). However, these photographs are of the first years of Levittown. Meanwhile, pictures showing the suburb as early as 1957 and 1958 show a change. Small trees and shrubs have become part of the landscape and both help to blend the houses into an environment that has a bit of the picturesque. Many of the trees were planted by Abraham Levitt and included "60,000 fruit trees, 53,000 shade trees, 175,350 evergreens, and 193,000 flowering shrubs" (p. 34). When I visited Levittown in 2009, which is nearly six decades after it had been constructed, saplings newly planted in 1950 or 1951 had blossomed into full-grown trees. As should be indicated by the statistics, trees are nearly everywhere in Levittown, including even along certain stretches of Hempstead Turnpike.

Trees grace the new library at Levittown

No. 4

19

Unchanged Cape Cod house enveloped by a full-grown tree

No. 5

As is revealed in the photograph that shows the Cape Cod house (No. 5), even for those houses that have not undergone extensive remodeling, the trees have significantly transformed the properties.

Picturesque suburbs like Llewellyn Park in New Jersey and Riverside in Illinois had land set aside for parks. In fact, Olmstead, who developed Riverside in the late 1860s, had previously built Central Park in New York, which added considerably to the attractiveness of upper Manhattan. In their development of 7.3 square miles of western Long Island, Levittown & Sons built

many parks. According to *Levittown: The First Fifty Years,* "Levitt built and gave to the community a $250,000 town hall, nine 75-by-100-foot swimming pools valued at $150,000 each, ten parks, including one with a professional-size baseball field and a grandstand, and many playgrounds" (Ferrer and Navarra, 1997, p. 33). One park that is along Jerusalem Avenue, which runs north from Hempstead Turnpike, includes a playground, a pool, a basketball court, and a mall of small stores along a broad street that fronts the park and the pool. It is rather picturesque as the three photographs (No. 6, 7, and 8) show. The stores that are in the mall were intended to be small shopping centers and they were called "greens." When the trees finally grew large, this nomenclature becomes obvious because the stores can hardly be seen in the picture below (No. 6). Also, the use of the term "green" is suggestive of the greenbelts that the federal government had built during the New Deal, which were intended as residential communities centered on a commons. To some extent, this part of Levittown conveys that picturesque aspect of the greenbelt.

The "green" located on Jerusalem Road, just north of Hempstead Turnpike, is East Village Green. The second photograph of this "green" (No. 7) shows another section of the park on the right hand side while on the left hand side a few stores that front the broad boulevard can be seen. On the day that the photographs were taken (9 August 2009), a few customers frequented the stores, especially the delicatessen, which is not shown in either picture. In the background are some houses along Astronomy Lane which runs along the backside of East Village Green. The third photograph (No. 8) shows the

pool in the background on the right hand side of the photograph.

Park with playground and street mall in the background

　　　　　　　　　　No. 6

The Broad Boulevard with mall and park, East Village Green

　　　　　　　　　　No. 7

Bicyclists riding in front of the pool in East Village Green

No. 8

Less than a mile away from East Village Green picturesqueness abruptly recedes into the many strip malls on Hempstead Turnpike, which is the main thoroughfare that runs through Levittown. In fact, Hempstead Turnpike is a six-lane highway, with three lanes on each side of the road, that cuts through the middle of Levitttown. Since so few roads cut across this thoroughfare from south to north, Hempstead Turnpike, in effect, divides Levittown into a southern area and a northern one, suggesting that Levitt & Sons did not have an overall plan for the suburb. Alfred Levitt admitted as much, stating that "on Long Island we never knew from one year to the next how much more we could build so we never had an overall master plan" (Liell, 1952, p. 101). Despite the "green" zones within Levittown, John Thomas Liell, in his detailed study of the suburb, concludes that Levittown was, at least in its beginning, "just a subdivision writ large" (p. 145). Added to the lack of overall planning is the fact that other developers bought land along Hempstead Turnpike to build strip malls because, once the Levitts had started building, property values increased as the residences became occupied (Jansen, 1998, 413). Already in 1952, Liell

noted that the strip malls on Hempstead Turnpike were drawing away commercial activity from the businesses in the malls in the "greens."   In January 1952 eight buildings were empty and of the buildings that were occupied, many were offices for Levitt & Sons (Liell, 1952, p. 159). During my three visits to Levittown in the summer of 2009, I noticed limited commercial activity at the "greens," especially for the one on the south side of Hempstead Turnpike that was built along Center Lane. Even on a Saturday afternoon there was very little commercial activity in this "green" and one of the largest buildings in the strip is the senior center. In contrast to the limited activity at the "greens," there was heavy commercial activity on Hempstead Turnpike even as early as eight o'clock on a Sunday morning (see No. 9). However, in the decades since Levitt & Sons built this subdivision, the most thriving business activity occurs at the large, indoor regional malls, like Roosevelt Field, which is six miles west of Levittown (Jackson, 1985, p. 259).

Levittown Plaza early on Sunday morning

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Separateness from the City

The second attribute of suburbia's essence regards the suburb's separateness from the city so that while the residents of the suburb lived an idealized private life among a community of persons away from the city center, some of them would commute to the city for employment. In the introduction to *The Suburban Community* the editor, William M. Dobriner, shows the circular model of rings with the middle ring containing the suburbs that are some distance away from the city center. Levittown is located outside New York City on western Long Island, "approximately 32 miles east of the Long Island Railroad's Manhattan terminal, Pennsylvania Station" (Dobriner, 1958, p. 289). The Long Island Railroad along with the two parkways, Northern State and Southern State, and Hempstead Turnpike, comprised the linkage between New York City and Long Island when Levittown was built. In terms of geography, then, Levittown fit the circular model of rings. At least during Levittown's first decade of history, this residential community exemplified Dobriner's suburban model as well. Between 1946 and 1956 ridership on the Long Island Railroad to New York City from Hicksville and Wantagh, railroad depots adjacent to Levittown, increased from 12,235 to 79,829. In *The Suburban Community* Harold L. Wattel notes that during the mid 1950s about fifty-two percent of Levittowners commuted to New York City (p. 289). This should not be surprising since so many of the residents of Levittown's early years had moved from Brooklyn and Queens and many of these persons had kept their jobs in Manhattan. Based on a survey he conducted of

Levittown residents, Liell gives the following figures for previous residence of Levittowners in 1949: Queens, 26.3%; Brooklyn, 18.4%; Bronx, 8.9%; and Manhattan, 7.6% (Liell, 1952, p. 60). As for employment, those Levittowners with clerical jobs and certain professional jobs continued to make the commute into New York City. However, by the 1950s two trends can be noted: a shift in employment from New York City, especially Manhattan, to Nassau County where Levittown is located and a preference by Levittowners to drive to work rather than to take the Long Island Railroad (pp. 240-243).

For many of the historians who have examined suburbia, the reorientation of the suburb away from the city has meant that the post World War II American suburb has established its essence in distinction from rather than in relation to the city. For suburbanites employment, business activities, and even culture and enterrtainment are found outside of rather than within the city (Jackson, 1985, pp. 271-274). This has become true for Levittown's relationship with New York City, too. The thrust of an article on Long Island, especially the western half where Levittown is located, in *National Geographic* for 1951 is that the island is no longer "a sandy strip of shore line off New York with a lighthouse on one end and Brooklyn on the other" (Walker and Stewart, 1951, p. 279). In the article there is a map of Long Island showing how the western half is being filled in. Levittown already appears on this map and the three main arteries that extend from New York City across the island can be readily identified; they are the Northern State Parkway, the Southern State Parkway, and Hempstead Turnpike (pp. 282-283). Howell Walker, author of the article, points out that in "a revolt against

the city" both people and businesses have been moving eastward into Nassau County. While Levittown, itself, did not and still does not have any industry, employment opportunities for the community's residents in zones east of New York City increased as industrial and commercial centers were developed in Nassau County from the 1950s through the 1970s. Moreover, as shopping centers, like Roosevelt Field, located just six miles from Levittown, were built, residents could shop and even get jobs in these centers rather than travel thirty-two miles to Manhattan. Eventually, as the decades passed, Levittowners relocated their employment and business activities from New York City to Nassau County.

While one part of suburbia's relationship with the city was supposed to have included an economic connection, the other part was based on separation so that the suburban residents could develop a harmonious community centered on single-family homes within a picturesque environment. On the matter of community, it is often pointed out that Levittown is not even a self-contained entity. What is known as Levittown in Nassau County began its existence as a developer's creation and, in a piecemeal process, expanded to comprise 17,447 houses. The expanse covered by these Levitt houses, as well as a few not built by Levitt & Sons, "is an unincorporated village or area falling within the two townships of Hempstead and Oyster Bay." As I rode about the subdivision on my three trips to Long Island, the signs I generally saw were either of Oyster Bay or Hempstead, not of Levittown (see No. 10). Morever, in 1958, Levittown was "latticed by 4 school districts, 4 fire districts, 3 water districts, 2 Congressional districts, 4

postal districts, and 9 telephone exchanges" (Dobriner, 1958, p. 291).

Street sign, border of Hicksville and Levittown on Jerusalem Road

Despite the lack of boundaries, even ones that could have been created by a lattice network of straight streets, Levittown did create a spirit of community at several levels. In *Long Island: Our Story*, a book consisting of articles, essays, interviews, and photographs that was put together by the staff of *Newsday,* a Long Island newspaper, there is an article entitled "Suburban Pioneers." In this article Geoffrey Mohan looks at the early years of Levittown during the late 1940s and the

partially built suburb's first residents. In those days when there were no personal telephones, no churches, only one small school, muddy front yards, no local post office, and few cars, "automatic neighborliness" brought people together as a community that wanted to survive, despite the predictions that Levittown would become a slum by the early 1960s. In the article Beth Dalton of Dalton Funeral Homes asserts, "You know, Levitt built the houses. It's the Vets that moved in, that created Levittown" (Jansen, 1998, p. 409). To illustrate the "automatic neighborliness" that inspired individual homeowners and renters to become a community, Mary Heron Quinn tells the story of druggist Lester Smith. During a blizzard in the winter of 1948 Smith hired a snowplow to get him through the deep snow so he could deliver flu medicine to people who needed it. According to Quinn, "he was out all night trying to get through that snow" (p. 411). Forty years after such events, Fred Brunning writing in *The Newsday Magazine,* remembered that in "those days, life had a certain something, all right, a breathless kind of energy." He believed that this energy was within the veterans and their wives as they converted "7.3 square miles of tract development into a viable, respectable, functioning *habitat*" (Bruning, 4 October 1987, p. 8).

The time of the pioneers ended long before 1987 when Brunning devoted a few rhetorical flourishes to commemorate them. According to James Gallager, a long-time resident of Levittown, dating back to the late 1940s, the end of the "one-big-garden-community" occurred by the mid 1950s. It ended when women no longer needed or desired "the Kaffee-Klatsch," during which time they had reinforced one another through their

common inexperience of living outside New York City, and when men had learned to do for themselves with the power tools they had individually bought and no longer had to pitch in as a team to get the job done with manual tools and lots of sweat. To some extent, the disappearance of the "one-big-garden-community" was shown when the residents erected fences on their property. Levitt & Sons had a clause in each contract that stated that fences could not be erected on the property; however, when the company moved onto Bucks County, Pennsylvania to build another development, many Levittowners in Nassau County ignored this prohibition. Gallagher offers a telling comment about life in suburbia: William Levitt, who lived in an apartment in New York City at that time, "may have expected fellowship and harmony to flow across the lot lines. What flowed was children and dogs" (Gallagher, February 1958, p. 80).

While the "one-big-garden-community" of the pioneer days may have ended with the pioneer days, social interaction has continued in other ways. During the 1950s and still through much of the 1960s Levittown was a suburb of young persons. In 1957 there were more children than adults with the ratio being 2.13 per household (Dobriner, 1958, p. 296). The construction of schools was needed, first for the lower grades and then a high school, which necessitated that the Levittowners cooperate as a community of persons in setting up a school board and electing board members. In 1957 *Newsday Magazine* recounts how the adults came together to plan both for the tenth anniversary celebration and the way to expand the school system (Insolia, 2 October 1957, pp. 10-11). Already in the

early 1950s Levittown set up a library by renting one of the buildings in South Village Green. The library had a bookmobile that would bring books to people, especially children, where they lived. Today the library is in a large building in a park with a pool and a playground that is two blocks south of Hempstead Turnpike. Levittown had many after-school and weekend activities for children that included the Girl Scouts, the Boy Scouts, book reading clubs, cheerleading and batton twirling squads, and many baseball teams. A brochure for the winter of 1958-59 shows a varierty of activities available to all ages on most days of the week (*Winter Recreation Program*, 1958, pp. 3-4). During my summer trips I saw baseball games as well as a group of baton twirlers with adult supervision at the Levittown Veterans Memorial Park. The baseball games were fairly well attended by adults and for those children not interested in the game there was a nearby park with swings and other toys for play.

Centerfield view of baseball game at park on Loring Road

No. 11

31

Exclusivity

The third element of suburbia, as discussed by Jackson and others, is exclusivity. Beginning in eighteenth century London, as Fishman recounts the history of the modern suburb, members of the upper middle class departed the city in order to leave certain conditions and certain persons behind themselves. In the suburb, whether at Clapham or at Riverside or at Tuxedo Park in New York, which was a gated community, members of the upper middle class excluded most others as they established a class-based society. With their expanding subdivision in Nassau County Levitt & Sons was in the forefront of this social transformation because the company built fairly lowcost housing with federally insured mortgages of no or very low downpayments. Levitts' lowcost housing is one reason that many persons expected the community to become a slum (Dobriner, 1958, p. 293).

Through its sixty-year history Levittown has exemplified exclusivity but maybe not as much as some of the suburbs populated by members of the upper middle class. A S*urvey of the Banking of Northeastern Hemstead* for 1949 puts forth the following statistics regarding yearly income of Levittowners: Of 1360 persons surveyed 933 have incomes ranging from $3200 to $3750 (Liell, 1952, p. 295). Many of the persons with these modest incomes are mostly professionals and clerical workers; there are also some managers. Regarding members of the working class, there are many skilled workers, including foremen, and, in Liell's survey, the number of skilled workers (190) is even greater than the number of professionals (153). However, in this survey there are very few unskilled

workers (p. 233).   Hence, while Levittown became stigmatized as a low class community that many predicted would become a future slum, it was not, in its origins, a working class community. By the mid 1950s, as many owners had remodeled their Cape Cods and Ranches (see No. 12), in some instances, property values increased significantly. Moreover, most of the 1950s comprised a period when many persons sold out and new persons moved in.   This changeover, as well as the increasing differentiation in property values, introduced a heterogenity to Levittown which did not exist "in the smaller more expensive suburban areas of Long Island" (Dobiner, 1958, p. 302).

Many additions in the remodeled ranch

No. 12

While there was some exclusiveness based on class, there was and still is much more exclusion in Levittown based on race. When Levitt & Sons first opened houses for rent and then for sale, there was a clause in the contract that excluded blacks. Leftwing groups put pressure on the company to remove this clause, but the company resisted. However, when the Supreme Court declared "restrictive covenants" to be unconstitutional

(Jansen, 1998, p. 417), William Levitt dropped the clauses from the contracts. Nonetheless, the company continued clandestinely to make it difficult for blacks to rent or buy in Levittown. In a brief article on the Levitts, Charles R. Allen, Jr. reveals one of their practices (Allen, Jr., 31 May 1952, p. 525). A white customer in one of the Levitt offices inquired about the residents in Levittown, especially future ones that might move in. The sales agent said that the company no longer used "restrictive covenants," but he reassuringly added: "Listen, this is the point of the sale—strictly between you and me—and believe me, we sell to whites only, mister."   While Levittown had Italians and Irish and Jews, it had very few Asians and blacks. In the 1980s the same was true; at that time the population of Levittown was 98.8% white. The 1980 census gives the following statistics: 56,354 whites; 45 blacks; 17 Indians; 409 Asians; 1782 Hispanics; and 220 others (Smith, June 1985, p. 3). When I visited Levittown on three occasions in the summer of 2009, I saw mostly white persons, some Asians, and only a few blacks and Hispanics.

Conclusion

What can be thoughtfully and accurately stated about Levittown as an American suburb? Certainly the critics who ridiculed and predicted that it would become "Long Island's garbage pail" were wrong. Many persons who lived and still live there have sentiments like Leonard Gottesfeld who strongly asserted: "It was a helluva nice place to live" (Bruning, 4 October 1987, p. 10). Numerous articles in *Newsday* and in *Long Island:*

Our Story put forth warmly fond memories of life in the postwar suburbs, in general, and in Levittown, in particular. Some of the persons who are referenced for their youthful memories include Billy Joel, the musician, and Doris Kearns Goodwyn, the political commentator. Another famous suburbanite from Long Island that is cited in *Long Island: Our Story* is Alice Hoffman, who, like many others in the 1940s and the 1950s, was born in New York City but, as a young girl, moved to Franklin Square, which is a suburb near Levittown. In her novel, *Seventh Heaven,* she recreates life in suburbia during the late 1950s. Her re-creation includes the following description: "In the moonlight you could see that, even after six years, everything still seemed so new: lunch boxes and bicycles, couches and bedroom suites, cars parked in driveways and swing sets in the yards; there weren't even any cracks in the cement." Also, her re-creation pictures children who had recently moved from apartments in Brooklyn and Queens and, therefore, had never seen a firefly on a warm summer evening. These boys and girls eagerly "ran inside for empty pickle jars and filled them with the fireflies" (Hoffman, 1990, pp. 22-23). Away from the congestion of Hempstead Turnpike and ensconced in one of the lanes, named after a bird or a tree or a flower, one could easily become enveloped in such picturesque pleasantness (see No. 13).

Much of the reality of western Long Island, from Brooklyn and Queens to Nassau County, is often like Hempstead Turnpike (No. 14) and not a cozy cove carefully tucked away in a suburb. As Jackson has noted in *Crabgrass Frontier*, as well as many persons realize, suburbia and the car are intertwined into an American

The swimming pool in the park next to the library

No. 13

Hempstead Turnpike, two streets from the pool by the library

No. 14

way of life. In 1950 forty-one percent of American families did not own a car and the majority of working class families did not have one (Jackson, 1985, p. 247). However, by the end of that decade these facts had been reversed. The streets of suburbia are crowded with cars. On an early Sunday morning in 9 August 2009, when I drove through the streets of the subdivision, I found vehicles parked in the driveways extending in rows down to the curbside (see No. 15). The daily reality is that on

most days of the week these vehicles clog the suburbs, in what has been termed the centerless city, as well as the downtown area of the city. For the Southern State Parkway, which runs along the southern part of Long Island, the Department of Transportation gave the following estimates of vehicular traffic: 5000 per day in the early 1940s and 71,000 per day in the early 1950s (Jansen, 1998, p. 361). To alleviate some of the traffic congestion on the roads, the Long Island Expressway was built through the center of the island. Work on this expressway began at the same time that Congress passed the Interstate Highway Act, which provided for 41,000 miles of roads. However, more highways, including ones with more lanes, have often meant even greater use of roads producing even more traffic congestion to form within that "vast, amorphous conglomeration of housing tracts, shopping centers, industrial parks, freeways, and independent towns" (Jackson, 1985, p. 250). During the summer of 2009 I traveled on both the Long Island Expressway and the Southern State Parkway in Nassau County and during the afternoon my speed was often only between twenty and thirty miles an hour as I moved along in bumper-to-bumper traffic (see No. 16).

Seemingly hidden away within this extensive confluence of asphalt and concrete is the pictureque enclave of Levittown, New York, today just one of many suburbs sprawled throughout western Long Island. This subdivision, according to William Birmingham who had helped to build the houses and then, in 1949, bought one, was a place where "starting families [that] didn't want to rent or live with relatives" could have their own place. Birmingham added in the interview: "Also since [my

Cars on Mallard Drive off Jerusalem Avenue about 10:00 AM

No. 15

Traffic on Southern State Parkway before the afternoon congestion

No. 16

wife and I] were renting we had no home equity and by
this time we had another daughter. . . . a Levitt house . . .
was the best buy on the market in value" (Wu, 28 April
1988, pp. 5-6). Birmingham's story is that of thousands
of other World War II veterans who, through a favorable

mortgage on a Levitt house, got the opportunity to live a life that only an elite had in the nineteenth century. Six decades have past since Birmingham bought his house and, as the photographs in this article show, much of Levittown has maintained a picturesque quality (See No. 17). Moreover, the subdivision has consisted of a community of persons that through a few generations have cooperated enough to raise children in a stable environment where crime is low and youth programs are prevalent. In defending Levittown as a postwar suburb, Wattel asked the following rhetorical question: "In rapping suburbia, aren't the critics really striking at the heart of American culture" (Dobriner, 1958, p. 311)? Much of what is targeted for criticism in the suburbs, like excessive consumer consumption, exists elsewhere in the United States. While there are metaphorical cracks in the proverbial picture window of the Cape Cod or the Ranch, the dream fulfillment of *Miracle on 34th Street* is a more accurate depiction of Levittown than the alien nightmare of *Invasion of the Body Snatchers.*

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Remodeled ranch on a small but picturesque plot

No. 17

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Societal Values and Nuclear Power: A Case of Conflicting Priorities

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Value structures vary from culture to culture. A particular value hierarchy has the potential to govern priorities in relation to social policies. This paper examines the influence of Japan's social values on the development of its nuclear policy, in particular the importance of the changing relationship of physical safety to national security. In light of the historical experience of Japan with atomic weapons and the variety of accidents which have occurred in the Japanese civilian nuclear industry, one might expect that the Japanese would be firmly opposed to the use of nuclear energy. Yet, when seen in light of its value structure, the very significant use of nuclear power in Japan is a rational activity, as is the recent beginning of more widespread public opposition to the government's long-term plan to continue to increase dependence on nuclear energy. Based on the Japanese experience, the final part of the paper then briefly explores the potential for applying this analysis to examining the currently changing attitudes in the United States in favor of a reemphasis on the further deployment of nuclear power for the production of energy. At this critical juncture in the debate about whether the U.S. should expand the use of nuclear power, an understanding of how the underlying values influence the importance given to such societal goals as the reduction of global warming or lessening of dependence on foreign oil could add a valuable perspective to the debate.

Key words: Nuclear energy; Japan's nuclear policy; nuclear accidents; social values; value hierarchy; national security; safety.

Introduction

The debate about the use of nuclear power as a source of generating electricity has undergone some surprising turns in recent years. In the United States, for example, during the past 30 years no nuclear facilities have gone operational, yet the current public sentiment appears to be almost completely in favor of renewed construction, with the expectation being that several new plants will break ground in 2009 or 2010 (World, 2009; Grunwald, 2009). In attempting to understand this shift in perspective within the U.S., it is helpful to examine a case where the opposite shift appears to be occurring, but where the historical forces at work can be seen more starkly and where there has been only a gradual movement away from the original position. As background for future analyses of attitudes toward nuclear energy in the U.S., I will therefore examine the evolution of the use of nuclear energy in Japan, at first sight an unlikely candidate for public acquiescence in the use of nuclear energy.

As the explanatory device for this discussion I will utilize the idea of societal value hierarchies, which differ from society to society, with pronounced differences between Asian and Western cultures. In particular, I will argue that the evolution of attitudes toward nuclear energy in Japan is in great part explicable by the competing values of safety and national security, that the change in attitudes is actually based on a consistent interpretation of human values, although the understanding of these is founded on a factually

mistaken, but rational, underlying basis (Whitfield et al., 2009). In order to demonstrate this thesis I will rehearse the history of accidents in the Japanese nuclear power industry, the features of which point to consistent underlying value emphases. I further suggest that the opposite movement in public opinion in the U.S. is explainable on a similar value basis, even though the concrete result is a movement in the opposite direction. While the present discussion only suggests that a theoretical understanding of the nature of societal value structures will be helpful in understanding the current debate in the U.S., it should provide the necessary background for a more detailed examination of the concrete historical forces at work in changing attitudes toward nuclear energy. As shown in detail in the case of Japan, I propose that a more detailed examination of historical forces at work in the U.S. would show a consistent application of societal values, but with a shift toward acceptance of the use of nuclear energy as part of a value emphasis on national security. This understanding could help to put the discussion of nuclear energy use on a more reasoned basis, as well as provide a better understanding of why attitudes may change so rapidly.

Safety and National Security

The two values to be analyzed here within the Japanese context are safety and national security. At first sight this might seem to be an awkward pairing, since the meanings of the two words "safety" and "security" are closely associated with each other. The *Oxford English Dictionary* in fact gives the first

definition of "security" as being safety (Compact, 1971). Both safety and security are a concern for all human beings. Our concern about them probably comes from a fear of death or serious injury developed as a biological reaction to factors in our environment. Both are ultimately based on a fundamental right to life.

While technology might be involved with both concepts, what I want to emphasize with the distinction is the stress in security on prevention of purposive actions by human actors, while the main emphasis in safety is on prevention of failure in technological devices. National security is thus based on the prevention of actions by enemies of the state, primarily by means of diplomacy or by military force. The primary emphasis of national security is survival and the prospering of the group or community. Physical safety, on the other hand, is not based primarily on state action, but on the actions of individuals within the state. The state serves only as a regulator to control the actions of individuals. The main actors responsible for the physical safety of individuals in a society are its engineers and technologists, for they are the ones with the knowledge and expertise to protect individuals from failures in technology.

From an engineering perspective safety is not an either-or proposition. It is a matter of risk of possible harm occurring. While the implementation of technology without risk is perhaps achievable, in broad application it would be unaffordable. For example, a perfectly safe automobile might be constructed, but its weight, proportions, cost, and inclusion of a large variety of failsafe devices would create a barely drivable road monstrosity. We thus make compromises based on a

cost-benefit calculation, which differs for various circumstances and would include other factors such as efficiency of the product, its cost effectiveness, its longevity, and its ability to lend itself to the manufacturing process. A NASCAR race car would thus have different protective measures built in than a passenger sedan. An objective or engineering evaluation of risk involves a combination of the likelihood of a harm occurring multiplied by is severity. This calculation might be fairly accurate, but it will always involve some amount of uncertainty, since it requires predictions about the future, knowledge of unforeseeable circumstances, and understanding of all possible users of the technology (Martin and Schinzinger, 2005). In designing technology engineers consequently typically build in factors of safety, that is, protections against failure beyond the stated design requirements, or appropriate backup systems in case of failure. For example, the levees in New Orleans, while required to protect against a Category 3 hurricane might actually have been designed to protect against a Category 4 or a series of backup levees might have been constructed behind the points of greatest weakness (Luegenbiehl, 2007).

If technology is employed within the framework of national security on the other hand, an analysis of it depends primarily on the successful application of technology rather than a concern about its potential failure. Thus, for example, we worry whether an enemy of the state is able to successfully construct a weapon with which to attack us or, correspondingly, whether our weapons can be counted on as a means of defense. Rather than the safety of technology, the risk of harm

from failure, the more appropriate concept for the context of national security is reliability, the durability of a technology to work over a specified period of time. The element of time is significant since any technology will eventually fail (Vallero 2007).

The Nature of Values

To further clarify the following discussion, the nature of values needs to be briefly addressed. I define "values" as deeply held, important, enduring beliefs which tend to guide actions. They are so deeply ingrained in us that we tend not to realize that they form the basis of our decision-making processes. We tend to believe that everyone shares these views and that they are "natural" or inborn. Further, individual values and social values can be distinguished. Every person is different to some extent and consequently has his or her own belief structure. However, it is possible to make certain broad generalizations about values, because groups of people share a common background. These generalized beliefs then express the idea of social values.

Values do not exist in abstraction, but rather exist as part of a whole, that is, as part of a value system. Within a value system individual values are prioritized. Over time these priorities can change, and this reflects a process of individual or social change. In radical situations one can eliminate or add a value to one's system, but more typically values are emphasized or deemphasized as a significant amount of time passes.

Understanding the value system of a particular culture is important because values have a normative dimension. They set expectations regarding behaviors

which are then reflected in the establishment of traditions, customs, and manners of a culture. They establish the bounds of appropriate behavior. The common social values create a sense of unity within the population. One way of distinguishing different cultures is on the basis of their value systems. Although when taken to an extreme, generalizing about cultures can bring with it the negative effects of stereotyping, it is nonetheless important to recognize that in general cultures do have individuating characteristics. While many cultures share a significant number of values, the individual values are integrated into a hierarchical system, and so it is the importance placed on particular values which distinguishes one system from another. For example, two value systems might both include order and freedom in their structure, but in one of them freedom would usually be given preference over order, while the opposite might be the case in the other. The complex hierarchical feature of value systems sometimes makes it difficult to gain an understanding of the framework which underlies the actions or words of individuals from another culture.

This has been considered to especially be the case between Western and Asian societies, which tend to emphasize fundamentally different characteristics. Thus, it has been held that Asian societies in general value group furthering characteristics, while Western societies tend to value properties associated with rights of the individual. This difference impacts the entire range of values within a system. For example, emphasis on loyalty to an extended family or to an employer would be manifested differently in these two types of societies (Nakane, 1970).

Nuclear Energy and the United States

With a preliminary understanding of the underlying concepts important for the analysis in this paper in place, we can now look at the factual dimensions of the issue of nuclear energy deployment. After the first commercial reactor was put into operation in the U.S. in 1957, high hopes were pinned on the future of nuclear energy world-wide until the partial meltdown at Three-Mile Island (TMI) near Harrisburg, Pennsylvania in 1979. Caused by a failure in the main cooling system in combination with operator error, the accident resulted in only minor release of radioactive gas and no deaths or injuries, although some still argue that the incidence of cancers in the area subsequently increased. Coincidentally, however, the aptly named movie *The China Syndrome* had appeared only a few weeks before. The film, in which the events in which eerily resembled those at TMI, was a warning of a catastrophe narrowly averted, with the potential consequences of a complete failure explicitly spelled out. Public concerns about failure in a nuclear plant were thus perhaps exaggerated beyond the objective data. Yet the plant reopened six years later and continues to be a contributor to electricity generation in the U.S., which in total consists of 104 reactors generating about 20% of U.S. electricity needs (World, 2009).

Public attitudes toward nuclear energy reached a low point with the meltdown in Chernobyl, U.S.S.R., in April 1986. While a complete meltdown had been averted at TMI, Chernobyl demonstrated the consequences of failure of a nuclear energy plant. Eighteen people were

killed as an immediate result of the explosion and large amounts of deadly radiation were released, affecting not only the immediate area, but the crops in many parts of Europe. Many square miles of land surrounding the plant are still uninhabitable and many more deaths from radiation poisoning and radiation induced disease occurred over the next few years (Learning, 2006).

On a world-wide basis we see contradictory approaches to the use of nuclear energy. For example, France is committed to a nuclear future, already generating 80% of its electricity needs through nuclear energy, with more plants under construction. Its neighbor Germany, on the other hand, has renounced future reliance on nuclear energy and has made the commitment to dismantle its few plants (Welsch and Ochsen, 2001). This scenario is interesting in that Chernobyl demonstrated that a nuclear accident knows no national boundaries and the prevailing winds blow from France to Germany.

Iran is another nation which has made a commitment to nuclear energy, one which the U.S. opposes based on a perceived fear that material from a nuclear plant will be used in the construction of a nuclear weapon. While the U.S. is not likely subject to an Iranian attack due to lack of Iranian missile capability, the national security of the U.S. is affected due to its close partnership with Israel. A different attitude is being expressed by the U.S. toward nuclear developments in North Korea. There the U.S. has demonstrated a willingness to help the country build a nuclear plant as long as it promises not to build a nuclear weapon. This policy has been a failure in that the general fear is that nuclear weapons have already been constructed by North Korea (McCurry, 2009).

These last two cases demonstrate that there is still a perceived connection between the peaceful and military dimensions of nuclear energy, which make the history of the Japanese nuclear industry a particularly interesting case study.

Japanese Background Conditions

Given Japan's paucity of natural resources, after the World War II period the Japanese government made the decision to rely on nuclear energy as a prime power source, including the commitment to the use of controversial fast breeder reactors. At present, fifty-five reactors are in operation, the third highest number in the world after the U.S. and France, supplying approximately one-third of Japan's electrical power (55th, 2006). While no nuclear power plants have been built in the U.S. since the TMI accident, over the last few years Japan has put a new reactor on line each year, with current government planning calling for the doubling of capacity by 2050 (Safe, 2006). In addition, the national and local governments are currently in the process of approving use of MOX (mixed oxide) fuel in existing reactors and the construction of new fast breeder reactors (Nuclear, 2006; Top, 2005).

The trend toward increasing dependence on nuclear power is thus a continuing one in Japan, even as other nations are abandoning some of the technologies planned for future Japanese installations. The major justification put forward in support of the use of nuclear power in a nation understandably adverse to things nuclear, is that a degree of energy independence is a matter of national security, an argument still resonating from the 1970's oil

crisis. For much of the post-war period this argument swayed the majority of the population, but during the mid-90's and into this century increasing opposition among a traditionally docile citizenry began to arise, including recent first-time and surprising court decisions in opposition to the power industry's construction plans (Court, 2006).

The proximate cause for the growing public concern regarding the safety of nuclear power, in the face of continuing positive government assurances, was a series of incidents, beginning with a liquid sodium leak at the Monju experimental reactor in 1995. The most serious accidents occurred in 1999 in Tokaimura, where two workers died as a result of radiation exposure after performing an unsafe and illegal mixing operation, and in 2004 in Mihama, when five workers died as a result of steam escaping from a burst cooling pipe (Japan's, 1999; Steam, 2004). However, the incidents that shook public confidence the most were ones whose nature was initially covered up by industry. These incidents resulted in a loss of the trust the industry had gained during its early years.

Analysis of the safety incidents reveals a series of ethical failures on the part of engineers, industry, and local and national governments. These include lack of adequate planning for response to accidents, failure to inform affected parties in a timely fashion, delayed response to failures, suppression of internal dissent, falsification of records and inspection results, failure to correct known flaws, and a variety of acts of negligence.

A particular set of conditions have resulted in the adoption of a nuclear power policy in Japan which is unique in the world. Japan is country poor in natural

resources. It imports about ninety-eight per cent of the fuel needed to meet its electricity needs. It is also a mountainous country, with 70% of the land being uninhabitable. Japan is subject to severe earthquakes, as the 1995 Great Hanshin earthquake in Kobe recently illustrated. In 2007 a powerful earthquake caused damage to a reactor containment structure in Niigata prefecture (Rising, 2007). As geoscientist Leuren Moret put it: "Of all the places in all the world where no one in their right mind would build scores of nuclear power plants, Japan would be pretty near the top of the list" (Moret, 2005). Finally, it is the only country which has been attacked with atomic weapons. In light of its resource needs, the Japanese government made a commitment to rely heavily on nuclear power generation. However, in order to convince an initially skeptical public, which had experienced the force of an attack by atomic weapons, it had to adopt a standard of absolute safety for its plants, to basically guarantee that nothing could go wrong (Chapman, 1979). In a further attempt to lessen reliance on foreign fuel, the government also committed to a recycled nuclear fuel policy, known as the MOX or pluthermal program. This policy envisions recycling spent uranium and plutonium fuel to close the fuel cycle, so that at some point no more nuclear fuel will need to be imported. Several experimental fast-breeder reactors were built and operated and it is planned to eventually use the fuel in conventional light-water reactors (Sanger, 1992). In light of the promises made by the Japanese government it is then appropriate to look at the actual history of safety in the Japanese nuclear industry.

Safety Incidents in the Nuclear Power Industry

During its early years the nuclear industry in Japan had a remarkably good safety record. Several minor leakages from cooling pipes occurred from start of operations of the first reactor in 1966, but none caused any significant damage to the future of the industry (Chapman, 1981). In 1995, however, that situation began to change. That year a major leak of 640 kilograms of sodium from the secondary cooling system occurred at the Monju experimental fast-breeder reactor in Tsuruga. Although no radiation was released to the environment and no injuries were reported, the event received a great deal of publicity because the Power Reactor and Nuclear Fuel Development Corporation (PNC or Donen), the operator of the plant, tried to hide the extent of the leak by editing videotapes released to the public. Investigations also showed that there had been an unnecessarily long delay in shutting down the reactor due to an absence of clear procedures and a failure to notify local authorities in a timely manner (Choy, 1996). As a result of the accident, the reactor remained shut down in 2003, when the Nagoya High Court nullified the initial construction permission issued by the government on the grounds that insufficient safety assessments had been conducted. This marked the first time that citizens had prevailed in a nuclear plant suit against the government. The decision was overturned by the Supreme Court in 2005 (High, 2003; Top, 2005).

The Monju incident was followed in 1997 by a fire and explosion at a fuel reprocessing plant in Tokaimura run by the same corporation. Asphalt used to stabilize nuclear waste had caught on fire and burned for ten

hours, at which point an explosion occurred. Thirty-seven employees were exposed to a minor amount of radiation, but again the most serious public concern were the actions in the aftermath of the event. The company first reported that workers checked to verify that the fire had been extinguished when it was initially noticed, but later admitted that this was not done and that the workers had been instructed to tell a false story. The local authorities were not informed that a radiation leak had occurred until fourteen hours after the incident began. A Nuclear Safety Commission White Paper after the incident called for starting an emphasis on a safety culture at the company and an increase of information being made available to the public (Nineteen, 1998). With several other problems being reported subsequently at various sites, editorials began questioning the safety record of the nuclear power industry and its commitment to keeping the public safe and informed (Pollack, 1997; Fukui, 1999).

The most serious incident of the nineties also occurred at a reprocessing plant in Tokaimura, this one operated by JCO, a subsidiary of Sumitomo Metal Mining Company. While three workers were processing enriched uranium a criticality accident occurred, that is, one where an uncontrolled nuclear reaction took place, one which continued for a period of eighteen hours. The accident was subsequently designated a level five out of seven accident, the same as the TMI accident in the U.S. In the following months two of the three workers died of radiation poisoning, having been exposed to up to 17,000 times the average annual exposure to radiation (Nuclear, 2000).

Investigations after the accident revealed a number of problems at the reprocessing plant (Summary, 2000). The workers had not been sufficiently educated about the procedures they were to follow. They did not even know what constituted a criticality accident. This stemmed from that fact that in its initial application for an operating permit the company had stated that a criticality accident would be impossible. It also became public that the workers had been following a secret company manual in the mixing procedures, one which violated government approved policy, by using containers which lacked the safety features designed to prevent criticality (JCO, 1999). In addition, they even violated internal company policies by mixing seven times the safe amount at one time (Landers, 1999). Supervisors later admitted to time and competitive pressures on the company. A Nuclear Safety Commission review stated: "It is easy to presume that a dominant factor behind the accident was a decline of the ethical awareness in employees as the result of the company's pursuit of efficiency in management" (Summary, 2000). The *Annual Report on Promotion of Science and Technology* added that the incident "arouses a crisis of declining (sic) in ethics and social responsibility of Japanese engineers" (Annual, 2000).

The facility in Tokaimura was not marked as a nuclear production site. It was one of fifteen nuclear sites in Tokaimura, including the nation's oldest nuclear plant, which employed 10,000 people or thirty per cent of the population. The nuclear facilities paid sixty per cent of local taxes. Yet, despite the focus on nuclear energy, the town had no emergency plan and the company itself lacked a safety manual. After the start of

criticality JCO took an hour to notify local authorities and then did so by sending a FAX (Tokaimura, 1999). Firefighters initially called to the scene were not told that a criticality situation was in progress. It took over a dozen hours before a national task force met. Eventually 165 people were evacuated and 310,000 warned to stay in their homes. Throughout the event there appeared to be lack of knowledge of how to deal with the criticality itself and with its effects on the local population, as well as a lack of coordination between different levels of government (Landers, 1999). In 2003 six employees, including the surviving worker, and JCO were convicted by the courts for their failure to follow adequate safety measures, after having pled guilty to the charges. JCO was fined the maximum of one million yen (ca. $9,500) and also permanently ceased operations (Six, 2003).

Even while the criticality accident was ongoing, government officials were reaffirming the nation's nuclear policy (Choy, 1999). However, editorials asserted that the government's credibility had "hit rock-bottom" and began stressing the connection between nuclear incidents which had previously been seen in isolation (One, 1999). As a result of a new public disclosure law, all nuclear related incidents of any sort began to be reported in the press and public opposition to the nuclear program became more evident. A number of localities voted to delay construction of nuclear facilities or banned the use of MOX fuel (Japan's, 2000).

In 2002-03 the crisis for the nuclear industry reached a high point, with many of the nation's fifty-two reactors being at least temporarily shut down. The immediate cause for this was the revelation that the Tokyo Electric Power Company (TEPCO) had been falsifying both

government and voluntary inspection reports for a period of sixteen years (TEPCO HQ, 2002). The deception began to come to light in August 2002 as a result of a whistle blower letter written to the Ministry of Economy, Trade and Industry (METI) in July 2000. Subsequent revelations showed that TEPCO had repeatedly denied the allegations during the intervening period and that the Nuclear and Industrial Safety Agency in METI had not pursued the investigation very forcefully. The agency, contrary to policy, also revealed the whistle blower's name to TEPCO on several occasions (GE, 2002; Agency, 2002).

The cause of the "scandal" was the hiding of numerous cracks in reactor shrouds and cooling water pipes in inspection reports and from government inspectors (Zielenziger, 2002). Air pressure readings at several reactors were also falsified on several occasions through the introduction of additional air into the containment vessels. TEPCO's explanation for the falsifications was that the cracks did not pose a safety hazard and so were not reported (TEPCO Faked, 2002). Subsequently, a number of other power companies reported having ignored similar cracks (More, 2002; Japan, 2002). Several nuclear power experts blamed the government for having instituted too strict a set of reporting standards and the regulations were later modified to only require reporting of problems which materially affected the safety of operations (Watts, 2002; METI, 2002).

Although no physical harm to anyone resulted from these revelations, the harm to public confidence in the nuclear industry was immense. Both government regulators and TEPCO were repeatedly chastised in the

media as further revelations of falsifications were made on an almost weekly basis (Bosses, 2002; Toughen, 2002). By May of 2003 all of TEPCO's seventeen reactors, which normally supply 40% of the electricity for the greater Tokyo area, were shut down for scheduled periodic inspections or as a result of various cracks in their components. The last of these was finally given permission to restart in 2005 (TEPCO, 2003; TEPCO, 2005). TEPCO began running ads asking consumers to conserve energy and warning of summer brownouts (From, 2002). The national government continued to reaffirm its historical energy policy (Gathering, 2003). Residents in locales of TEPCO plants were torn between their economic wellbeing and their concerns about the safety of the plants (Tokaimura, 2003). Local governments became increasingly resistant to permit plant operations to restart. The power companies, for their part, increased their efforts to regain the trust of the local populations by visiting households in the affected areas to apologize and to promise improvements in the future (Energy, 2003).

Despite repeated assurances from the nuclear industry, the most serious accident yet in terms of loss of life took place in 2004. In August of that year a steam pipe in the secondary cooling system of a Kansai Electric Power Company (KEPCO) reactor in Tsuruga burst, ultimately killing five workers and injuring six others (Death, 2004). Subsequent investigation determined that the pipe had not been inspected since the start of operations of the reactor in 1976. It had eroded to a thickness of 1.4 mm from an initial 10 mm. Based on design specifications it should have been replaced when it reached a thickness of 4.7 mm (Kepco, 2004; Pipe,

2004). Subsequent investigations revealed that the failure to inspect had been noticed several months prior to the accident, and perhaps several years before, by a subcontractor charged with safety inspections, but that inspection had been delayed until the next regular inspection period, which was scheduled to begin five days after the accident (Blowout, 2004). No radioactivity escaped as a result of the accident, but in an echo of earlier events it was revealed that ambulance personnel treating the dead and injured were not informed whether the plant employees had been exposed to radiation (Rescue, 2004).

In reaction to the incident the normally pro-nuclear *Daily Yomiuri* printed an editorial arguing that there had been a failure to learn the lessons from the TEPCO situation, that there had been an "erosion of a serious desire for nuclear safety at KEPCO," due to competitive pressures. The Nuclear and Industrial Safety Agency report on the accident stated that the "safety first" policy of the company had become an empty slogan as a result of business concerns (Power, 2005). It is worth noticing as well that as late as 2006 TEPCO was still finding pipe cracks it had missed in previous inspections (TEPCO, 2006).

Analysis of Japan's Nuclear Policy

Based on the brief review of the factual situation regarding the nuclear power industry in Japan, what can be established about its underlying value structure? Unique historical and geographical circumstances in Japan have simultaneously created a strongly pacifist and anti-nuclear weapons culture and one which is for the

foreseeable future exposed to the potential devastation that can result from a nuclear plant accident. The discussion about the future of nuclear energy in Japan is on-going. The Japanese are still very much concerned about their long-term energy future. For them it is both a national security and national defense issue, not simply a matter of economics or environmental policy, since they perceive their very survival as a nation to be dependent on adequate energy resources, which can at any time be cut off by other nations, as they were during the 1970's oil crisis.

Given the definitions I have established, at stake is the relationship of the values of safety and national security. In the face of the accidents which occurred in the Japanese nuclear power industry the government continued to assure the public of the safety of the installations, thus seemingly expressing the importance of safety in its value hierarchy. This counterfactual assertion actually demonstrates that national security has a higher priority in the value system. Such an interpretation should be expected, given a general understanding of the Japanese value system, which is largely based on Confucian philosophy. The core element of Confucianism is the building of relationships, such as between ruler and subject or father and son. The proper individual (gentleman) is thus never seen in isolation, but always bound up in social relationships. This results in a group orientation, the largest expression of which is the national interest (Nakane, 1970). Historically, this has justified sacrifice of the individual for the group and submission to the will of the group, as famously put in the Japanese proverb: "The nail that sticks out will be hammered down." The group

orientation has been quite recognizable in the post-World War II period when great sacrifices were expected from individuals in both their employed and personal lives, such as in the development of an export driven economy and living in what Westerners derisively referred to as "rabbit hutches."

The group orientation of the Japanese can also be illustrated through the attitude of the nuclear workers. In several of the incidents many people were involved in the cover-ups, in the TEPCO case over 100. From an outsider's perspective one would assume that in such a large group at least some would act autonomously, but that would generally not be the expectation of the Japanese. Secrecy among the in-group is a common feature of Japanese organizations. The TEPCO nuclear engineers, for example, were reported to be on a separate floor of the headquarters building, to which even senior executives did not have free access. They were known as the "nuclear tribe" and acted in a tribal fashion, considering even others in the company to be outsiders. The psychology of such groups becomes one of group protection rather than concern with the general public (Vallero, 2004). The whistleblower event in the TEPCO case further illustrates this thesis in that the only one to reveal the information was an outsider, an American working for GE International. GE International had been subcontracted by TEPCO to carry out inspection work. The government broke a legal requirement by revealing the whistleblower's name and other identifying data, thus showing loyalty to Japanese industry rather than to an outsider (Agency, 2002). Subsequent editorial pieces in the Japanese press indicated that this was perhaps all an American plot to retard the development of nuclear fuel

which could be used to make nuclear weapons. The message of such statements is that it is difficult for Japanese to even envision the possibility of whistle blowing on one's company, that loyalty to the group is in effect one's highest duty (Luegenbiehl, 2004).

Since the focus is on the group, there is a lack of focus on individual responsibility. It is the group as a whole which is held responsible for failures, which is illustrated by the common phenomenon of a company president resigning in order to take responsibility for a failure by the company. As a result, the question of individual competence takes on a secondary role. The idea of "doing one's best" seems to be more important irrespective of qualifications for a particular assignment. Large Japanese corporations rotate their employees frequently among seemingly unrelated jobs in order to build loyalties in the larger group. They even prefer their engineers to come to them relatively untrained so that the company can mold the individual. This means that on an individual basis it may not always be the best qualified who performs a particular function (Luegenbiehl, 2004).

Despite the emphasis on group adherence, the fear of the release of radiation from a nuclear accident could not have been underestimated by the Japanese policy makers—thus, the promise of perfect safety made by the government. This demonstrates that not only does the relative place of a value in a hierarchy need to be considered, but also the extent to which a value can potentially be affected. Of course, everyone is aware of the potential for catastrophic consequences of a nuclear explosion. This is what makes an emphasis on safety particularly important in the industry. Something might go wrong infrequently, but consequences of it doing so

in a densely populated country can be enormous. Yet the relaxation of vigilance over time in the Japanese nuclear industry and the failure to learn from past events appears to illustrate the theory of normal accidents, which holds that lack of serious consequences resulting from a lack of emphasis on safety furthers the impulse to cut even more corners (Perrow, 1984).

Now, it might be said that this does not make a nuclear strategy different from any other use of energy, for example, if a country has made a commitment to coal generation, but then discovers that mining coal costs too many lives and burning fossil fuel pollutes the atmosphere excessively. However, in this case one can take a number of intervening steps, such as increasing the level of safety in the mines, using more automated procedures, etc., and switching gradually to different, less polluting types of coal, while at the same time working on a gradual retreat from using coal as a source of energy. If something does go wrong, such as a mining accident, the consequences will be relatively localized and new preventive measures can be taken at the remaining mines.

It is easily seen, however, that this strategy fails in the case of nuclear power. It takes a significant amount of time to replace the capacity of even one plant and until all of the plants are replaced, the consequences of failure remain catastrophic. The shutdown of the seventeen TEPCO reactors illustrates this, although in this case it was only a temporary measure. In light of this, the political course seems to be to press on with the strategy and try to convince the public that the strategy is a safe one and that the producers of nuclear energy can be trusted. When that trust breaks down and can no longer

be renewed, however, a crisis of confidence will inevitably erupt. A commitment to a failed strategy will be seen as being irreversible. Many of the problems that have occurred in the Japanese nuclear industry are a direct result of the failure by the government to accept that no technology in widespread use can be made perfectly safe and the unwillingness of the industry to correct this fundamental misunderstanding, as can be shown by several examples.

A consistent theme emerging from the accidents in the nuclear power industry in Japan has been the tendency to cover up problems or a failure to report them as required by Japanese law. The nuclear industry consistently tried to hide the extent of problems which occurred. In the TEPCO situation engineers were hesitant to report the cracks because government regulations would have required them to shut down the reactors for lengthy periods of time for repairs. In the KEPCO case there was a desire to avoid early shutdown of the reactor. These actions seem justifiable when seen in light of the perfect safety claim, since even when a potential problem was discovered, in theory it could not affect the safety of the reactor. In fact, TEPCO explicitly used this as a justification for not reporting problems over a period of several decades. In all the cases, however, the truth eventually emerged and resulted in increased public opposition to the industry.

The wrong emphasis on safety can itself lead to problems, for instance if safety is emphasized too much. By initially acquiescing to a standard of absolute safety, a standard which is impossible to obtain, engineers set themselves up for failure as various problems inevitably developed in the industry. By the time government

regulations were changed to a risk-based methodology ('Minor,' 2002), which called for reporting and immediate correcting of only actual safety problems, much of the public trust had already been lost (French, 2002). If one regulation can be violated in that it is judged not to involve an unsafe practice, then it becomes increasingly easier to violate others, even if they are centrally relevant to the question of safety.

Another issue relevant to this discussion is the apparent lack of concern for the needs of the local population in the industry's decision-making processes. Several of the accidents illustrated the lack of preparedness by the companies for possible problems. Delays in notifying the public and authorities were common themes. Lack of planning for emergencies and for protection of the public, for instance by establishing evacuation procedures, was another. The 1999 Tokaimura incident, in particular, showed that both government and industry had inadequate safety, notification, and evacuation measures in place. The particular circumstances of the Japanese nuclear industry, where geographical factors require putting many reactors together (seven at Kashiwaseki-Kariwa), often near large population centers, make this an especially pressing issue. However, when seen in light of the perfect safety claim, the lack of procedures makes sense, since if nothing can go wrong, there is no actual need to engage in abstract planning processes.

In the eyes of the public the existing safety claim magnified any failure which actually occurred. Incidents which in the U.S. would have seen only minimal press coverage, since they did not result in any loss of life or injuries, were the subject of news reports for weeks in

Japan.   This resulted in increased concern among the public beyond what was a reasonable reaction and eventually resulted in the law which required that all deficiencies, no matter how minor, were required to be publicly reported, which in turn continued to increase the level of public concern.

Over time the calls by the Japanese government for renewed attention to a safety culture appear to have had no effect on the nuclear industry, which has apparently felt itself insulated by simultaneous governmental commitments to a continued carrying out of its original nuclear policy.   The policy, with its accent on perfect safety, in a sense almost required that there be no learning from the past (Brasor, 2007).   Simultaneously, however, there has continued to be increased skepticism among the public, as reflected in the willingness of local officials and courts to stand up to the national government by refusing to acquiesce to licensing demands (Nuclear, 2007).   It is only when economic pressure has been exerted by the national government on communities heavily dependent on the industry that most current plans have gone forward.   None of the opponents to the current policy have argued that power generation is no longer a matter of national security.   What has happened is that the safety concerns have been elevated to such an extent that in this particular case, given the general anti-nuclear background in Japan, the position of public safety on the value hierarchy competes on a more equal fashion with the concerns about national security (White, 2008). Value hierarchies change over time. A more complete analysis of Japanese society might show that there is a gradual shift in society away from a complete orientation on the group (Smith, 1983), as

evidenced, for example, by increasing dissatisfaction with continued scandals in government and industry (Abe, 2006), but demonstrating that is beyond the scope of this paper. My present purpose is limited to using the example to explain the current shift in public support for nuclear power generation in the United States.

Applying the Japanese Example to
the United States

The value structures of Western countries and of the U.S. in particular, have tended to be different from the emphasis of Asia on safety and national security by giving primacy to the individual over the group. Against the background of the work of Adam Smith, the interests of individuals are seen as ultimately benefitting the group through the workings of the "invisible hand" (Smith, 1904). In the U.S. the primacy of the individual is enshrined in the Bill of Rights to the Constitution. Again, it needs to be remembered that this does not mean that national security is not an important value in the U.S. hierarchy of values, for it clearly is, but reflects a matter of emphasis. Thus, for example, a criminal who would be a threat to the public will be released from custody if it is found that his or her rights have been violated. Furthermore, the question of the use of nuclear energy was traditionally interpreted in economic terms rather than in a national security context. So, an emphasis on safety was not seen as a value conflict between safety and national security.

When examined from the perspective of safety, the nuclear industry in the U.S. has had a good record. As the industry itself has asserted, no one has ever been

seriously injured or died as a result of an accident at a nuclear power plant in the U.S., not even as a result of the incident at TMI (Martin and Schinzinger, 2005)   Of course, given the data established in this paper, this claim is not true on a world-wide basis.   It would seem, however, that at least in the U.S., the absence of serious harm is an indicator of the relative safety of nuclear energy. So, what accounts for the opposition to nuclear energy in the U.S. over the last thirty years?

The previous discussion emphasized the objective or engineering analysis of risk. However, there is also a subjective dimension to risk, which can best be expressed in terms of the idea of acceptable risk. Acceptable risk is that level of risk at which the public feels comfortable with the products of engineering work (Vallero, 2004).   The values of a particular society play a major part in the level of risk considered acceptable. For example, questions regarding the value of an individual life, how important future generations are considered to be, how risks should be distributed among the population, how different risks are to be compared with each other, under what circumstances the risk will occur, all form a part of determining the acceptability of risk.   Further, in general there are different degrees of risk acceptance depending on a particular set of circumstances. So, for example, given an equal amount of objective risk, there will be more risk acceptance if a risk is assumed voluntarily rather than being borne involuntarily, if the consequences are reversible rather than irreversible, if they involve a common hazard rather than a dread hazard, and so on (Lowrance, 1976). In the wake of TMI and Chernobyl it therefore mattered little how much or little risk the public was exposed to, what

mattered was the public perception of the risk. Given the possible catastrophic consequences of a nuclear disaster, along with its long-term and widespread effects, the reaction of the public was quite understandable.

Second, in the U.S. the economic costs of disposal of nuclear waste constituted a significant part of the discussion, largely revolving around Yucca Mountain as a possible location (Nuclear, 2009). When added to construction, generation, and maintenance costs, the disposal costs actually made nuclear power generation significantly more expensive than the use of coal in a country which has abundant coal reserves. Thus the economics actually supported the public's feelings about the safety of nuclear energy. Further, the frequent debates about possible disposal sites brought out NIMBY (not in my backyard) reactions, not only in Nevada, but at all the alternative sites which have been suggested. The fear of living near spent fuel rods has thus been added to the concern about possible safety problems in operating reactors. In the meantime these rods have continued to be stored in water tanks at the plant sites, increasing the worries of the local populations. The federal government's current practice of renewing the licenses of reactors for an additional twenty years beyond the original forty year designed life span has not served to ease these worries (Grossman, 2009).

In Japan, to the contrary, neither of these two factors applied. Japan has only minimal coal resources, so it cannot serve as an alternative resource, much less a more economic one. The public discussion would thus only revolve around which foreign source of energy to depend on. Japan's nuclear policy also managed to avoid serious discussion of storage issues by committing itself to a

recycled fuel or MOX policy. From the early days of nuclear power, demonstration plants to use recycled fuel were built and it is still the intention to use recycled fuel even in traditional plants. Although these projects have not been implemented commercially, they do guide policy even while the storage capacity for fuel rods at plant sites is being rapidly used up (Rokkashomura, 2006). As a side note, it should be mentioned that this policy is actually adding to current safety concerns in that Japan depends on France for recycled fuel and the radioactive material is then subject to a long sea voyage.

The last question we are then left with is what accounts for the current change in attitude toward the construction of nuclear plants in the U.S. The answer is that the use of energy has begun to be transformed into a national security issue. This change is not due to a single factor, but to a confluence of several, including the rapid rise in the price of gasoline, global warming, recent wars, and the current deep recession. These events have brought home to the American public the extent to which it is dependent on foreign nations for its survival. The earlier understanding of the public was based on confidence in the military power of the U.S. Even during the 1970's shut-off of oil supplies there was the underlying assumption that ultimately the sources of Mideast oil could be controlled. Recent excursions into the Middle East have shown, however, that intervention can actually inhibit rather than loosen the supply of oil. When combined with the realization that much of the remainder of oil reserves are held in countries not allied with the U.S, such as Russia and Venezuela, the security of supplies no longer appears to be assured. Second, while the rise in the price of gasoline to the consumer

and the current recession appear at first sight to be only economic issues, they have actually also brought home to the public that what seems to be at stake is the very future of "the American way of life." The phenomenon of global warming further reinforces this belief, pointing to the need for alternative energy resources.

America has had to deal with potential loss of oil supplies before. It has undergone recessions during its anti-nuclear period. It has frequently intervened militarily in foreign countries in the last few decades. The existence of global warming has been argued for a number of years. None have by themselves changed the public's concern about the safety of nuclear power. The conjunction of these factors, however, has resulted in a reversal of previous attitudes, although not in the underlying value system of the American public (Murelio, 2009; Kanter, 2009).

It can then be said that factors which do not at first sight appear to be issues of national security, when elevated to a sufficient level and combined, have the capacity to change their character. Thus the nuclear policy in Japan was a national security issue from the start and the American example shows that the transformation of circumstances can raise what might seem to be merely an economic matter into an issue of national security. The degree of something can change its very nature.

This brief discussion only suggests a way that an understanding of the issue of changing attitudes toward the use of nuclear energy in the U.S. might be subject to rational analysis (Whitfield et al., 2009). To fully support the adequacy of such an approach would require a detailed consideration of the historical evolution of

attitudes and events, similar to the one I have conducted in relation to the Japanese nuclear industry. That task is left for others. The analysis of the Japanese industry does suggest, however, that changing perceptions can be understood without necessarily requiring objective changes in regards to the safety of nuclear power generation. To base an argument regarding the implementation of nuclear power solely on data regarding its presumed level of safety might thus not be as effective an approach as it seemingly should be. Instead, more attention might be paid in analyses on the status of personal safety in a society's hierarchy of values at a particular time in history. The concrete discussion regarding nuclear power in Japan thus can inform theoretical discussions regarding the U.S. but, perhaps more significantly, also the ongoing practical debate in the public forum.

Conclusion

The purpose of this discussion has been to illuminate the role of value hierarchies in decision-making processes. It has not been to make a judgment about the appropriateness of using nuclear energy as a way of generating electric power. The discussion does highlight, however, that the wrong way to approach the question is to make the claim that nuclear energy is either safe or unsafe in an absolute sense. The decision depends on a particular set of value priorities and the extent to which a particular value is affected by a set of concrete circumstances, as well as the historical and environmental conditions which circumscribe contemporary attitudes. The implementers of technology

need to be aware of such factors when attempting to communicate with the public about the safety of their devices. Failure to do so can lead not only to misunderstandings, but to potentially unforeseen harmful effects from the technologies themselves.

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Toward an Historical Poetics of Digital Cinema[1]

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In this paper, I argue for a new approach to thinking about digital cinema that takes into account its aesthetic, as well as its technological and industrial, dimensions. This approach is rooted in the work of noted film scholar David Bordwell, who has developed a method for studying the evolution of film style over time—a method that produces what he calls an "historical poetics of cinema." Bordwell is particularly interested in the way in which film style is affected during periods of technological overhaul in cinema; at such moments, filmmakers try to exploit the unique features of new technologies while still integrating them into standard work practices. Such has been the case, I suggest, with the digital technologies that have transformed most areas of American filmmaking over the past two decades. Tracing the impact of these technologies in the realm of cinematography, in particular, I begin the work of establishing a taxonomy of digital film style, paying special attention to recent movies like *Miami Vice* (2006) and *Inland Empire* (2006), which exploit the distinctive capabilities and limitations of digital video cameras to create new aesthetics. Ultimately, my goal is to make a small contribution toward the larger project of producing an historical poetics of digital cinema.

Key words: digital cinema; film look; film style; cinematography; Miami Vice; Inland Empire; David Bordwell.

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[1] This article is based on a paper entitled 'Which Digital Cinema?: Notes on an Emerging Poetics of Digital Film Style,' which was delivered at the 2007 Modern Language Association conference in Chicago.

An Historical Poetics of Digital Cinema

Much has been written in recent years about how the paradigmatic shifts in movie production, distribution, and exhibition triggered by the advent of digital technologies have utterly transformed—perhaps even ended—film as we (used to) know it; very little, however, has been written about the aesthetic implications of these developments. I would therefore like to pursue, in the pages that follow, an approach to digital cinema rooted in the work of David Bordwell, a film scholar who has devoted himself to "the study of principles of filmmaking as they inform films in particular historical circumstances" (Bordwell, 2008, p. 54). This "historical poetics of cinema," as he calls it, "requires not only analysis of . . . films but also research into norms and craft practices impinging on the principles informing the films. It investigates how film artists, as historical agents, work within the zones of choice and control offered by their circumstances" (Bordwell, 2008, p. 54). For my purposes, the most important part of Bordwell's research program is his ongoing exploration of the way in which "stylistic continuity and change can interact during a period of technological overhaul" (Bordwell, 2008, p. 283) in cinema. In a key essay on CinemaScope, for example, he demonstrates how "the physical constraints of a new technology have stylistic consequences" (Bordwell, 2008, p. 284), tracing the impact that this widescreen format had on filmmaking practices in Hollywood during the 1950s. Introduced by Twentieth Century-Fox in 1953 as a way to lure audiences seduced by the novelty of television back into movie theaters with the promise

of epic storytelling and sheer spectacle, CinemaScope revolutionized the film industry, prompting every other major studio to abandon the squarish Academy Standard frame in favor of widescreen. It initially proved to be something of a nightmare for filmmakers, however. Given the new, markedly rectangular, dimensions of the 'Scope frame and the limitations of the early anamorphic lenses used to shoot films in 'Scope, they had—at least at first—to revise radically the filmmaking style perfected during the classical Hollywood era. As the technology evolved, though, it allowed filmmakers the freedom to incorporate into their work the techniques of mise-en-scène and montage developed over the previous three decades, while at the same time offering them a fresh menu of artistic options related to the expanded visual field of the widescreen frame. By the end of the 1950s, CinemaScope had given birth to a new filmmaking style, one that synthesized traditional and modern methods to create a hybrid aesthetic. In Bordwell's view, this is typical of the way in which stylistic continuity and change interact during a period of technological conversion in cinema. As he puts it: "When a new tool is introduced into U.S. studio filmmaking, it's usually shaped to fit existing routines. Filmmakers try to exploit the new device's unique features while still integrating it into standard work practices and stylistic functions" (Bordwell, 2008, p. 283). I want to suggest that this is exactly how American filmmakers have responded to the arrival of digital filmmaking technologies over the past twenty years, and that by charting, in a Bordwellian fashion, the interplay of stylistic continuity and change that has followed the arrival of these technologies, we can produce an historical poetics of digital cinema.

In order to create a complete historical poetics of digital cinema, of course, one would need to detail the stylistic consequences of digital technologies in every area of filmmaking where they have been applied, including cinematography, editing, acting, special effects, and sound design. Such a project is clearly beyond the scope of the present article; in the interest of making a contribution toward this end, however, I would like to offer some observations on the emerging poetics of digital cinematography. The questions I want to answer are: What impact has the introduction of digital video cameras—both standard definition (DV) and high definition (HD) models—had on filmmaking practices in the United States over the past decade? What have the stylistic consequences of this new technology been for American cinema both inside and outside Hollywood? How have stylistic continuity and change interacted during this period of technological overhaul in the realm of cinematography?

The "Film Look" in Digital Cinematography

Surveying the vast majority of films shot on digital video during the last several years, one might well conclude that there have been no significant stylistic consequences to the introduction of digital film cameras at all. The most remarkable thing about the cinematography in these films is that it seems so unremarkable; indeed, it is often difficult, even for a trained eye, to discern the difference between the look of these films and the look of contemporary films shot on traditional thirty-five millimeter film stock. This is certainly true of recent big-budget Hollywood movies

shot in HD, including *Superman Returns* (2006), *Déjà Vu* (2006), *Click* (2006), *Zodiac* (2007), *Superbad* (2007), and *I Now Pronounce You Chuck and Larry* (2007). One might argue that the same is true even of recent low-budget independent movies shot on DV, such as *Lonesome Jim* (2005), *Ellie Parker* (2005), *The Puffy Chair* (2005), *In Between Days* (2006), *I Want Someone to Eat Cheese With* (2006), and *Quiet City* (2007). Despite the high profile of many of these movies and the substantial audiences that many of them attracted, the fact that they were filmed digitally appears to have been lost on most viewers. As Nathan Lee, Kent Jones, and Paul Arthur put it in a *Film Comment* article appraising the crop of digital films released in 2006, ". . . no one blinked. All the huffing and puffing about the digital virus infecting the purity of 35mm now feels *very* 2003. . . . All things considered, this may have been the year when film and video became indistinguishable" (2007, p. 39). What are we to make of this? Given how difficult it can be to tell film and digital video apart, should we assume that the introduction of digital video cameras has had no real impact on filmmaking practices in the United States—that digital cinematography is in all respects identical to traditional cinematography and thus has no aesthetic dimension of its own?

The answer is, arguably, no. As Lee, Jones, and Arthur imply, critics railed for a number of years after the arrival of digital video cameras in the 1990s about the inferior quality of images captured on digital video compared to those captured on film, casting the possibility that the former might one day replace the latter in almost apocalyptic terms. It is only fairly recently that film and digital video "became

indistinguishable," silencing the naysayers. I want to suggest that the close correlation we see today between the look of digital video and that of film is the result of the interplay of stylistic continuity and change that Bordwell tells us occurs during periods of technological transformation in cinema.

When it was first introduced in the 1990s, digital video camera technology, like CinemaScope almost half a century earlier, presented a host of challenges for filmmakers seeking to integrate it into the established work practices and stylistic functions that define contemporary American filmmaking. The most serious of these challenges were the perceived shortcomings of early digital video cameras when it came to rendering images that approached, in terms of quality, those yielded by industry-standard thirty-five millimeter film stock. The general consensus among filmmakers at the time was that digital video fell short of the benchmark set by film in four major areas: resolution and colorspace, frame rate, exposure latitude, and depth of field. First, digital video initially afforded far less resolution and colorspace than thirty-five millimeter film. While a standard definition NTSC (National Television System(s) Committee) digital video frame then had 349,920 pixels (at 720 x 486 pixels per frame), a frame of film has the equivalent of 12,582,912 pixels (at 4096 x 3072 pixels per frame), offering over thirty-five times the resolution of digital video (Billups, 2003, p. 176). Moreover, film can display over 800 million colors while the best uncompressed video, at the time, could barely maintain a color gamut of 256 colors for each of its component colors (red, green, and blue), for a total of 16.7 million colors or roughly .02 percent of the

colorspace offered by film (Billups, 2003, p. 176). To make matters worse, the signal captured from digital video camera had to be compressed in order to manage the data flow or record images to tape, meaning a further loss in picture quality. Second, digital video originally captured images at a different frame rate than film. Whereas film is inherently "progressive," meaning that it records entire frames in succession, early forms of NTSC digital video were interlaced, meaning that each frame was formed by combining two fields of even and odd numbered lines of image separated in time by 1/60th of a second (Billups, 2003, p. 58). This time lag caused a distracting jagged edge to appear in images where a figure moved through the frame or the camera itself moved. Third, in the beginning, digital video had significantly less exposure latitude or dynamic range than film. Film cameras were able to record more than six times the range of illumination digital video cameras were capable of recording, meaning that film was able to provide far more texture and detail than digital video, especially with regards to highlights (Billups, 2003, p. 177). These brightly-lit portions of the image were often "clipped" or "blown out" on digital video, appearing as undifferentiated blocks of white. While digital video cameras were able to capture more detail than film cameras in low-light situations, they did so by boosting gain, which resulted in undesirable "noise" or grain in the picture; if their gamma settings were reduced to eliminate this noise, they lost the ability to see in the dark, producing only "crushed" blocks of black where there were shadows in the image. Finally, the 3-chip digital video cameras introduced in the 1990s were unable to emulate the shallow depth-of-field that had

long been a trademark of thirty-five millimeter film. Their lenses were only capable of recording images in deep focus, meaning that the foreground, the middle ground, and the background were always in focus simultaneously. Moreover, the lenses also tended to distort figures and objects filmed in close-up, making them look unnaturally wide on screen. Simply put, filmmakers could not initially use digital video cameras to capture images that approximated the look of film; for many of them, this represented an insurmountable obstacle to the integration of digital video camera technology into their filmmaking practices. They felt that audiences would not accept digital video that departed radically from the look of thirty-five millimeter film, and thus preferred to continue shooting movies in the traditional manner.

As digital video camera technology has evolved, however, and as filmmakers have found ways to make digital video look more filmic, they have begun to regard it more favorably. The advent of HD digital video cameras in the early twenty first century was an important factor in changing attitudes toward digital cinematography. These cameras are able to attain a resolution of at least 2,073,600 pixels (at 1920 x 1080 pixels per frame), providing picture quality much closer to that of film than DV cameras had been able to manage. They are also able to output their signal directly to a hard drive, thereby avoiding the compression problems that previously plagued digital cinematography. Finally, they can be equipped with progressive scan technology that eliminates the interlacing problems inherent with earlier digital video cameras. Even filmmakers who are still stuck with

interlacing digital video cameras can utilize newly available post-production processes like Adobe After-Effects or MagicBullet to capture the look of progressive scan in their films. In addition to taking advantage of these technological innovations, filmmakers have also adopted strategies that have allowed them to circumvent or minimize the obstacles that once prevented them from duplicating the look of film with digital video. For example, they often use neutral density filters to reduce contrast in their images and mimic the softness of film, and depth-of-field adaptors to make their digital video cameras compatible with thirty-five millimeter lenses that can be used to achieve a shallow depth-of-field. This combination of technology and technique has become the standard approach to shooting movies on digital video not only within the film industry, but also in the "real world," where it has been disseminated via popular magazines such as *Videomaker*, *MovieMaker*, *DV*, and *American Cinematographer*, as well as by do-it-yourself digital filmmaking handbooks like *Digital Moviemaking*, *Digital Cinema*, *The IFILM Digital Video Filmmaker's Handbook*, and *The Digital Filmmaking Handbook*. Indeed, it is worth noting that for all of the supposed formal and narrative differences between Hollywood movies and independent movies, the style of digital cinematography manifested by both is often remarkably similar. Although independent filmmakers initially faced a bigger challenge than their mainstream counterparts in realizing a "film look" in their work, due to the less expensive consumer- and prosumer-grade DV cameras they were forced to use, it now seems clear—especially in view of the growing number of indie films shot in HD, such as *Broken English* (2007), *Hannah*

Takes the Stairs (2007), and *Youth without Youth* (2007)—that the low-tech grubbiness of many earlier independent movies was the product of necessity, not of aesthetic choice. In short, per Bordwell's thesis concerning the way in which stylistic continuity and change interact during a period of technological overhaul, digital video has, after causing a brief period of disruption, been shaped to fit existing routines in American cinema, producing a style of cinematography almost indistinguishable from the one that preceded it.

And herein lies the problem. Since the dominant style of digital cinematography is, unlike the hybrid aesthetic that resulted from the introduction of CinemaScope in the 1950s, practically indistinguishable from traditional film cinematography, we may be tempted to conclude that the advent of digital video has no real implications for the future of cinematography. The essential point to emphasize here, however, is that the "film look" favored by the majority of filmmakers using digital video today is not "native" to that format; rather, it is the result of a conscious manipulation of digital video technology and technique to achieve a particular aesthetic effect and, as such, is simply one of many possible styles of digital cinematography. With this in mind, I would like, in the pages that remain, to briefly explore what alternatives to the "film look" in digital cinematography might look like. In my view, two recent films shot on digital video, Michael Mann's *Miami Vice* (2006) and David Lynch's *Inland Empire* (2006), embody contrasting visions of how digital video technology might, in the years to come, transform traditional film cinematography instead of simply reconstituting it.

Beyond the "Film Look" in Digital Cinematography

Miami Vice, shot on HD digital video, represents an attempt to create a "hyperreal" style of digital cinematography—one that produces a minutely-detailed simulation of reality by highlighting, rather than masking, the immense depth-of-field and low-light sensitivity native to digital video cameras. Dion Beebe, the film's cinematographer, has described the attitude that he and Mann had toward the use of digital video in the movie as follows:

> 'We wanted to satisfy ourselves that what we could achieve in digital was not something we could simply produce on 35mm film. . . . We . . . decided that there were attributes of HD technology we liked and wanted to exploit, like the increased depth of field. Because of the camera's chip size [2/3"], they have excessive depth of field that we decided not to fight, but rather utilize.' (Quoted in Holben, 2006, p. 53)

In addition to the unique, 3-D-like effect Beebe and Mann attained by emphasizing the depth of field innate to their digital video camera, they also sought to create a distinctive look by taking advantage of the camera's ability to capture images in low-light situations. As Beebe puts it:

> 'Hi-def already stands out for its incredible sensitivity in the low end. . . . You are able to create files that really extend this end of the

sensitivity curve, enabling the cameras to really dig into the shadows. The perfect example of this is shooting at night and actually capturing details in the night sky, which is something that film, shooting at 24 fps with a 180-degree shutter, just can't do yet.' (Quoted in Holben, 2006, pp. 53-54)

The hyperreal style of the digital cinematography, which reveals much more of the diegesis to us than would be visible in a conventionally-shot movie, suits the film's narrative perfectly.

A reinvention rather than a remake of the popular 1980s television series that Mann produced, *Miami Vice* tells the story of two undercover vice detectives, Sonny Crockett (Colin Farrell) and Ricardo Tubbs (Jamie Foxx) who attempt to infiltrate a high-tech smuggling ring operating in Miami. Steven Rybin observes that:

As in other Mann films, protagonist and antagonist in *Miami Vice* are often defined by the similarity of their desires and/or the manner in which they seek to fulfill their desires in the face of sometimes overwhelming contingency. The figures in *Miami Vice* attempt to overcome the circumstances which threaten to derail their carefully designed plans through the harnessing of technologies and sophisticated systems of intelligence that grant them a wider scope of vision, control, and surveillance. (2007, p. 199)

Rybin notes that the visual style of the film, especially its deep-focus cinematography, helps to render the "world in which Crockett and Tubbs live as simply

overwhelming, too much to experience visually in a single viewing of the film" (2007, p. 203), thereby "immers[ing] us into the psychological world of the detective work performed in the film . . . while at the same time constantly reaffirming a Vertovian depiction of an immense, contingent, and, in the end, ungraspable world" (2007, p. 204). One of the best examples of the film's digital cinematography supporting its story in this fashion can be seen in an early scene that finds Crockett and Tubbs on a rooftop in downtown Miami at night, trying to make sense of a desperate phone call they have just received from a former confidential informant, Alonzo, who tells them that an FBI case he has been working on has just gone bad and that he is on the run. Shooting on location, Mann frames his actors against the glittering cityscape, which, although it is in the distant background, is sharply in focus thanks to his use of a Viper FilmStream HD digital video camera. The extraordinary depth-of-field in these images is almost dizzying, capturing the vertiginous feeling of being atop a tall building, as well as the sense of confusion and helplessness experienced by the two detectives as they are confronted with a situation beyond their understanding or control. Film critic Manohla Dargis writes that *Miami Vice* shows us "a world that seems to stretch on forever, without the standard sense of graphical perspective" (2004, p. AR22) and that in this scene, in particular, "it's as if the world were visible in its entirety, as if all our familiar time-and-space coordinates had dropped away, because they have" (2004, p. AR22). This visual effect, so crucial to evoking the world of "overwhelming contingency" described by Rybin, is directly traceable to Mann's

decision to exploit the native capabilities of HD digital video and points to one possible alternative to the "film look" style that currently dominates digital cinematography.

On the other hand, David Lynch's use of digital video technology in *Inland Empire* points to a dramatically different—almost diametrically opposed—alternative to the dominant style of digital cinematography. If Mann exploits the native capabilities of HD digital video in *Miami Vice* to show us "too much," creating a dizzying, hyperreal aesthetic in his film, Lynch exploits the limitations and imperfections of standard definition digital video technology in *Inland Empire* to show us "too little," creating an aesthetic that is purposefully surreal. Extolling the lower quality of the prosumer-grade Sony PD-150 DV camera he used to make the film, Lynch writes that:

> The quality reminds me of the films of the 1930s. In the early days, the emulsion wasn't so good, so there was less information on the screen. The Sony PD result is a bit like that; it's nowhere near high-def. And sometimes, in a frame, if there's some question about what you're seeing, or some dark corner, the mind can go dreaming. If everything is crystal clear in that frame, that's what it is—that's *all* it is. (2006, p. 153)

By obscuring large portions of the frame through a combination of conventional low-key lighting and unconventional DV camerawork that "crushes" the shadows that fill the frame, making them almost impenetrable, Lynch is able to simulate the unsettling

atmosphere of a dream in his film. As Amy Taubin describes it:

> The visuals in *Inland Empire* look as if they're decomposing before your eyes, as if any minute they are going to disappear into a void, and the extreme lighting adds to that effect. The instability of the image feeds the feeling of anxiety and also reinforces the sense that the film does not take place in the real world. (2007, p. 57)

These unique visuals allow Lynch to explore, in a new fashion, the theme of desire and fantasy that has occupied him in many of his more recent films—especially *Mulholland Dr.* (2001), which *Inland Empire* echoes in a number of ways.

The elliptical, funhouse narrative of *Inland Empire* is difficult, if not downright impossible, to summarize adequately; suffice it to say here that it involves the story of a Hollywood actress, Nikki Grace (Laura Dern), whose life and identity unravel when she takes a part in a new film project and begins to lose herself—quite literally—in the role, becoming confused over the parallels between her character's adulterous relationship with a married man and her own budding affair with her co-star, Devon Berk (Justin Theroux). Like *Mulholland Dr.* and Lynch's other recent films, which, as Todd McGowan suggests, demonstrate "how mystery does not sustain desire but is itself a flight from desire, an attempt to escape the horrible deadlock that desire produces" (2004, p. 72), *Inland Empire* explores the manner in which "fantasy provides a way of staging an encounter with trauma and an authentic experience of loss that

would be impossible without it" (2004, p. 68). What distinguishes Lynch's latest film from his previous work, however, is that he undertakes this exploration for the first time via the medium of digital cinema. It quickly becomes apparent in the film that DV camera technology has allowed him to express the surreal nature of Nikki's alienation from reality in a way that would not have been possible with traditional film cinematography. Take, for example, the moment in the movie when she first mistakes her character's reality for her own—a moment that heralds her impending identity crisis and flight into fantasy. We begin with a scene that has Nikki and Devon, in character, embracing passionately on the set of their film, *On High in Blue Tomorrows*, as the director, Kingsley Stewart (Jeremy Irons), watches from behind the camera. We then cut to another scene in which Nikki and Devon converse in hushed tones before a fireplace in a dimly-lit living room. "I think my husband knows about you . . . about *us*," Nikki whispers, "He'll kill you . . . *and* me . . . he'll…" She breaks off, laughing self-consciously: "Damn! That sounds like dialogue from our script!" Suddenly, Kingsley speaks angrily off screen: "Cut! Cut it! What's going on? What the bloody hell's going on?" Confusion and horror dawn on Nikki's face as she realizes that she is engaged not in a private conversation with her co-star and lover, but in playing another scene from her film; she has gotten the movie and her real life completely mixed up. Lynch effectively underscores the surrealism of the moment through his use of digital cinematography. Most notably, he reduces the gamma setting on his DV camera, "crushing" the shadows that surround and fall on Nikki. This creates the impression that she is adrift in an inky black void, cut

off from the real world; by darkening the hollows around her eyes and making her face look ghostly and mask-like, it also suggests the extent to which she has lost touch with her own identity. It is worth noting, as well, that Lynch shoots Nikki in tight close-ups, taking advantage of his DV camera's tendency to warp and elongate figures filmed at this range to emphasize her disorientation and the unnatural elasticity her sense of self has developed. Both of these effects would be difficult, if not impossible, to achieve using traditional film technology. While the surreal style of Lynch's low-def digital camerawork is quite different from the hi-def hyperrealism that Mann cultivates in *Miami Vice*, it plays a similarly crucial role in establishing the unique ambiance of the world of *Inland Empire* and points to another potential alternative to the "film look" style that currently dominates digital cinematography.

Conclusion: Further Avenues for Research

By way of concluding, I should point out that my discussion of the hyperreal aesthetic of *Miami Vice* and the surreal aesthetic of *Inland Empire* has by no means exhausted the possible alternatives to the dominant "film look" style of digital cinematography. One could imagine many more ways of exploiting the native characteristics of digital video cameras to create other, equally intriguing, styles of digital cinematography. I should also repeat that, in addition to more fully developing a historical poetics of digital cinematography, we also need to develop other taxonomies of digital film style. What impact, we might ask, have digital technologies had in the realm of editing? David

Bordwell has demonstrated that the intensified continuity editing characteristic of much of contemporary Hollywood cinema has been motivated, at least partly, by digital editing systems like Avid and Lightworks (2006, p. 155). We might also consider the way in which the lengthy recording times made possible by digital tape and direct-to-hard-drive output have given filmmakers the unprecedented ability to shoot entire films in one take, negating the need for editing altogether in recent independent movies like *Adrenaline* (2007), *The Quietest Sound* (2007), and *Midnight* (2007). Likewise, we might detail the stylistic consequences of the digital technologies used in the area of film acting. How have the long takes made possible by digital technologies affected the way in which actors play scenes? How has the digital motion capture technology used in recent Hollywood movies like *The Polar Express* (2004), *King Kong* (2005), and *Beowulf* (2007) transformed the nature of film acting? Clearly, there is much work yet to be done. My hope is that the observations I have offered in this paper on the historical poetics of digital cinematography represent a small step toward the completion of that work.

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