SOLAR ENERGY DEVELOPMENT: A SELF-RELIANT TECHNOLOGY IN SEARCH OF A SELF-RELIANT ECONOMY

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THESIS ABSTRACT

SOLAR ENERGY DEVELOPMENT: A SELF-RELIANT TECHNOLOGY IN SEARCH OF A SELF-RELIANT ECONOMY by ALVA TABOR

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE on 13 MAY 1977 IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARCHITECTURE.

In urban respects the importance of architecture, as the practice of designing urban environments to adequately accommodate community growth, is in adapting the currently available natural resources, and the appropriate tools of technology to meet the functional expectations of urban inhabitants.

Presently, the systems of commerce and capital which operate to maintain the living environs of America do not encourage builders to introduce the use of alternative energy sources. Engineers and architects, as the designers of tomorrow's living facilities, must begin to require the use of alternate energy systems in these future structures. Energy conservation and alternate energy techniques can not be applied in new construction and rehabilitation which will serve residential needs for comfort without consuming increasing quantities of expendable fuels.

Alternative energy and self-help urban development are utopian notions in the context of our prevailing energy networks and the socio-economic environments that they serve. Nonetheless, these utopian visions can provide an overall notivation for changing our ways of life and growth. Change comes from necessity; in this instance, the necessity for people to obtain adequate housing, and the necessity for altering the price that they must pay for the long term comforts of their homes. The essential changes which would bring about adequate, low-cost housing will require major alterations and the existing urban establishment. Taking a collective step toward reliance upon alternate energy resources in America will be very slow and difficult.

There are people who are attempting to make this major transition, who see this alternative as their final hope for prosperous urban livlihood. These people are in the most difficult living situations- the urban situation of living in New York City. The residents of 519 East 11th Street have made some small progress through self-help and the acquisition of a small resource-an abandoned building and the land it occupies, and the assistance of receptive technicians.

The following is an account of how the people of East 11th St. used the techniques of collective participation and low-cost rehabilitation to create a viable urban housing alternative.

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This thesis is dedicated to the people of 519 who opened their doors and accepted me as a fellow worker, and my Cambridge comrades who kept me well fed.

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INTRODUCTION

> "Local pride ought above all to center, so far as the materal objects are concerned, about the determination to give the surrounds of the community nobility, dignity, beauty...
> We Americans spend far too much of our early strength and time upon injuring our landscapes, and far too little upon endeavoring to beautify our towns and cities."*
>
> *Words of the American philosopher, Josiah Royce

New York City has more than 100,000 abandoned dwellings in over 7,000 neglected buildings, and their numbers are steadily increasing. During the last decade numerous government housing programs have been administered in an attempt to prevent the continual erosion of the inner city's housing stock. Inspite of massive federal subsidies, the exorbitant costs of construction and financing interest rates, in addition to ineffective building maintenance and residential organization, have made the demolition of these buildings almost inevitable.

Urban homesteading was implemented as a final alternative for those who had no other means to obtain satisfactory housing. The city's Sweat-Equity program allows willing groups of city inhabitants to obtain the trained advice of non-profit housing services like U-Hab, through re-loaning of city money for construction financing -- money which the city receives through its tax-free municipal bonding authority.

519 East 11th St. was one of the many tenements owned by a large land-owner on Manhattan's Lower East Side. In the spring of 1972 thirteen fires broke out and transformed this fully occupied, functioning building into a gutted, deserted shell. In the space of a few weeks the tenants, who had been organizing against their landlord, were driven from their dwellings.

However, some of these dislocated people realized that the fate of the area rested solely with its residents. They went to the city's Housing and Development Administration, and following a full year of extensive negotiations, arranged a loan of $177,494 to purchase and renovate 519 through the city's newly established Sweat-Equity program.

Actual renovation of 519 began in October 1974, and in Sept. '75 when I started working on the project, the building was approaching completion. Virtually the entire interior had to be rebuilt; new windows, new flooring, new plumbing and electrical systems. Almost 300 burned beams were replaced, and structural faults caused by weathering of the exterior brick were corrected.

Since September 1975 I have helped to provide the benefits of energy conservation and solar hot water heating for the long-term self-reliance of the tenants of 519 E. 11th St. Because of my role as an energy assistant to the 519 project my account shall revolve around the relation of energy alternatives to housing and economic development.

There was a time in America when families who did not have access to large sums of money could by choice operate within the American economic system through self-industry which produced many of the necessities and comforts of lige that would otherwise cost money. Previous to the

1930's an average family, or other groups of people, could obtain undeveloped land, and sustain their growth and well-being on homesteading. Homesteading provided a means for people without campital resources to develop and eventually gain such resources through their ingenuity and labor.

Today, self-industry depends upon the initial possession of some surplus by people. If people do not already have ownership of a valuable commodity, like land, then they must have substantial sums of money if they wish to become more self-reliant. Now, especially in cities, there is no way that people can gain any long-term prosperity without amassing large savings accounts, instead city residents without cash reserves, or credit are forced to inhabit the fringes of the city's resource system. This situation does not mean that surplises no longer exist in today's communities, on the contrary surpluses in the form of vacant buildings and land are steadily multiplying throughout older major cities. The costs of financing and construction of new buildings in cities has become so exorbitant that a surplus of unfinished modern high-rise structures has appeared in New York City. Needless to say, the multitudes of city residents who do not have the money to buy prosperity would like to change the urban development scene to offer them some options for acquiring at least housing and neighborhood well-being through their self-industry and their accessibility to non-capital resources are present.

I. BACKGROUND ON URBAN GROWTH IN THE NORTHEAST

Urban growth with less waste can be achieved in part through conscientious rehabilitation of obsolescent or aging buildings. It is not impossible for economic and administrative standards to be revised and for techniques of rehabilitation to be adopted that would greatly improve buildings without rebuilding them.[1] The innovative organization, known as the Urban Homesteading Assistance Board, has recently made substantial gains in this direction and has contributed to the education of city officials and to the community awareness of the urban populace. Planners and housing experts have long acted with an apparent ignorance of how costly their inefficient use of built-resources was; as early as 1959 housing organizations studying the housing boom admonished city governments for not effectively cultivating the enormous resources available in the existing stock of buildings (housing) in the nation: a report in the ACTION Series in Housing and Community Development estimated that the value of housing structures in urban communities, exclusive of land, was (as of 1955) $320 billion, or about 25% of all national wealth.

The introduction to this detailed survey of the existing opportunity for residential rehabilitation stated that if the business of maintaining and improving existing housing was found to be profitable the government, as well as the city would prosper.

In response to the physical deterioration and the functional obsolesence of urban facilities administrators and builders opted to level many of the poorly producing, aged areas of their cities in order to construct new high standard, more intensely productive building stock.

New methods for financing urban development and sustaining large residential, (finance and trade center) populations were sought and thought to be found in the post World War II building boom of the sixties.

One result of this search for improvement was in high-rise dwellings. The less stifling high-rise projects had residential towers built far enough apart to allow enough air, light, and if possible open space to make the environment habitable. The shift toward this dense, multi-story apartment design began in the late fifties and developed strongly during the sixties.

As industrial and technocratic advances mounted after 1900 land, commodities, and consumers tightly merged on the urban level of existence. This intensive capital industry has been lucrative for more than half this century. Big cities represent such mass mobility and such sources of surplus for countless trades and enterprises that rapid development of natural resources and high rates of capital accumulation and redistribution coincided. It is difficult even to estimate how many millions of dollars the metropolitan trends in land use have brought to stores developers, to the building and transport industries, to the fabricators of cement, steel, lumber, glass, furnitrue, machinery, utilities, etc. in conjunction with the daily use of cars, service stations, incurance, do-it-yourself tools, telephones, televisions, to mention only a few comforts.[2]

Whether concurrent production and consumption can prosper indefinitely remains a problem for theoretical economists and political philosophers, perhaps an elusive one. Any study of the physical conditions of our cities or the fiscal statiscics of our economic employment would suggest the fact that it is enormously expensive to devour space as urban expansion has done in the northeast corridor during the past quarter century. The cost of housing megalopolis is not paid once the beast is created. Maintenance is needed for houses, and for the transport needed to carry inhab-

itants from them to jobs. Vital resident services must continually be provided, power access, and sewage systems have to be installed and kept operating to support more urban homes.

In actuality, by 1967-68 the threat of inhabiting too much space was supplanted by the danger of overcrowding in cities. Sprawling suburban development though wasteful, both through its extended use of central services and its dependence upon auto transport, brought some short-term relief of residential density pressures.[3] Capital and land resources outside of cities were continually engulfed in the effort to meet rising demands, with supposedly improved solutions. The city merchants, workers, and administrators went forth under the basic assumption that these energy-expensive, capital intensive developments could always be sustained because of a firm control over and an abundance of human and natural supplies.

The latest phase of city growth emerged with the production of the automobile and the post World War II construction boom. Single-family subdivisions proliferated, and though land was made available for them, productive activity still remained in big metropolitan centers. 96% of this nation's population increase settled in standard metropolitan areas (regions having at least one city of 50,000 inhabitants or more) between 1950 and 1960. Though rates of production and distribution rose sharply in major metropolitan centers, 3/4 of the population resided outside the cities' administrative boundaries. This last phase of expansion has resulted in the functional connection of adjacent urban areas into multi-centered urban regions extending for hundreds of miles in some cases (from NYC to Washington, D.C. for instance). Housing by 1960

specified 1½ times as much dwelling space per person as had been occupied in 1910. Due to rising living standards and diminishing household size only 3.1 persons lived in a dwelling unit as against 4.5 in 1910. Suburban housing devoured space even more quickly than it added to the urban populace. Had the population densities in New York in 1860 been maintained until the present time, the total 1960 population of the entire metrolitan area, could be accommodated within the city limits.[4]

Correspondingly, the average density of developed urban land within the New York metro-area dropped from 64,000 inhabitants to around 13,000/mi.^{2} in 1960. As communities in outer urban regions developed at densities of 1,000 to 6,000 people per square mile, the gross density in Manhattan reduced from a maximum of 100,000 persons per square mile in 1910 to 77,000 persons per squre mile in 1960. In practice, enumeration districts with a population density of 1,000 or more persons per square mile are now designated as urbanized (a mere 1.5 persons per acre) by the U.S. census.

II. THE EMERGING NECESSITY TO CONSERVE ENERGY AND CULTIVATE ELEMENTAL RESOURCES

As a consequence of this sprawling development larger resource and production networks had to be built to serve an ever broadening range of needs. The enlistment of fossil fuels by the industrial sector enabled widespread high-energy metropolitan needs to become a habit, not just a luxury. Petroleum products, furthermore, supplied the power for the automobile and for trade transport that delivered people and products to all locations. An important result of this stepped up capitalized provision of housing services was the accumulation of enormous amounts of capital and material assets for their providers. These capital profits were partially transformed into wages that attracted greater numbers of workers to the urban sphere. Substantial sums of capital assets were also converted into more land improvements and housing that would than be consumed by the city's new wave of employees.

As the dimensions of urban communities grew, transport systems[5] were increasingly relied upon to remedy problems of commercial distribution and suburban workers' access to city located jobs.

Until the threat of fossil fuel extinction arose the urban road to greater profits led to more cars and electric appliances and more dissociated communities. It has been pointed out by Colin Clarke that expensive transportation within a city, time wise (as on foot), must be offset by spatially compact environs, and high person/acre densities. When faster transport was invented therefore, the population could afford to spread out which decreases density while expediting the formation of more profitable commerce.

The tendency to dispersal of urban settlements was further reinforced by the specific use of cars because they could not be moved or stored in densely developed areas without huge capital outlays for roads, traffic controls and garages; branching out offered a cheaper urban arrangement, up to a point.

From the standpoint of progress in terms of energy, a 20th century citizen's right to ownership of an automobile gives that individual access to the most advanced tools which convert (consume) expendable fuels and expensive materials into work. The use of this transport tool alone has provided its users with mobility and apparently greater self-determination but in order to utilize the automobile and other transport, 25% of America's yearly energy production was consumed. The price paid for machinery which allows man to travel further more quickly is an increasing rate of energy consumption. It takes about eight times more energy to push a vehicle through the air at 85 miles per hour than at 55 miles per hour. The extensive replacement of animals with energy converting machines on U.S. farms and in cities over the last 50 years has amplified this fuel cost though augmenting the individual's man-hour work output. A more detailed investigation into the subdivisions of the country's economy which are presently benefitting from increased fuel inputs reveals that household, commerce, and transport capabilities have been increasingly augmented.[6] Has this energy-investment really been advantageous to the city's long-term progress?

When the amount of productive work being done by electricity amounted to 10 percent of the country's output during 1970, the nation expended 26% of that year's fuel requirement in making electrical power. The diminishing ratio of productive work to gross fuel input is technically a function of the efficiency with which energy is converted to action. Though we now have more sources of high-grade energy at our disposal we are utilizing these energy forms at rather low efficiencies, for instance, electrical heating and cooling.

A densely developed city like New York at least permits more efficient use of energy for mass transport, households and commerce because of its functional compactness. This productive capability was nullified, however, when fuel and commodity distribution ranges expanded to their present suburban boundaries. For each member of the household involved, suburbia may have meant greater expenditures, but they could generally afford them. However, balancing added convenience against the desire for space and other amenities works out differently for citizens who have different taste and housing needs, and different levels of income to satisfy them.

With the existing relationship of land prices and maintenance cost to low-income considerations relief was not to be produced by the owners of the debilitated tenements which house most low-income families.[7] Primarily landlords were running their buildings only to make profits. As the profit margin fell below 10% or 13%, as they did due to rising operating costs, landlords were compelled to abandon their properties feeling that all economic life had been drawn from the long ago amortized structures. Profit seekers prefer to build housing for sale, or rent already depreciated apartments, since they offer quick capital returns without long-term responsibilities. This condition follows from the low first-cost

that traditional, consumptive energy-economics made possible. Eventually, the economic worth of fossil fuels inflated to such a degree that the cost of new city construction, as well as existing property maintenance became prohibitive. The expanding cycle of production/consumption that had spurred city growth for three decades was now rolling to a standstill.[8] The point at which centralized production and trade begin to work inefficiently had been reached. Urban growth can no longer go on radiating outward at low densities from great metropolitan centers, at least not through current levels of earning, spending, and energy production. Higher rates of capital transaction and resource conversion are required to maintain the single-dwelling character of urban expansin, and indeed, the intensity of cash flow has increased due to the 'higher economic value of fuel' which means higher prices for goods and services. A sign of the stepped up conversion of energy to meet commercial production needs is evidenced by the fact that highly mechanized, mobile homebuilders are currently producing most of the nation's new housing starts. In practice, therefore, the U.S. economy persists in utilizing capital incentives to stimulate the intense use of expendable energy for producing the typical dweller's needs. The seemingly opposed conditions of national inflation and urban recession are actually overtones caused, in part, by America's accelerating consumption of non-renewable fuels.

The capital-industry cycle* begins with the ecosystem where incident solar radiation is concentrated and stored in plant species and fossil fuels. These accumulated sources of solar energy are then farmed, or in the case of fossil fuels, extracted and refined by the capital-industry's production system (manufacturers) into specialized, high-grade energy components. High-grade fuels such as coal, natural gas, and various grades of fuel oil make such useful items as electricity, and motorized transport available to all those in the U.S. who have the financial ability (through income) to procure them.

Some of the capital gained by the production system's tranformation of energy to work allows the next stage of the cycle, the consumption system, to operate. Industrial materials, retail commodities and services are fabricated by whole sale manufacturers through the utilization of petroleum products and labor power. An ever-growing demand for manufactured goods insures that the consumption system will thrive, even as dollars earned by workers for their part in the provision of commodities are spent by them as consumers who desire those commodities, in addition to their essential food and shelter.

In order for material progress and financial acquisition to accelerate the consumption of more fuel and commercial resources, at faster rates, in exchange for the consumer's dollars myst be encouraged through the economic system. As long as corporate enterprises can use monetary profits to tap more natural fuel resources the capital-industry cycle can revolve lucratively. But, the incredibly swift extraction of many of the planet's fossil fuels has definitely reduced the progress of the cycle; the dollar

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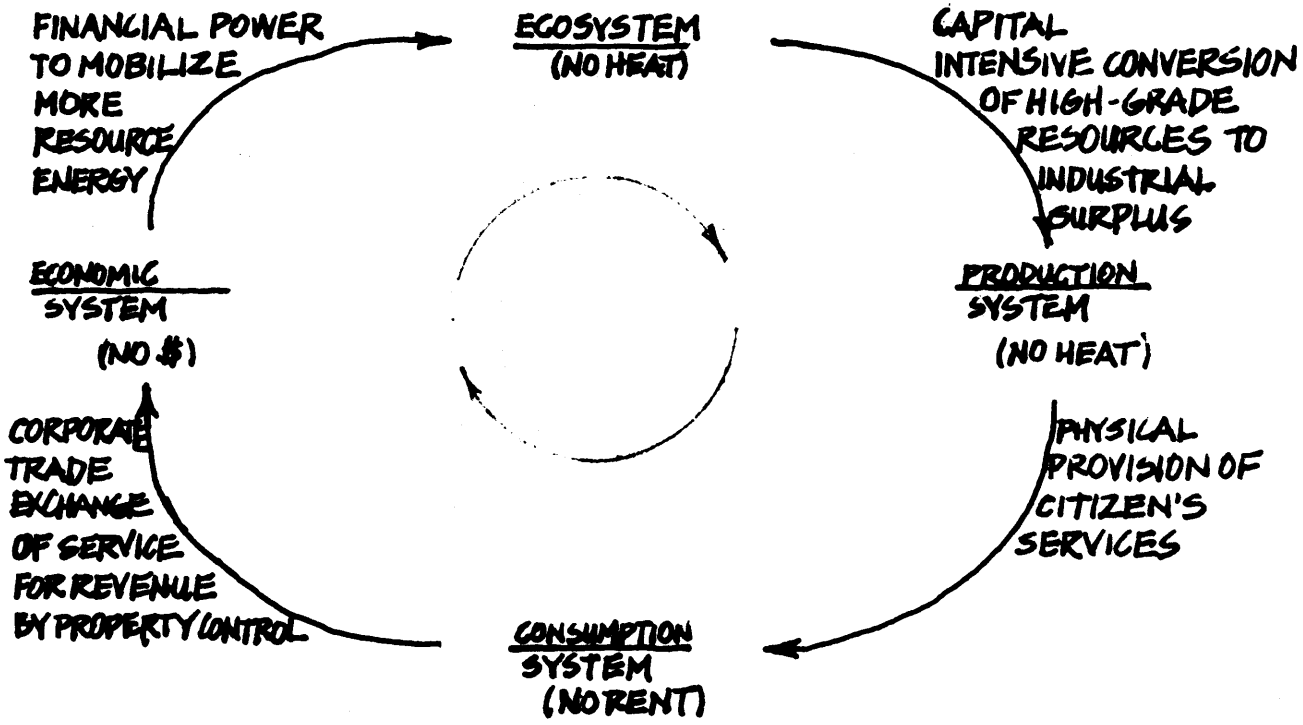
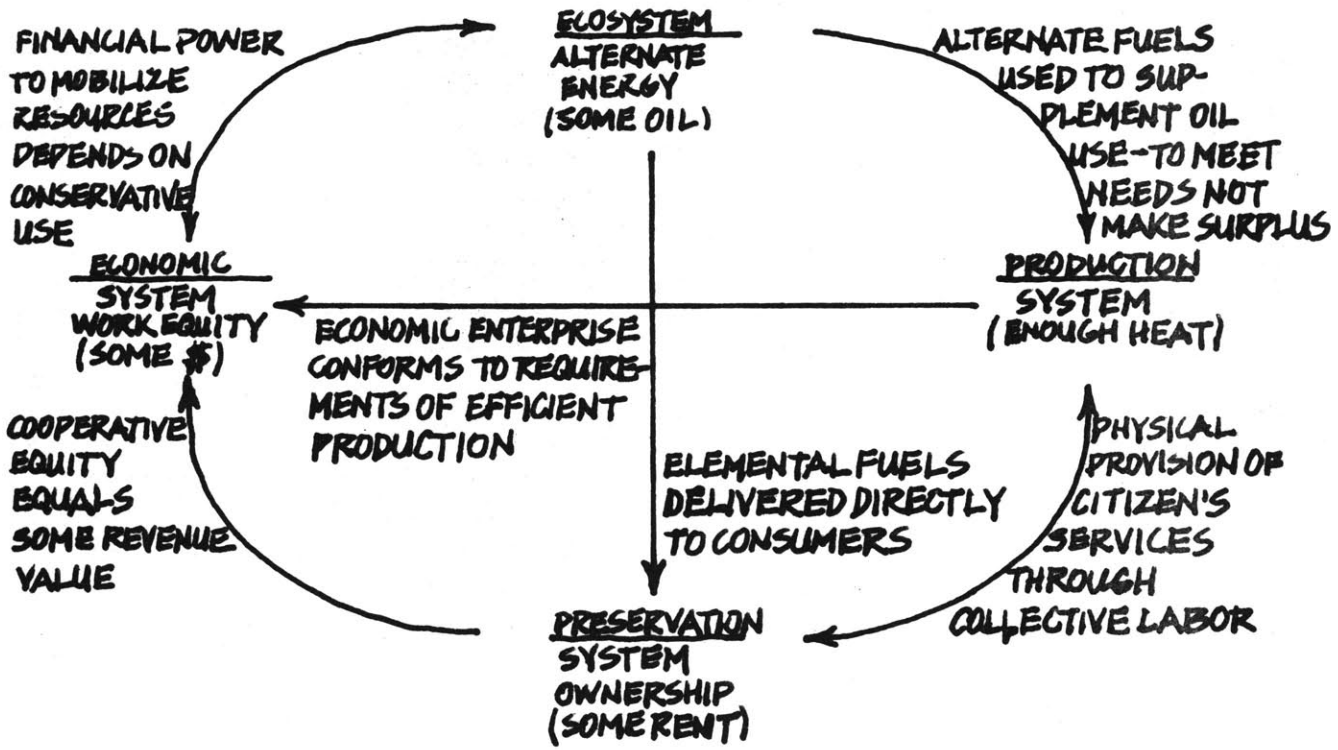
* based on ecosystem, production and economic system interactions stated by B. Commoner.



ILLUS. 1 – THE CYCLE OF CAPITAL-INDUSTRY

buys less (NO) oil which means that the cost of production goes up, then the prices of consumption rise resulting in fewer economic profits. In response to the growing scarcity of fossil fuels oil companies substantially raised their fees for cycling oil into (NO) heat goods, and drastically streamlined their production systems. Eventually, as increases were passed on in the cycle, through inflation in the NO RENT consumption system, economics dictated that the fundamental (NO) dollar worth of oil must escalate.

The growing problem of the finite availability of fossil fuel, causing disabling price escalation, can be overcome in one of two basic fashions. The first approach involves finding alternatives to fossil fuels that could be adapted to the existing uses of the capital-industry cycle. In this instance, the alternative energy sources would have to be renewable, and of a kind that could be utilized through the present large-scale, centralized production system. Elemental energy forms such as solar and wind energy are practically inexhaustible but they are not and may never be, sufficiently integrated into the existing production process. Nuclear energy presents an alternative that has immense pollution and safety complications, though atomic fuel is thought to be more compatible with centralized mass production methods. The successful substitution of any of the alternative energy sources for oil could allow the capital-industry cycle to continue profitably.



ILLUS.2-CYCLE OF ALTERNATIVE ENERGY

The other basic choice requires that the present capital-industrial cycle be deactivated and substantially modified to meet a new order of priorities based on the need to conserve and not increasingly consume inexhaustible energy resources. This second approach calls for the general adoption of inexhaustible fuels, but these must then be used in conjunction with a production system that is decentralized, more labor-intensive, and primarily responsive to the needs of long-term conservation - not long-term consumption of goods. Next, the present comsumption system must be made less dependent upon mass manufacturers and suppliers by having more direct access to the resources of the ecosystem and by having a means of acquiring economic benefits without total reliance upon centralized corporate enterprises. Finally, the economic system must be made to reflect the financial worth of resource presentation, rather than resource exploitation, by relinquishing net short-term profits in favor of the increased gross efficiency or resource utilization. Elemental energy forms have the potential for appropriate use in such an alternative cycle.

III. THE HISTORY OF 519 East 11th STREET PROJECT

"The family housing now being built in the older cities of the United States seems to be falling behind suburban housing from the view of affording some sense of identification between the family and its dwelling. The cost of land and the difficulties of relocation have led to an ever greater emphasis on high-rise buildings as the standard urban housing solution for families of low and moderate income."*

The 70's brought attempts to provide decent living space in quantities that would be hard to build at lower densities. Numerous high-rise projects were constructed in the core cities of the country, especially New York City. In some cases these housing structures presented environments that were foreign in the context of the surrounding community. In all cases these high-rise dwellings and their attendant services displaced some once vital portions of the existing neighborhood. Frequently, the scale of such projects seemed to be beyond any human dimension. Families, particularly young children, missed the sensitivity of a congenial, homelike atmosphere. Instead of environmental conditions being improved, designs for mass housing, and open space landscaping often remained sterile, offering no encouragement to despairing residents.

From energy aspects it became evident by 1972-1973 that the build-high-cheap-and-subsidize solution was not profitable, or advantageous for low and moderate income families. The social effects of family life in these rather anonymous homes were clearly unhealthy for young children.

Through first hand experience and administrative concern about how families identified with multi-unit housing, some urban developers modified their housing styles to provide a "low-rise" alternative. The New York

*Ed Logue, President of UDC

State Urban Development Corporation (UDC) joined with the Inst. for Architecture and Urban Studies (IAUS) to implement a program of low-rise high density housing.This program focused on such multi-dwelling requirements as providing a high bedroom count. In contrast to designing places that had high dwelling-unit per acre densities, the aim became to build housing with high density in terms of people per acre. Their general design objective was what might be called a "low-rise-lots-of-kids" solution.

Subsequently, working with local community groups, Model Cities agencies, and with various city administrators, the New York State Urban Development Corporation developed some real sites and workable programs which got some LRHD projects built. These projects were supported and largely made successful by governmental incentive programs such as 236 funding which permitted the construction of the housing to be done at an economical cost to families of low and moderate incomes.

Eventually, subsidies also became necessary for these families to meet the cost of living in, and managing the modern towers. With the sudden warning of fuel extinction, the cost of building immense amounts of new housing, and maintaining them soared to exorbitant heights.[9] Economically and environmentally, mass housing now spelled trouble for urban growth. The spiraling cost of fuel also paralyzed the seemingly boundless spread of suburbia. All avenues of urban growth preceded on the precarious dependency of oil.

The nation's problem solvers were finally confronted with the results of their consumptive solutions for growth: the survival of commercial and cultural life in the 1970's urban fashion depended upon large infusions of high-grade power. Because of the expendibility of oil resources, the increasing economic cost of using them had begun to make their low-cost

long-term applications impractical. Land and building investments could no longer yield profits supplied from fuel consumption tax benefits.

Car driving suburbanites suddenly had to start paying more for new cars,gas and oil, and briefly had to wait in long lines at petrol stations. These inconveniences were minor in comparison to those facing city inhabitants. City driving costs, which already were elevated, climbed drastically and that was just the beginning: public transport prices rose, maintenance and operating costs rocketed as utility and repair rates rose. In urban homes operating bills and rents multiplied steadily.

The low and moderate income housing being supported by city programs began to show signs of deterioration. As city production levels descended towards the rising levels of consumption, central city regions that could not profitably meet the cost of their upkeep began to be abandoned financially and administratively. Municipal directors began adopting strategies of "cut-back spending" to assure the most fruitful investment of the City's dwindling capitol resources.[10]

The City's Housing and Urban Development Administration (HDA) estimates that 30 thousand apartment units are abandoned each year in the five boroughs of New York City. Escalating fuel costs alone have caused enough profit shrinkage for landlords to abandon their properties. When a building is abandoned in New York City, and the landlord fails to pay taxes on the property for three years, the city takes over the property which then becomes "In-Rem". If the building happens not to be gutted by fire after it is vacated, it can be demolished by the city as a potential safety hazard. Wreckers have knocked down entire blocks where poor housing communities once thrived in the Lower Eastside and the South Bronx.

IV. The Account of the 519 E. 11th Street Rehab Effort

One "experimental alternative", which Mayor Lindsay took the interest to advocate during his final term of office, was a self-help rehabilitation program that could be financed at city cost to recover the beneficial use of abandoned structures. The acknowledgement by the city administrators of the need for a participatory-rehabilitation program brought urban self-help housing into the realm of feasibility. But specific directives for implementing a low-cost housing rehab effort in decaying communities did not arise in Housing and Urban Development planning.

Local Community Group Activities Leading to the Formalization of the Sweat-Equity Concept

Actual procedures for involving community residents in the redevelopment of their community evolved from the personal activities of some young planning workers interested in innovation and the labors of a determined and resourceful local housing organization called Adopt-A-Building.

Mike Freedberg, Roberto Nazario and Phil St. George all had evolved a concept of community action and were directly engaged, at various levels, in doing the work required to make these community and personal objective a reality. 519 E. 11St became the initial focus of the efforts being carried forth by these three, young men and others. Freedberg came to New York City having recently graduated from Yale, hoping to bring some positive new thrust to the housing activities of HDA. He and Phil,a classmate and colleague at HDA, elaborated on the notion of self-help rehabilitation through city assistance and set down guidelines that showed how the administrative capacities of HDA and the financial backing of the city could be utilized in equitable conjunction with local neighborhood organization and vital resources.

In an apparently prescient fashion, relinquished his job at HDA feeling that his efforts were too far from the source of the problem to produce fruitful results, while Phil remained in HDA's bureaucratic arena to establish the legal/administrative mechanisms that would be essential for the support of any city-wide self-help program. Subsequently, though their courses had seemingly diverged, their endeavors would combine constructively in the redevelopment of E. 11th Street.

Freedberg first encountered the situation on E. 11 St. through his work with a West Village organization called the N. Y. Switchboard. The Switchboard was a small group consisting of young people, like Freed who had gained enough technical expertise to provide some effective assistance to many of the counter-culture transients who gravitated to the village. The organization became in some ways a forum for the anti-traditional views of city life that gained credence during the sixties. But those in the Switchboard were not content just being a community mouthpiece. They also worked to adapt defunct building stock for the needs of the counter-communal folks in the area. Many uninhabited, city-owned buildings in the Lower Westside that would probably have been demolished for some future renewal project, were examined by Freedberg and others with the intent of converting them into crash-pads; places wayward,radical folks went to crash made in vacant structures through many of the city's older districts; the Lower East and Westsides, Ocean Hill-Brownsville, Harlem, Brooklyn and the Bronx.[11] The concept of community hostles had become widely accepted by the young generation now peopling the streets of the city, being aware of this emerging lifestyle the Switchboard made continual attempts to provide crash pads facilities at nominal cost and effort.

The New Necessity for Collective Housing

Essentially the Switchboard's efforts to convert vacant buildings for low-overhead transient housing responded to the growing need for housing alternatives. Mass housing complexes occupied most of the habitable region below Houston St.and the edge of Loisaida bordering the FDR Drive. Above 14th St., the northern border of Loisaida, middle and upper clas co-operatives comprised most of the affordable family housing. On East 11th St., within Loisaida, all the influence of the fuel shortages and the urban cutbacks had come together.

As the rate of urban mobility increases for families in urban communities, housing property changed ownership so often that it eventually became occupied by groups of residents who have no substantive authority over it, and thus, no active interest in it.

Most of the 70,000 inhabitants of Loisaida, which includes the 11th St. block between Aves. A and B, are Hispanic with the rest being of Black, Chinese, or White ethnic backgrounds. Over half of this population lives on welfare, unemployment, or in many cases receive social security benefits.[12] Reliance on public housing subsidy incomes had become common among families in Loisaida. Though dependence on the welfare system is hardly applauded by its recipients, the socially repressed attitude under which this alienated neighborhood labors makes this dependence generally acceptable to them. This situation is however, not construed by Loisaida residents in the broad objective context of municipal welfare/oppression, but rather in the much narrower, subjective context of receiving incomes without working. Such an immediate interpretation is justified first by the ironic fact that these people feel entitled to receive welfare compensation because of the physical, crime ridden conditions that they must live in, and secondly,

by the misguided modern presumption that a better life is one in which people are provided the necessities of life while participating less in acquiring these needs and spending more of their time in leisure consuming the products of progress.

This sort of misapprehension has led to the despondency and animosity generally associated with ghetto neighborhoods. Community development is impossible where individuals not only feel that they deserve a handout, but think such support is really the only viable means for improving their conditions. In this regard, it seems almost fortunate that the mass housing projects of the late 50's and 60's failed to alter the atmosphere of poverty in the Lower East side.[13] Had these institutional solutions succeeded the promise of real freedom for the folks of the Lower East Side would have been utterly denied.

The Emergence of Community Involvement in Loisaida

People had never thought about how their rent went to keep the walls painted and the heat working. They were so inconsideratly exploited by the landlords to whom their rent was paid that the tenants had to band together and assume management of their neighborhood before it became a totally abused and exhausted area like so many others in urban northeastern cities.

Puerto Rican, Black, and other ethnic groups occupied the low-rent and subsidized rent housing available along 11th and 12th Streets on New York's lower eastside. The turn of the century tenement buildings that were built throughout Loisaida around Tompkins Square Park now served as low-maintenance, amortized apartment houses owned by self-concerned real estate owners. These so called real estate owners

showed just enough concern for the occupants of the land to extract the monthly rent from them. Several styles were used to keep the rent rolling in; frequent eviction threats, promises of coming inprovements, participation in housing subsidy programs, among others. The agreed terms under which rents were received was not being used. Old doors and jimmied locks were not being replaced, nor were leaky pipes and broken windows and toilets. Heating, water, and, electrical supplies became intermittent or absent. Some residents would not go on under such living conditions and they began to assume the duties assigned in their leases to the building superintendent. Eventually these residents became concerned about how much of the rent money,which represented a big monthly expense, went to performing duties of the building superintendent. The Loisaida residents found that none of their sorely parted with rent returned to maintain the conditions of their homes. FUrthermore, it became clear that the long term security of these dwellings was of no substantial interest to the land owners, and rent collectors. Property taxes were not being paid, nor had back debts and taxes owed the city been attended to by the tenement-real estate managers. Anxious tenants organized to rectify this highly inappropriate flaw of financial resouces out of their community. The organized tenants of these buildings made the reigning slum lords confront their negligent,consumptive behavior. Unfortunately, though perhaps not unexpectedly the landlords responded uncooperatively. They withdrew all support from their housing property and left it to the dangers of theft,fire and urban removal. Buildings began to tumble before the blows into the wrecking crane company operation.

These buildings were being systematically identified and recovered by the folks working in Adopt-A-Building.[14] A-A-B made investigations through municipal real estate records to determine who the abandoned buildings

belonged to. Generally the records showed that the owners had not paid city taxes on the buildings for lengthy periods - 3 or more years. Due to this non-payment of city taxes, the city assumed ownership of the tenements. In their abandoned states the city opted to raze the dwellings to remove their responsibility for any potential safety hazards. A-A-B stepped forth and requested receivership of these buildings, proposing to restore them rather than destroy them leaving barren lots. This proposal was agreeable to city administrators because it saved them the expense of approximately $10,000 for contracting a demolition crew, and it offered the city a possibility of collecting revenue from a restored property at some future time.

The Acquisition of Abandoned Buildings by Local Housing Organizations

A-A-B's operations expanded to assist tenants of buildings owned by delinquent landlords)in forming tenant organizations that could assume control of the premises before abandonment fully set in. Through the tenant assistant and emergency repair programs A-A-B stimulated and trained many housing groups in Loisaida. Other organizations like Charas and Seven Loaves spread community awareness and a sense of cooperative potential while conducting a number of environmental and educational projects in the area.[15] An attitude of self-involvement emerged amongst the neighborhood residents of the district, and the means for collective participation existed in the housing and planning groups. Hal Landy, also from the Switchboard, and Michael Freedberg's search for a crash-pad facilities unwittingly brought the opportunity for constructive action that was needed to ignite a strong community effort to stop the deterioration taking place on 11th St. People who had resided on E. 11th St. for most of their lives watched their homes transformed into gutted

ruins, Occupants of 507, 509, 511, 513, 517, 533, and 535 E. 11th St. all became victims of desertion. Some of these residents eagerly gave their support to Freedberg and Nazario who were trying to keep from falling to the hands of City demolution crews.

Retrieving 519 from the wrecker's ball and hammers was only the beginning. Now that the structure would safely remain erect there was the task of making the building and its surroundings liveable again. The job of renovating the badly damaged tenement building posed problems that comercial construction companies could not overcome profitably. The willing and well aware people of 11th St. knew that they possessed neither technical skill nor the financial resources for undertaking the rebuilding job, but they took on the challenge anyway -- they had to, there was no other recourse.

The Cooperative Path to Homesteading

A group of folks committed to reviving 519 and the E. 11th St. block between Avenues A and B was formed including Tony Bruno, a young man with some experience in masonry, Karen Bennan, a native New Yorker who had come to 519 from the Switchboard, Joe Barnes, a young alien who had come to 11th St. through circumstances, Don Fernando Colon, an older man of some prominence in the neighborhood. A young couple, Santiago and Ann Gonzales, participated in the 519 cooperative, as did Eduardo Carabello, a teen-aged resident of the Lower East Side, who realized the need for committed individual effort, Carlos Garcia, a Lower East Side resident who has skills in plumbing and construction, Michael Freedberg, a graduate of Yale who had experience with house bureaucracy and ideas for change, Roberto Nazario, a member of the Lower East Side community who had already begun directly addressing local housing problems

through A-A-B, and Juan Rios; a neighborhood resident who had encouraged the people of 11th St. and gotten them involved in the 519 project. This group of people by no means completely represents those who contributed to the rehabilitation effort. (See Appendix for a more detailed listing of the rehab. participants.)

After the 519 Housing Development Fund Corporation was established and it was clear that the people of 11th St. meant business, a deal was made with the city where in they would sell 519 and the adjacent empty lot to the Corporation for $1800. Subsequently, Freedberg and Nazario began negotiations for a city loan of $177,494 based on a "sweat-equity" down payment. Hal Landy withdrew from the project because he could not accept the kinds of obligations he saw forthcoming. The loan proceedings took place at HDA where the Sweat Equity Program was initially set-up in conjunction with their co-op conversion program. This housing agency administered 519's construction loan under the Municipal Loan Program, while their office of co-op conversion[16] monitored the renovation process.

Such financial and administrative support was not provided merely at the request of the 11th St. neighborhood. A number of advocacy groups voiced there positions in favor of the Sweat-Equity Program on a city-wide basis. One such group, the Association of Neighborhood Housing Developers, aided 519 by maintaining contact with the city bureaucracy and eliciting its full cooperation. Further help was given 519 by the Urban Homesteading Assistant Board (UHAB) which supplied technical assistance in arranging legal and financial matters for all Sweat Equity Projects.

Self-Help Rehab Procedures

Through the concerted labors of these administrative and technical assistance groups, and the 519 Corporation ,the building's reconstruction began to take shape. Somewhat oddly, the first task that the Sweat Equity undertook was their own form of demolition. This work largely required mountains of debris that had piled up to the third floor to be removed from the building's interior. The demolition process also included removing partitions, tile and marble stair treads, wood wainscote base and all interior trim. Cracked, blistered, or otherwise defective plaster on walls and ceilings had to be removed. In the instance of 519 fire damage was so great that most of the floors, ceilings and roof were obliterated in the rear half of the building, requiring complete replacement. Unused conduits, drains, water pipes and the bulk head skylight had to be taken out. Mechanical and electrical systems had to be pulled out to make way for the new alterations; besides they were not functional after the fires.

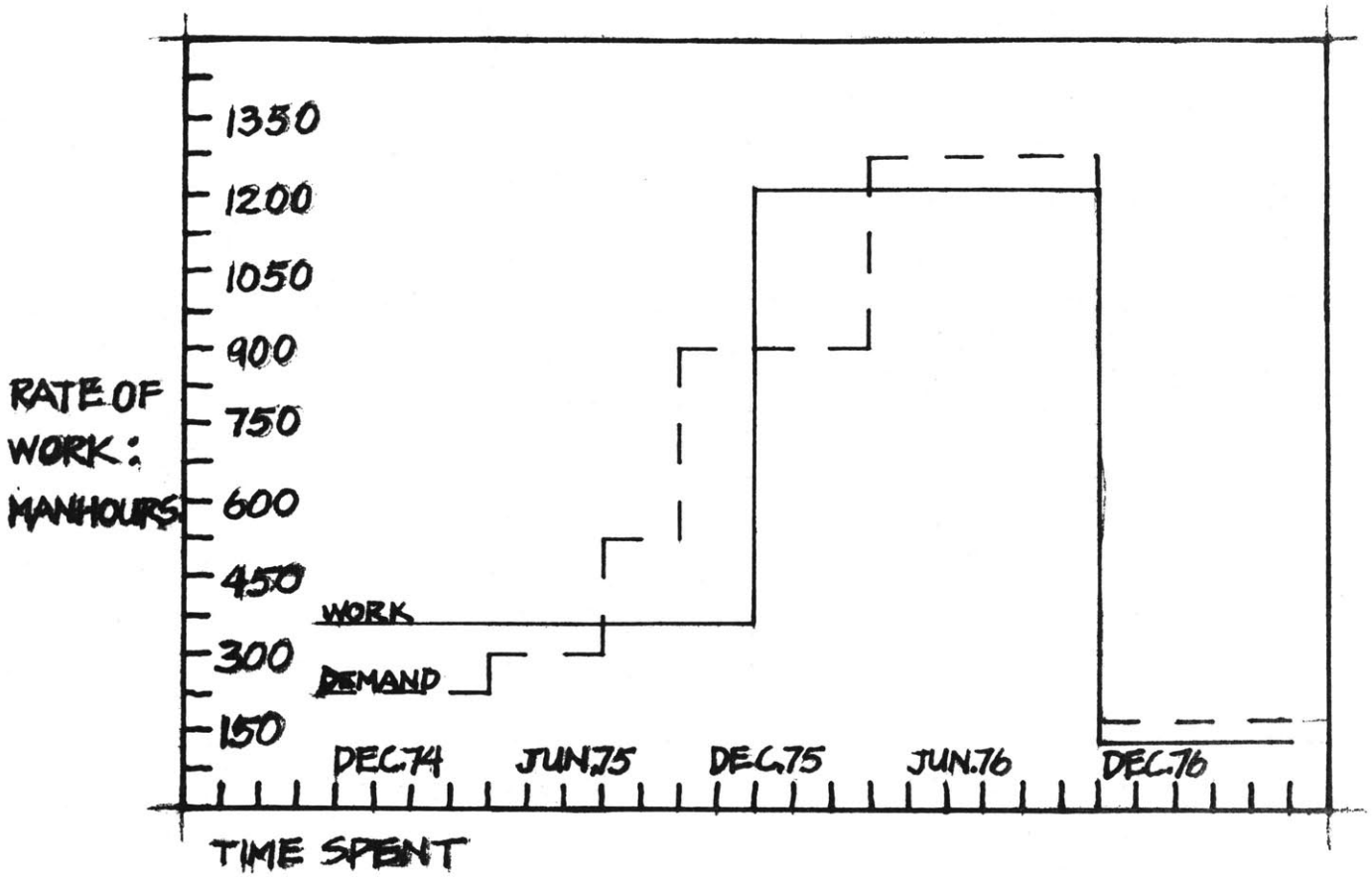
The demolition work began in the fall of 1973 as negotiations for the city loan were in progress. The severely cold weather that the crew had to work in was the least of their problems. Fire damage had rendered all floor and ceiling supports hazardous. Workers constantly had to avoid holes and weak spots in floors, and prevent piles of rubbish from accumulating and putting excessive loads on one area of floor. Dust created by the removal of plaster became such a nuisance that piles of trash would be watered down slightly before their removal.

Even the act of rubbish removal so often referred to in the rehabilitation specs was no easy operation. Chutes of metal with wood bracing had to be constructed outside windows so that debris gathered inside

the building could be slid down these chutes and away from the building to huge metal bins called 'dumpsters'. These large dumpsters had to be ordered from one of a number of companies that would deliver a bin within a few days after it was ordered. Anticipating the need for a bin was never simple. Consequently, trash piles would grow rapidly while the demolition crew awaited the arrival of an empty bin. Sometimes the dumpster would be so packed with debris that they could not be moved away. Instructions had to be given to workers as to what materials could be thrown into a bin and how much of them.

Anticipation was a skill that the members of 519 learned quickly in proposing methods for implementing Corporation work plans. Procedures, no matter how thorough, were really only good as a rough list of all steps taken to complete the work at 519. Through all stages of the rehabilitation work problems like the one of coordinating the bins during demolition grew and had to be met by crew supervisors. Cooperative duties and daily administration of affairs had begun at 519 even before it became a corporation. All the members of the cooperative had some ideas about how the necessary construction procedures could be carried out. Some members had taken on the administrative roles required to pry the loan out of New York's municipal machinery.

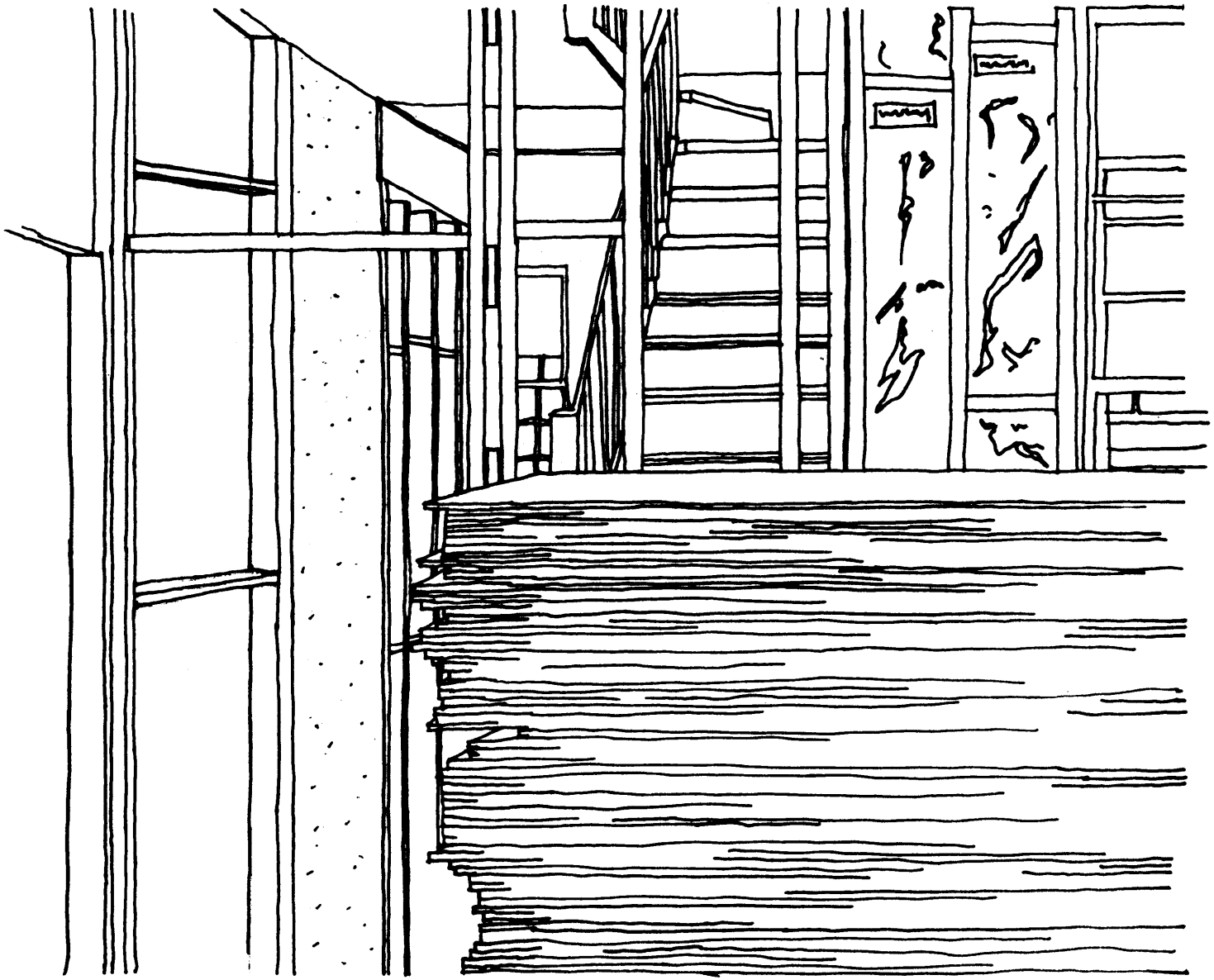
These individuals became general decision arbitrators, and performed buying and book keeping tasks , while continuing the removal work in the building. Though the clean-out work was demanding, especially for the greatly unaccustomed workers of 519, the rate of work demanded to move the project ahead could be supplied sufficiently by the workers.



ILLUS.3 – RELATIVE COMPARISON OF GROUP WORK TO JOB DEMAND DURING PROJECT

The work pace picked up as demolition gave way to masonry repairs and heavy carpentry work. As more and more time was spent on construction replacing hundreds of floor and roof beams there was less time for collective considerations of all matters. Group participation gave way to subgroup delegation of immediate tasks; clean-out work continued on some floors while beams began to be replaced on others. Places for storing a growing number of tools had to be found as did suitable locations for storing construction materials. With increasing frequency the number of operations that could be done at one time in the building caused the 519 crew members to become so dispersed that their effectiveness as a work force seriously diminished. The crew was already small, about 12-15 people, depending on who was helping, and either due to inexperience or the sheer lack of hands, work could quickly reach a tedious pace. Large pieces of slate could not get moved from the building at the same time that 2x4's were being brought upstairs, or new beams were being cut. Those working on beams would have to stop and carry down slate slabs, and them maybe everyone would bring 2x4's up to a place where they could be kept securely until needed.

When the construction budget was drawn up funds were allocated for the hiring of a construction supervisor who would manage the on site operations. Supervising the work of a crew the size of 519's may not seem such a difficult job in itself, but the work supervisor, Tony Vivolo, was also expected to teach individuals how to use various tools, and direct all the complex detail work that was commencing. Vivolo, of course, was trained and had worked in the traditional craftsman situation where work is carried out



ILLUS. 4

using all the experience, coordination, and refined equipment of a contracting company. Adapting his knowledge and skills to the task of directing the crew at 519 often became demanding because the builders there were anything but contractor types. Communications, even got confused at times because Vivolo's older-style methods of construction, especially in wood framing, did not often appear appropriate for completing the jobs that the workers were undertaking. Feelings sometimes flared as a novice worker would give into frustration while trying to learn a particular building technique; or Vivolo would express displeasure at the level of craftmanship he observed in the work.

In spite of distractions and shortcomings the work continued at 519 as the old infra-structure began to take on a new shape. The process of collective action within the 519 Corporation began to take on new aspects too. When the members of the 519 Corporation assumed the roles of renovators, owners, and future co-op managers they took on much more than just the task of making better houses for people to live in. Only as the project unfolded could the workers at 519 start to realize the extent of the obligations layed before them. The finest apartment renovations that could be built would not alleviate all the other problems that the cooperative must face; using individual initiative to make decisions and provide solutions in the best interests of the tenents collective, redefining personal priorities to coincide with the needs of cooperative management -- not personal convenience, redirecting individual motivations to strive towards group improvements as well as singular successes.

The Residential Transition from Individual Dependency to Collective Inter-Dependence

Neither the Federal or municipal programs, nor bureaucratic or social agencies designed to resolve the problems of communities like Loisaida have ever given an initiative to these communities' members to make their own decisions, to make their own answers.[17] The 519 Corporation had now won the position of having to find all the answers from corporate policy to financial management, to construction procedures. The people of East 11th St. first had to recognize that they could salvage their neighborhood. The members of 519 had to recognize that as a housing development corporation they could make decisions and take action. With each action that the 519 Cooperative determined to undertake the participants learned more about their capabilities and how they could be used to procure whatever resources were necessary for the revitalization of the block; engineers, and architects could be brought in; writers, business men, bankers, and politicians could be brought in as their services were required. All kinds of work could be carried on at 519 in cooperation with established professionals as long as there was a fundamentally clear understanding by all; that if you were a professional you were there only to fulfill your role as a professional. They (the organized community members) were the ones who were going to decide...what policies were going to be set and mandated for their communities, blocks, and buildings...how to control the economy of their community.[18]

Through the organized efforts of A-A-B and the 519 Corporation municipal housing and real estate officials were forced to recognize the rights of Loisaida residents. Vacant buildings are not knocked down any more; they are being sealed up by city contractors using cinder

blocks, as suggested by the 519 Corporation, not sheet metal. In-Rem property in the area does not go up for public auction without the approval of local housing organizations like A-A-B. This governmental recognition of the 11th St. community has done more than improve housing activity and conditions; such considerations have served to encourage the workers of 11th St. and other blocks in Loisaida, to ignite new and resolute assurance in them that no matter how poor, or how unskilled they could learn to play constructive parts in their community destiny.

If any one of the community's residents watching the initial stages of the work at 519 had been asked if they thought the building would be finished, the response would have been an unanimous "no". Community spectators thought that the crew, working sometimes in sub-freezing weather, was insane to make such attempts at rebuilding the ruined 519 tenement. The general feelings of the neighborhood went from a notion that the workers would loose interest in the job, to one that it would be too expensive a venture, to a position that the resident owners would have to go on welfare in order to pay their rents. These changes in community opinion took place over a period of months during which substantial progress was made in the construction work.[19] Plywood and beams were being installed on the roof, and on all of the floors in the rear of the building.

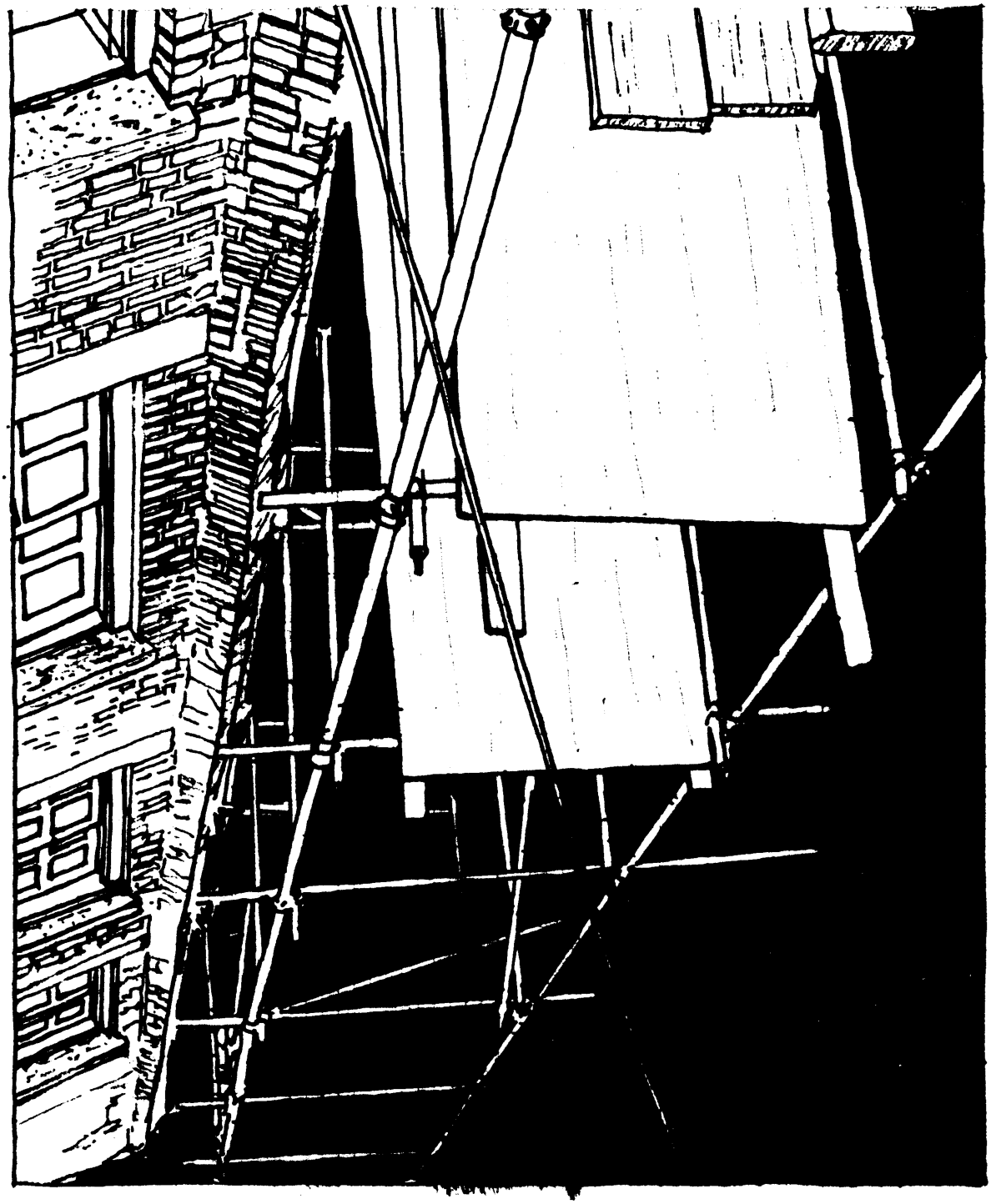
Some members of the community like Juan Rios and Eddie Carabello had overcome their skepticism and were actively involved in the work. Their active support of the project made other folks consider that the project might succeed, and that they could help it succeed. A con-

tinual dialogue was carried on between the neighborhood and the 519 Corporation by resident Corporation members like Juan, Eddie, and Roberto. Slowly, more residents began to understand the issues that were focused around the 519 project. The explanation of the issues and activities developing at 519 to the other residents of 11th St. enhanced their identification with the idea of self-helf rehabilitation.

The Liberties of Low-Energy Construction for 519's Rehab.

In these mechanized modern times it is difficult to imagine major construction work being carried on without motorized tools like cranes, or catepillars. At the 519 job site, however, the only motorized accessory to be found was a small, gasoline powered manually controlled winch. Though this might sound like a minor piece of equipment, it was certainly advanced beyond any devices used by original builders of 519. Manual craftsmanship was of course more heavily relied on in the building of the late 19th century. Plasterers, woodworkers, and facade ornamentors were greatly responsible for the integrity of 519 and the many other tenements surrounding it. The quality of construction provided by the craftmen's hands could still be recognized even in the aged and mangled structure of 519. Twelve-inch brick walls still rose soundly through the rooms of plaster and burnt wood. The window and cornice detailing on the from of 519 was convincing evidence that "Buildings are not made like this any more".

In a fashion almost réminiscent of the tenements' original era, small teams of workers maneuvered 14 and 16 inch beams from stacks on the sidewalk to a place half-way back alongside 519's east wall. The beams would then be secured in a sling and hoisted to an upper floor where they could be cut and guided into place. Approximately 300 transverse beams had to be replaced, and some new beams had to be added to provide



ILLUS. 5

support where an interior wall once stood. Diagonal braces had to be inserted between beams which were from 16 to 20 inches apart. Plywood sub-flooring then had to be laid in over the beam-work. Much experience was gained in cutting and fastening timbers, and working at heights during this process.

Accomplishments of a Maturing Housing Cooperative

From all quantitative indications the Sweat Equity Rehabilitation process seemed to be successfully providing essential low-cost housing resources and significantly improving the community participants' development opportunities. Participation in the construction work and the actions of the 519 organization had substantially increased the neighborhood's levels of initiative, communication, and cooperative effort. Individuals who were very dissatisfied with the conditions they had to live in, for whatever reasons, had joined their productive abilities. People had adopted objectives which were concise and consolidated enough for them to become committed to a collective task.

Residents had initially banded together to protect their housing rights and prevent real estate administrators from continuing to exploit them. Not only had legal and financial control of a group of tenement buildings been obtained, but the 519 Corporation also was developing a potential for self-reliance through the construction and co-op management skills that its members exercised. In spite of local and municipal indifference, and financial opposition, the 11th St. community had made some resolutions about the future of its housing property, and these resolutions were being carried out.

Through hard work and chance the advantages of practical economy, low-rise design, and community workers' equity had been put to use in the community residents' interest. The economic advantages of using collective resources conservatively are clear in the face of the wasteful mismanagement that had led to abandonment on 11th St. These advantages need no further explanation.

The qualities of low-rise design are of course implicit in the basic structures of the tenement buildings. The four to six story buildings originally housed sixteen to twenty two families.[20] 519 is a five story building with the benefits of architectural features such light wells between adjacent structures; these won recognition as good detailing when 519 was built. The railroad flats were built to require low maintenance, and facilitate occupancy by a number of low income family groups. The walk-up access to apartments kept the scale of the buildings small enough to be made manageable without elevators. Although the original interior plans of 519 were not adequate for the needs of the original, crowded-in occupants, the space proved versatile enough to accommodate the renovated apartment layouts designed by the 519 Cooperative. Instead of the four almost identical apartments formerly on each floor, with two central bathrooms in the halls, the plans that were finally agreed upon called for three apartments on the first, fourth, and fifth floors - two studios and one two bedroom unit, and two apartments on the second and third floors - one two bedroom, and one three bedroom unit. The new 519 plans had thirteen apartments in three architectural variations.

The Redesign of 519's Interior

The plans for the renovated apartments primarily reflect the need for the efficient, simple erection of materials in construction, and the minimum installation of plumbing and heating lines. The essential occupant requirement that was considered was provision of as much uninterrupted room space as possible; this meant reducing circulation space to the minimum, and combining room functions where feasible. All apartment kitchens and bathrooms were arranged to utilize a single plumbing stack in the front or the rear of the building. Living, dining, and kitchen areas were interconnected in all cases to maximize the versatility and volume of the space, and eliminate the need for hallway connections between separately enclosed areas.

The somewhat unconventional apartment designs were accepted by all the members of the 519 Corporation, who held few preconceived notions about the physical character of their housing units. The single feature which 519 members demanded most was having as much unrestricted living space as possible; high ceilings, clear floor area, and windows were most sought after, even at the expense of some occupant's privacy. This demand for uncluttered living space was so strongly expressed that the 519 Corporation chose not to comply with the HDA standards[21] that specified where egress and interior accesses should be in relation to specific use spaces; for instance, front doors were not to open into kitchens, and bathroom access could not be directly off the living area. Such HDA standards were frequently deviated from.

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Appropriately enough, most of the deviations that were made during the construction of the 519 rehab produced significant functional improvements in the final physical shelter. As a result of unfamiliarity on the part of HDA with low-income space preferences, maintenance requirements and service needs (i.e., heating and utilities), the design recommendations and building standards imposed by New York City inspectors and agencies were inadequate in facilitating the eventual housing support that 519 needed. Instances arose where future tenants working on the rehab had to make a visit to the housing administrators at HDA and emphatically explain why they wanted rooms that were termed not up to code by housing regulations. The advantage of such design modifications being made by the crew was one that was created by the crew's self-help rehab method. The future tenant/workers could come to terms with the physical consequences of the architectural building specifications through their role as builders. Consequently, many "custom-fitted" details could be simply included in the construction of 519 that would not have emerged from standard contractor building. Apartments received different flooring and kitchen equipment, different ceiling and finishing details, and slightly different room configurations among other items.[22] Paving and tiling patterns always reflected individual building styles; usually tiling added an interesting diversity to the building. When construction plans were obviously not appropriate for serving 519 they could be refined decisively and smoothly.

One particular area where standard housing specifications would have disasterously misguided the renovations at 519 was the little publicized area of heating and energy conservation. In the 519 construction budget that was prescribed by the city estimators, only $300 was alloted to purchase wall insulation for the entire building. This misappropriation might have gone undetected if a young pioneer-minded architect named Travis Price had not brought the potentially detrimental consequences of this situation to the attention of the 519 crew. What may have appeared as a cost reduction for the sake of economy would actually have led to an unnecessarily enormous long-term cost for 519.[23] Essentially, not having enough money for adequate wall insulation, by not installing any, 519 would have saved approximately $6700 in initial material expenses. This immediate savings, however, would soon be lost as the co-op managers of 519 paid steep prices to keep their building warm. Preliminary estimates, made on conservative assumptions, showed that if 519 invested the funds needed to buy substantial building insulation then after 30 years, the length of the loan mortgage, the tenants of 519 could save $119,760 in heating fuel cost.[24] If the cost of heating equipment for a poorly insulated building is added to the heating fuel cost then 519 could potentially save $195,210 after 30 years of paying conservative annual fuel prices. These long-term fuel savings were not the only aspects of energy conservation that Travis outlined for the people at 519. The benefits of greater self-reliance which were being gained through sweat-equity and cooperative management could be enhanced by the incor-

poration of energy conservation and solar water heating techniques. Just as self-help rehabilitation had proven viable for furnishing suitable housing, reduced fuel consumption would promote the subsequent maintenance of that housing.

Though the members of 519 had very little understanding of the principles of alternative energy the same inclinations that had led them to undertake the gut rehabilitation of 519 now turned them almost implicitly in favor of the utilization of energy saving systems.[25] Even while some people felt that Travis' proposal to use the sun's power at 519 was rather 'way-out' the 519 Corporation had developed a risk taking mentality during their rehab campaign, and were encouraged that the utilization of such innovative methods would provide them with new self-sufficient benefits. After much discussion with Travis about the mechanics of applying insulation and solar heating and serious consideration of the proposed advantages, the 519 Corporation approved the unprecedented addition of these energy techniques to the tenement's renovation. But approval by 519 was only a beginning. No financing had been provided for any energy conservation systems, and construction costs had run higher than anticipated already. The 519 crew was willing to help with the work on the system, but Travis would have to take on the difficult search for material and construction funds. The 519 Corporation had been in the position of having unconventional plans and no money to realize them before; there was strong expectation that the problems of acquiring insulation and solar heating would be solved. However, the arrangement formed with Travis Price, as a technical assistant, was unlike any pre-

vious working agreements with technicians. Formerly, when technical assistance was called for, specifically in the fields of plumbing, electrical, and boiler installation, money was available for hiring tradesmen at economical fees to perform the work. 519 members would work with the tradesman on the installation, and in some cases perform tasks that were indicated by the tradesman to reduce his overall labor costs. Through this collaboration with technicians 519 workers also acquired additional technical construction skills. By working with technical assistants in this manner the primary objectives of cooperative self-help were served: technicians were directed by the 519 Corporation to assist only as technicians, not as doctors who would prescribe their cures for the problems of 519. The collective 519 commitment to include energy features in the renovation of 519 placed them in an unusual technical assistance arrangement. Complete financial responsibility, and almost total organizational management was relegated to the technicians who would provide assistance in the unknown realm of energy uses in buildings. The opportunities for folks at 519 to participate in the tasks of planning and constructing the energy reducing additions were limited practically to the process of installing 3½ inch batt and 1 inch thick sheets of polyurethane in the exterior walls of the building.

Fortunately, construction of interior partitions in 519 had not begun, so it was convenient to include the wall insulation in the composition of the walls. The already remote possibility of having some sort of solar space heating provided in 519 was eliminated because risers

for the building's one-pipe steam heating system had already been placed. The 519 Corporation came to the conclusion with Travis, that wall insulation, storm windows and a solar water heating system could be incorporated feasibly into the reconstruction of 519. The working relationship reached between the 519 crew and the solar/conservation technicnans would serve to strengthen the 519 cooperative's abilities to maintain comfortable housing at conservative financial costs. By drawing on the elemental resource of sun,and reducing the consumption of fossil fuel, in conjunction with sweat-equity construction savings, the subsequent costs of operating the apartment cooperative could be lowered. A maintenance and operating cost of approximately $35 per room was aimed at to keep apartment charges reasonable. Access to energy conserving techniques furthered the building's chances of achieving greater self-determination and housing development skill.[26] The utilization of solar energy gave the tenents a reliable alternative to conventional fuel resources. Dependence upon expensive steam boiler repairmen could be reduced significantly. Heating machinery that required specialized technical maintenance would be replaced by solar heating components which could be kept functioning by any 519 workers who were acquainted with plumbing, welding and general water heating system operations. Acquiring control of an energy system that is still considered to be beyond the technological reach of the urban establishment 519 attracted an increasing amount of publicity and became a symbol of positive changes in the 11th St. community. But this recognition and influence was attained

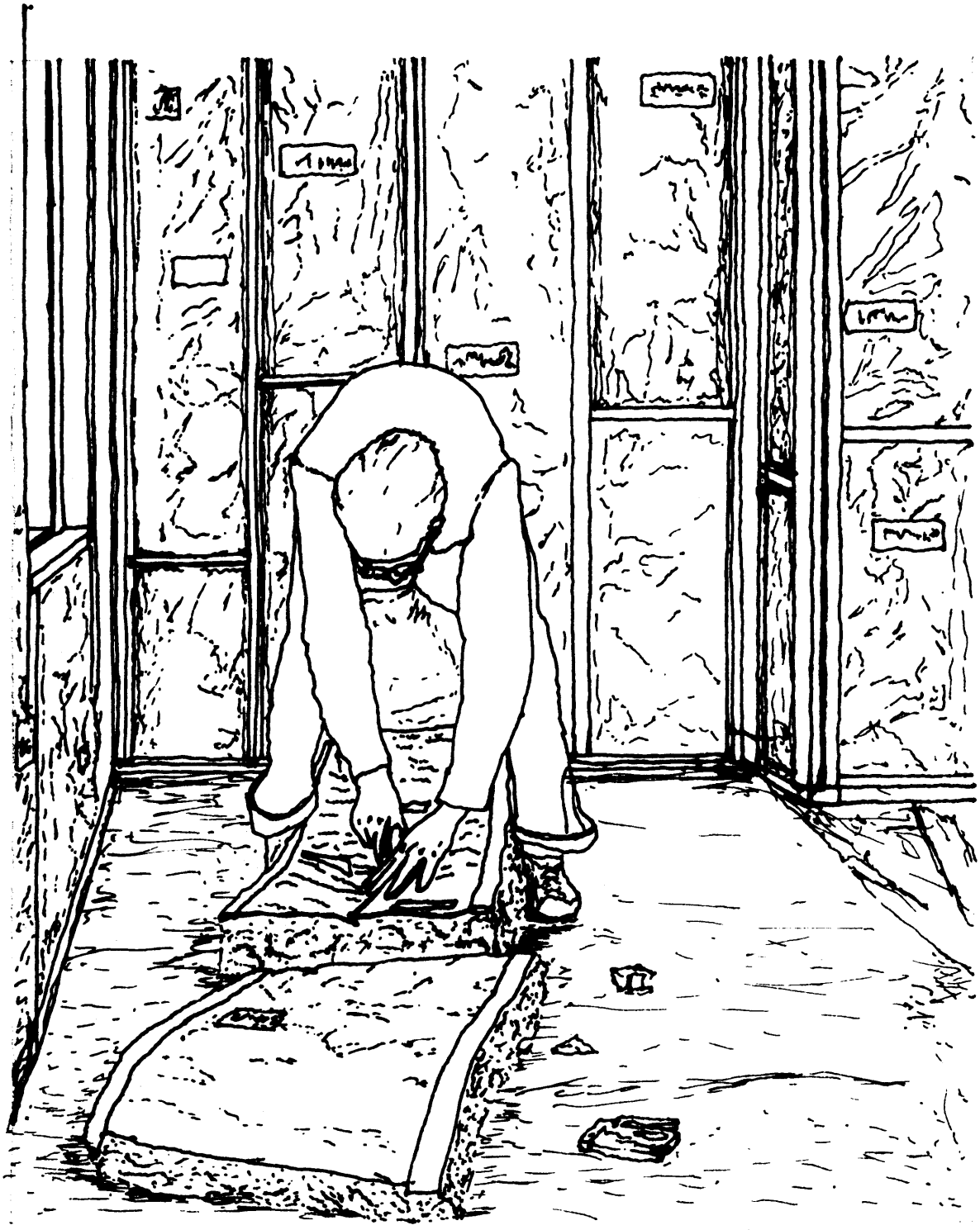
solely through 519's unwitting dependence upon the energy consultant's services; a dependence that could conflict with the collective goals of community-reliance.[27]

Incorporation of Alternative Energy Techniques in 519's Rehab.

By the end of summer in 1975 the construction workload became so overwhemling that the 519 crew relegated responsibility for all energy affairs to Travis Price. A result of the determination and and ingenuity on the part of the the enthusiastic architect, was a federal grant awarding monies for insulation and solar retrofitting.

The Community Service Administration grant,[28] approved in June of 1975, was not received until that October thereby delaying retrofit work until that time. Most of the exterior refinishing work, including the entirely new roof had been completed during the spring and summer. Interior stud-walls were erected in conjunction with the installation electrical and plumbing lines. Workers were anxioux to close-in and heat the building before the cold of winter arrived.

Travis and a couple of architectural students, who had joined as participants in the energy project, commenced the process of installing insulation so that walls could be sheetrocked. The 519 crew installed msot of the Owens-Corning fiberglass insulation (R-11 type). Insulating was generally a simple task, but care was necessary to insure the covering of spaces, and prevent holes from being punched in the insulation's reflective backing.



ILLUS. 7

Everyone had their own style of working so that maintaining standards in installations for each apartment was a concern. Consequently, each individual had to concentrate on making their apartment meet building requirements. Work began to be done in the basement which had served primarily as a storage space for tools and materials used throughout the rest of the building. A concrete basement floor had to be poured so that the boiler and oil tanks would have a place to go when they arrived. Tony Bruno, the chief mason,and I mixed concrete continually in a small portable mixer that we set up in the air shaft between the front and rear parts of the cellar where the slab would be poured. Batch after batch of concrete was churned out and trowled in place faster than we could dump in the rocks, sand, and cement for the next batch. By the end of the day concrete was being mixed out in front, at street level, and brought down to the rear of the basement in buckets to augment the supply from the mixer. There was somehow a feeling of exhilaration among the exhausted 519 crew at seeing the basement slab in place...

Ordering and starting materials have more consequence than one might anticipate. 10'x4' sheets of polyurethane were ordered, but 8'x4' sheets, 1" thick arrived at 519 from Dow-Corning. Ceiling heights of 9'6" therefore required the fitting of an additional piece of polyurethane, instead of simply trimming a single sheet to the proper length. Space for storing materials was always scarce and excessive amounts of insulation and sheetrock were needlessly damaged. Of all the construction elements involved in the interior of the building, the walls seem to be the most tedious to build. Construction defects in wall assembly

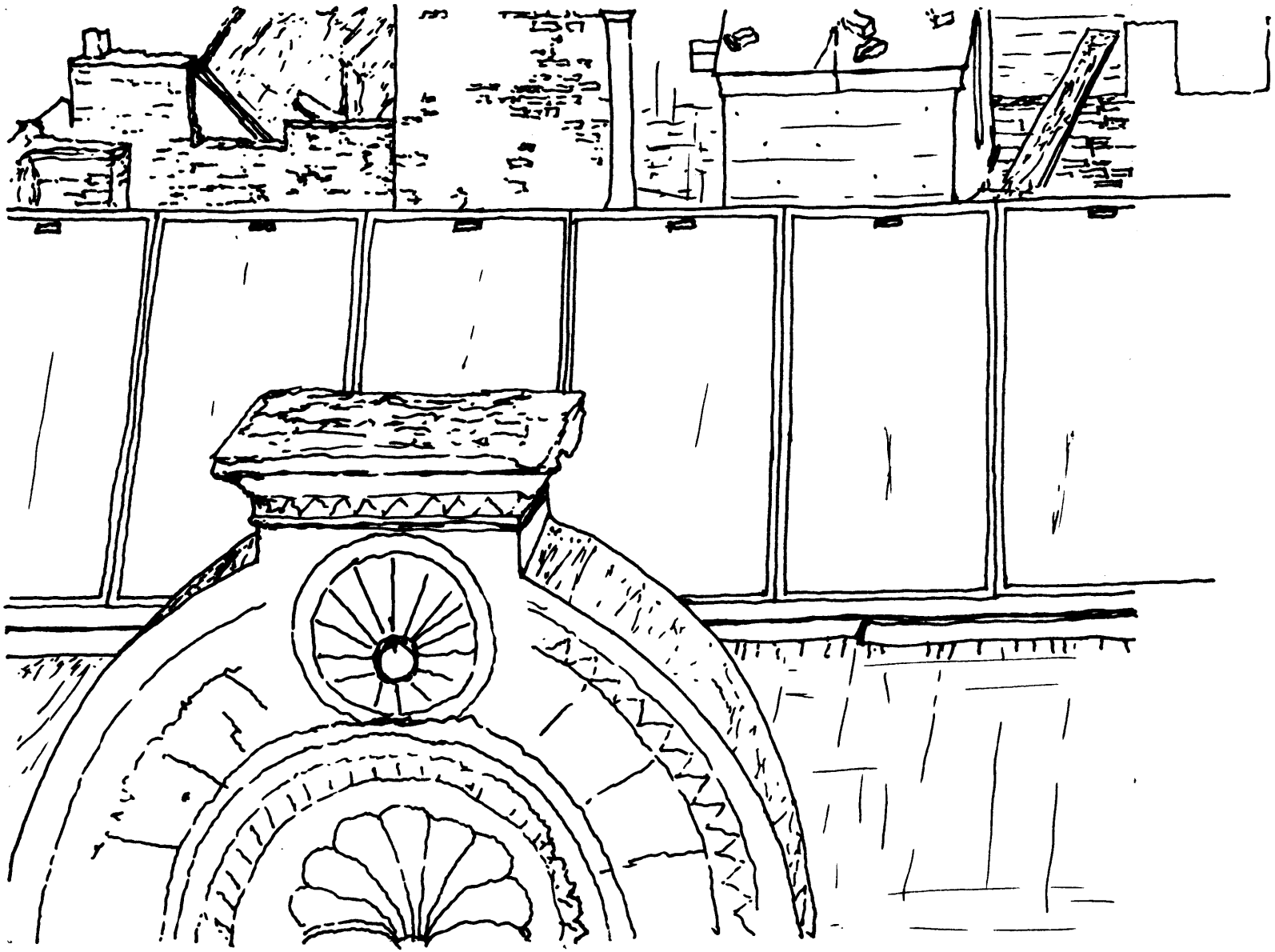
were sometimes dreadful; as more layers were added, continuity had to be maintained from studs to sound-proofing, to insulation, to sheetrock, to plaster-finishing. This seeming straight-forward process of sheathing walls became involved because all the passive, and some active building controls were built into the walls. Now the crew had to live with its craftsmanship.

Installation of the Solar Hot-Water Heating System

While work proceeded on the interior of the building the components for the solar water heating system began to arrive. 30 water-cooled Sunwork's collectors were received and hoisted to a fifth floor apartment where they were primed and painted. Bright contrasting colors were chosen for painting the panels. The components for the system did not present nearly as many difficulties as the construction of collector supports on the rood did. Building codes specified:

1. that nothing could be built on the roof surface;
2. that the support structure could not restrict access to any area of the roof by firemen;
3. that the support structure should meet fire safety regulations.

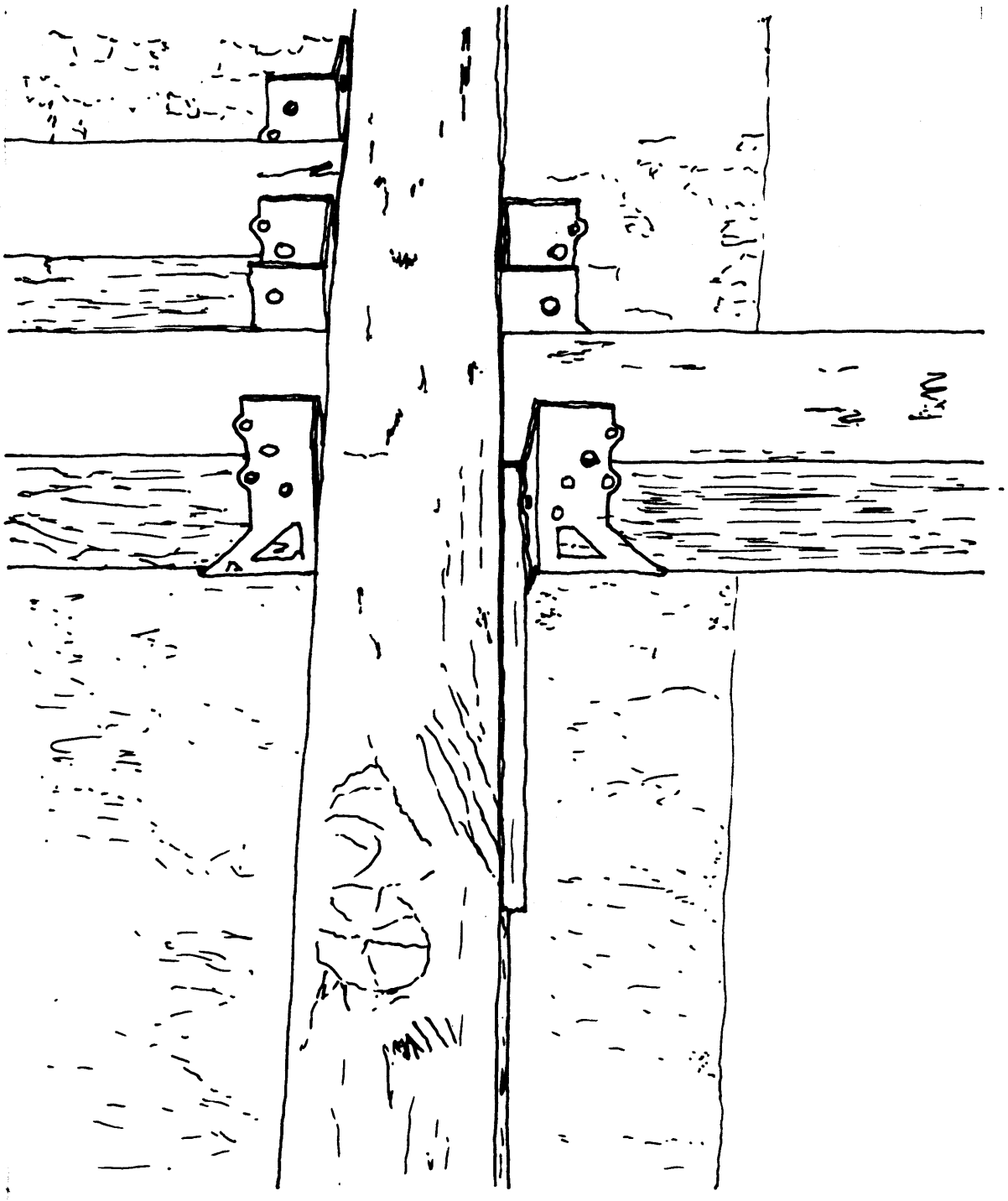
The building solution that was settled upon was to contruct a space frame of wooden 4"x4" members that could span the width of the roof and support the collectors. These support frames were to be anchored into the parapet walls which measured about 24' apart on the roof plan. In actuality, the width of the roof caried as the weathered parapet walls leaned in and out; so careful measurements had to be taken at the points on the walls where the frames would be mounted. Roof elements like the parapet ornament, vent stacks, and the bulkhead cast shadows that made large portions of the roof unsuitable for the location of the solar



ILLUS. 8

collectors. The small proportion of roof area to building volume seriously limited the amount of collector surface which could be placed on the tenement. The 618 square feet of collector surface used for the hot water heating system were arranged in three rows from the front to the rear of the roof: the first row had six collectors with an area of 123 square feet, the second and third rows had twelve collectors each, totalling 492 square feet. Not many more collectors than those thirty could have been included on 519's roof. The use of wood allowed the flexibility and simplicity of construction that was needed to adapt the support frames' designed to the physical conditions. The wood construction required more labor-time than would have been necessary for assemblying a set of prefabricated metal members. The wood frames had to also be protected against fire by sheet metal sheathing. But the price of designing a prefabricated metal frame would have been markedly greater than the amount spent for the wooden frames. Furthermore, building tools such as hammers, electric saws, and drills were adequate for building the wood frames. However, plumbing work involving welding was required to connect collector loop supply and return pipes.

In the basement a rear door had to be removed, and part of a wall had to be dismantled in order to bring in the hot water storage tank. In fact, the size of the tank (550 gallons) was restricted by the dimensions of the boiler room. A considerable amount of piping installation and electrical work was involved in setting up the storage and distribution portions of the system. Although most of the components used in the system were conventional, except for the collectors themselves, the layout of the solar system required specialized design expertise.



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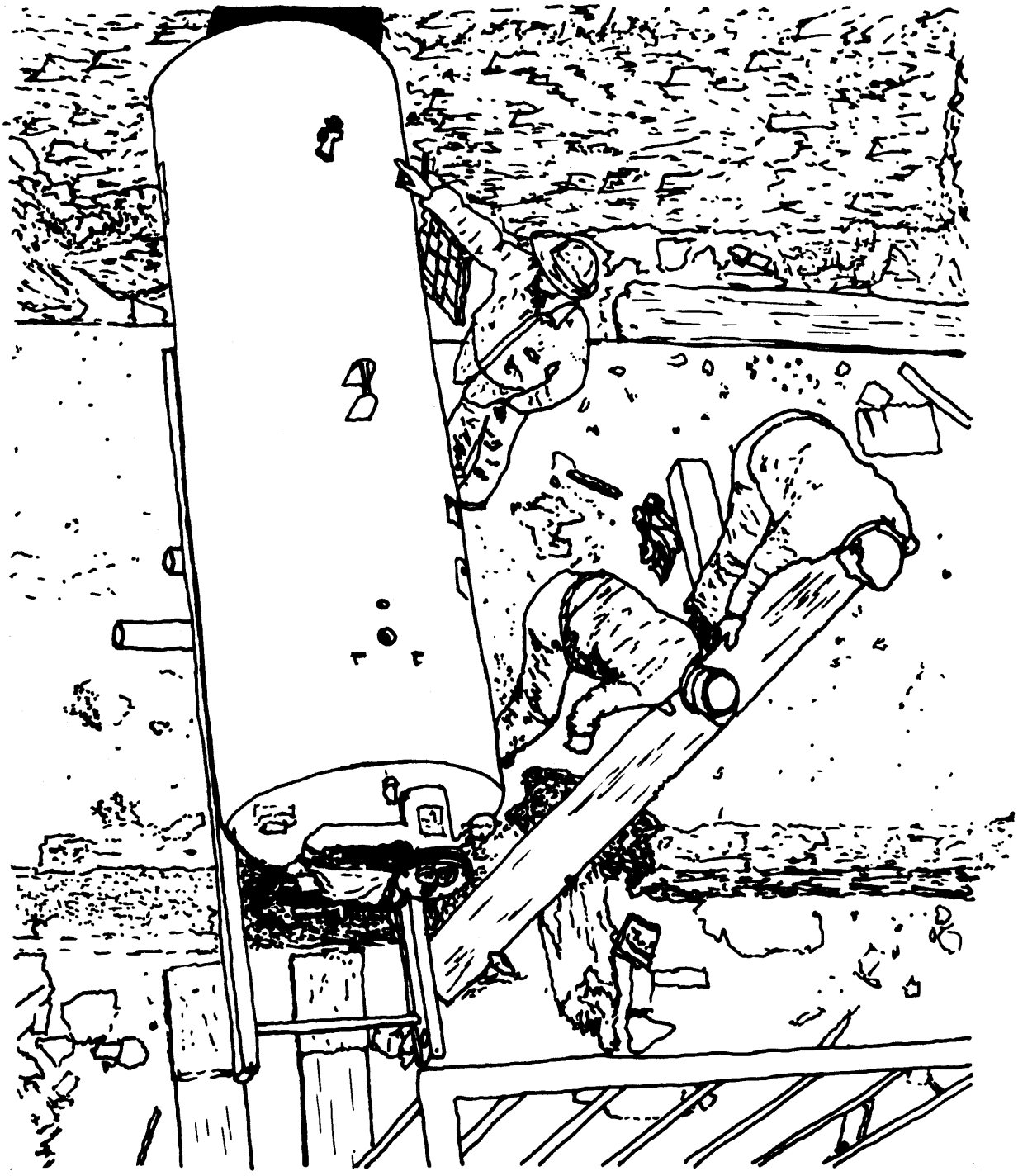
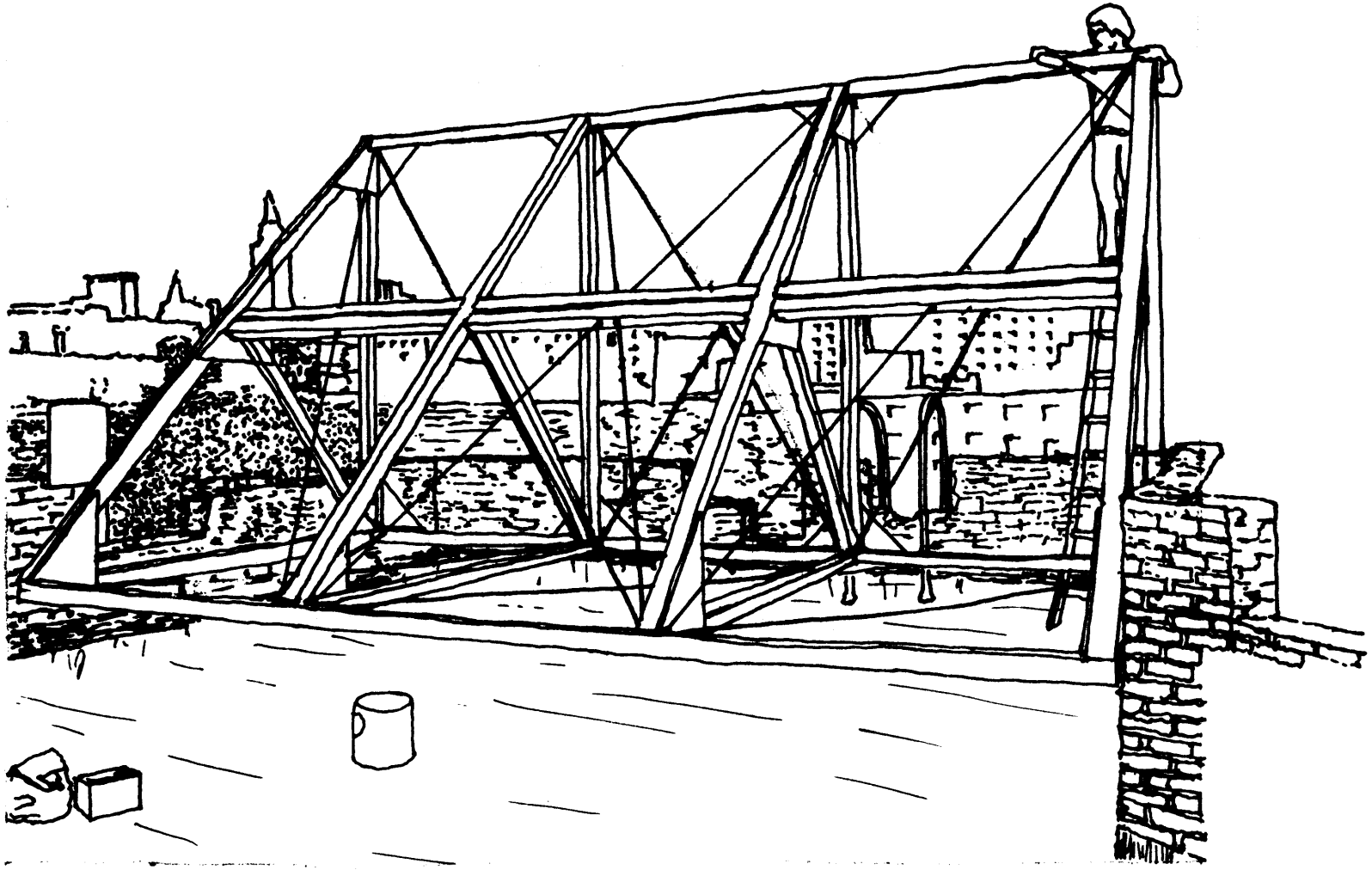


ILLUS. 10

Fees paid for consultation with mechanical engineers and work done by plumbers and electricians were kept to a minimum throughout the project. Construction costs were kept down due to the donation of construction labor by the technicians who laid out the system. The costs of the system might have been further reduced had more time been spent finding inexpensive suppliers. As the completion date of 519's rehabilitation approached, the urgency grew for getting the solar water heating system operational. Individuals at 519 had given their support for the addition of alternative energy in a singular, rather than a collective manner. Appraisals of the advantages provided by energy conservation and solar water heating diverged widely.[29] Consolidated community acceptance of the unconventional use of energy hinged upon the actual performance of the insulation and the solar energy system.

Maintenance Costs-Savings From Energy Conservation and Solar Heating

Solar collection commenced on March 16, 1976, shortly after the occupancy of 519. The overall heating fuel bill for the building after one year of operation amounted to a cost of $48/room/year for No. 2 grade fuel oil-a total of $2016. Using as a comparison estimations of a maintenance/operating cost of $110/rm/yr it becomes evident that annual operating expenses for 519 were considerably reduced. Since other operating costs were virtually eliminated (maintenance, and minor repairs) by 519's cooperative self-management the reduction of the building's energy cost effectively diminished 519's price of upkeep by 50%. The appropriateness of sweat-equity and resource conservation as tools for urban rehabilitation had been demonstrated with the financial cooperation of both federal and state governments.



ILLUS. 11

V. PERSONAL INTERPLAY DURING THE 519 REHAB

The individuals who had joined together in the 519 Corporation learned to contribute their ideas and their labor toward a concerted building effort. These people were willing to work within the boundaries of cooperative participation. They became disciplined enough to manage themselves and the affairs of a construction job. All the issues and responsibilities of the gut rehabilitation job were brought forth and addressed by the 519 workers at their weekly Corporation meetings. In these meetings was where consideration of all matters took place: up-coming tasks were scheduled; past work progress was assessed; technical and logistics problems were discussed and resolved; apartments were chosen and exchanged if two people desired to do so; personal difficulties with the work were voiced and suggestions for improvement were made; reports of relevant activity in the municipal sector were made; strategies for handling anticipated administrative obstacles were made; request for new individuals to join the 519 Corporation; or for present members to depart from it were considered.

Changing Community Models

Not everyone could conform to the demands of working in a collective fashion. Some individuals had personal needs that could not be made subordinate to the necessities of the organization: some people wanted to help with the construction but did not want to move into 519; others wanted a place in 519 but could not put in their sweat-equity because of other jobs they had; some folks who had begun working on the project could not continue because family expenses were so great that added income had to be sought elsewhere; a few individuals simply were interested in

personally exploiting any opportunities that the cooperative afforded them - they were probably the most dangerous elements that threatened the success of the rehab project.

In general the Corporation meetings became longer as the 519 project proceeded. The number and proportion of issues that emerged during meeting increased steadily. Initially, meeting discussions were about commitments required from the members of the Corporation and the daily roles that each member performed: how was work on the masonry proceeding? When will the electrician come to install the breaker boxes? How much more plywood would be needed? Had it been ordered, when would it arrive, and how much would it cost? Who would work on the parapet walls? Who would order 2x4's and pick up more nails? Why were some workers late arriving on the site in the morning? Two of the most frequently considered issues in meetings were how much sweat equity being done and how much sweat would have to be done according to the financial climate at the time, and secondly, who would do security in the building overnight during the week?

Eventually, the intensity and complexity of the construction work mounted to a level where the time needed to comprehend and coordinate the construction operation became so great that there was less time spent actually performing productive work.[30] This problem was compounded by the fact that seven workers had discontinued their involvement in the project who were originally part of the crew.

But progress was continually achieved by the remaining 519 workers. The problems posed by the work overload did, however, generate some

severe disagreements among 519 workers as to how the work load should be handled. Some people felt that all the workers should concentrate on one task at a time until it was completed while others on the crew felt that workers should take on whatever jobs they were good at executing. This way the work would proceed more efficiently, it was thought.

Group Coordination of the 519 Project

By April 1975 the members of the 519 Corporation had to divide their attentions among several areas of activity. Primarily, the rehabilitation of 519 required skillful judgement and planning in three basic fields of operation:

1. Low-cost construction;
2. Collective community organization
3. Technical utilization.

Low-cost construction played a vital part in the process of 519's rehabilitation. It was critical to the project that the members of the Corporation become skilled enough in some construction trades to build responsively and efficiently enough to meet work schedules economically. Not having had much building experience the crew of 519 began building with the disadvantage of losing time and wasting materials due to inexperience. This difficulty was slowly overcome as individuals became adept in certain techniques, and assumed construction duties which required these techniques. Work was therefore performed most efficiently by the crew when a sufficient number of individuals had gained skill in all the operational aspects of the job. Skills in fundamental aspects of construction-carpentry, masonry, plumbing- were suffi-

ciently developed to complete the successive stages of construction, with the exception of finishing work,[31] where a large portion of work was done slowly and in some cases, inadequately.

Collective community organization provided the 519 crew with the incentive for participation and later permitted the bureaucratic awareness of administrative restrictions to be responded to productively through their cooperative efforts. The community perspective held by 11th St. residents had to be persuasively stated to city housing and real estate administrators in order to secure their cooperation. The interest of Loisaida and other depressed neighborhoods like it had to be actively represented at municipal policy levels during the city crisis of impending default. Local resident awareness and neighborhood agency coordination also had to be achieved to sustain community commitment and action. Within the 519 Corporation collective organization was essential to the effective group resolution of problems, and to the continual accomplishment of assignments by individual workers. Without planned collective participation the capabilities of the participants often cannot be most usefully applied to the on-going work being done. A sense of accomplishment and know-how was a rather intangible, yet very important source of motivation for the 519 crew. If work progressed swiftly then the crew had a sense of confidence and direction. If work was going poorly then the crew became doubtful and distracted. Collective involvement, even through weekly Corporation meetings, gave each individual a sense of identification with and appreciation of the work being done by all the other individuals on the crew.

The Prudent Utilization of Technical Resources

Technical utilization of expertise beyond the immediate scope of the 519 renovation required sophisticated planning on the part of the Corporation coordinators and detailed construction collaboration on the part of the 519 crew.

Building codes specified that some aspects of the construction work had to be approved by licensed tradesmen. Legal and financial transactions made by the 519 Corporation frequently necessitated the assistance of professionals in those fields. The preliminary, yet involved task of filing applications for municipal loans, and city approvals demanded close consultation between technical advisors and the Loisaida applicants. The existence of non-profit groups like A-A-B and UHAB promoted the type of technical participation where sweat-equity groups chose cooperative targets to work toward, and technical assistants undertook the negotiations necessary to reach those targets.

As a consequence of working with technicians who were not preoccupied with gaining profitable fees the 519 crew could accomplish many technical assignments through sweat-equity that would otherwise have been charged for by the technicians. Close cooperation between the 519 Corporation and specialized professions served to widen the scope of influence that both parties had. Members of the 519 Cooperative attained practical expertise through their experience with technicians and thus became more adept at resolving technical problems. Specialized professionals at times undertook roles in occupationally unrelated work, preparing paperwork that an over-taxed municipal office was unable to handle immediately.

519 had the distinction of becoming the first multiple dwelling in Manhattan to make use of solar heating and fuel saving insulation. During the coldest winter in over a half century the tenants of 519 were able to live comfortably and reduce their dependence upon technocratically controlled exhaustible resources. (See Appendix II)

VI. REFLECTIONS ON SELF-HELP HOUSING

The sweat-equity renovation of 519 comprised accomplishments over a wide range, from the motivation and training of community residents to the implementation of new fiscal and administrative procedures for city-wide redevelopment. Cooperative reoccupancy of 519 East 11th St. signified the long fought for reversal of abandonment on 11th St. Having proved that self-help redevelopment was economically productive the city has been persuaded to sponsor the renovation of four more vacant tenements by other groups on the block. The sweat-equity development program had proven to be an effective alternative to the various programs that had been legislated in response to the steady erosion of the inner city's housing stock.

Alternatives Afforded by Sweat-Equity

Buildings in Manhattan alone are being abandoned at the rate of 1,000 per year, casualties of increased maintenance costs, and declining profits. Saving abandoned dwellings from demolition became almost hopeless due to the exorbitant costs of renovation and the prohibitive interest rates for mortgages. Inspite of massive federal subsidies, low-income housing rehabilitation was becoming a thing of the past.

Urban homesteading, by turning the ownership and management of abandoned building renovation over to community residents, offered a promising option for dying urban neighborhoods. Sweat-equity financial procedures provided community groups with the critical ability to replace cash with their collective industry as an initial investment. Investments made by housing groups on the basis of sweat-equity precluded the need for large sums of capital that would ordinarily be used for downpayments. The capability and influence of a community can be maximized by the

collective involvement of the residents. Tasks too extensive to be performed by individuals can be successfully completed through group effort in a fashion that is agreeable to all. In case of 519's rehab collective involvement was supplemented by the individual work of crew members in finishing their own apartments.

Through the direct participation of 11th St. residents in the redevelopment housing they could comprehend the process of rehabilitation, identify with its problems and solutions, as well as gain confidence in their personal abilities and merits. The participants in the 519 rehab learned that financial, political, and technical obstacles could be overcome through their determined efforts. In addition to the attitudinal benefits of direct participation in the rebuilding of 519, the workers acquired buildin skills through hands-on-training. Construction techniques were learned, utilized and then made available to other interested community members, all while the tasks of rehabilitation were being accomplished.

The cost of and dependency upon expensive technical services were eliminated by the professional assistance which A-A-B, U-HAB, the Energy Task Force (the newly organized alternate energy group), and other technicians provided. The members of the 519 crew played optimal parts in the execution of all technical aspects of the work, instead of having this work done for them.

After the construction work of 519 was completed the cooperative ownership and management, made possible through sweat-equity, put control of the renovated housing in the hands of the residents, making them directly responsible for building improvements, which they have learned the skills to carry out. Ownership adds to the community's sense of local identification with their environment, and increasing a potential

for greater self-development in the neighborhood. This response to ownership has been evidenced on 11th St. by the cessation of destructive car-stripping on the block, and the concern of neighbors for the security and preservation of 519 and the adjacent vest pocket park. Cooperative management is particularly effective in minimizing the long-term maintenance tenance and operating costs of the 519 apartment units.

All these factors contributed to the alleviation of many of the problems faced by urban renewal and neighborhood housing programs of the sixties and seventies, and the successful re-establishment of vital community activity in Loisaida.

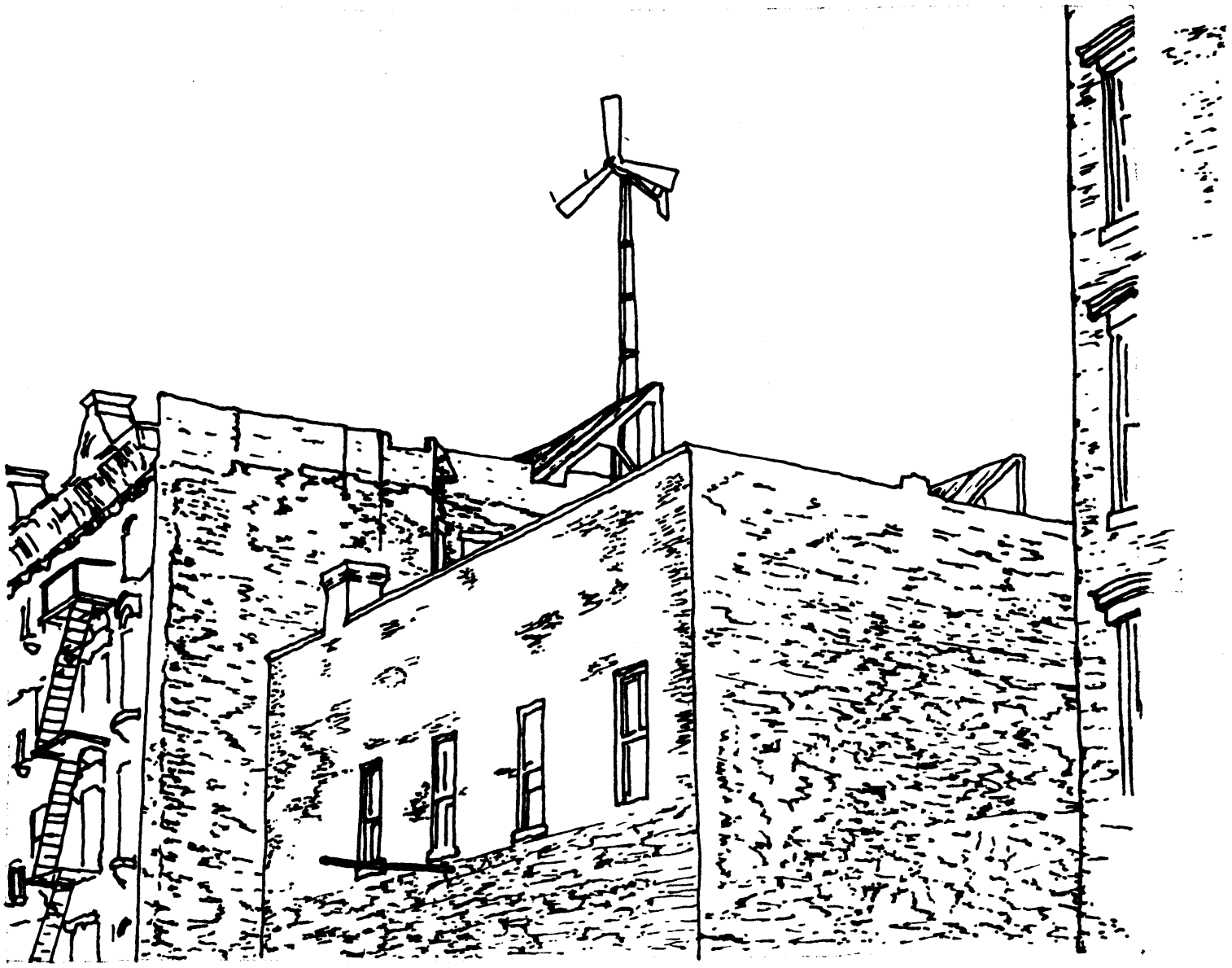
Making Self-Help Reliable

The rehabilitation of 519 East 11th St. was among the first sweat-equity projects to be completed along with 948 Columbus Ave., 251 East 119th St.,and 2149 Pacific St., Brooklyn. Many of the circumstances and procedures encountered by these projects during their pioneer building efforts, have been eliminated, or refined as the result of their accomplisments. A lost of experience has been gained by communities who became more self-reliant in order to survive in urban environs that had become barren around them. Rejuvenation of single buildings connot counteract the deterioration of entire neighborhoods. Those involved in the building of better low-income housing saw their efforts not as an answer, but a beginning. In actuality, the continuation of community rehabilitation is the most essential requirement for the eventual prosperity of the residents. From the standpoint of long term participation and growth the rehabilitation process that the crew of 519 followed has proven very successful. Work on three other buildings is being completed under improved sweat-equity training plans. The agency that administers CETA (Community

Employment Training Act) provided funds for workers' financial support (a significant problem at 519) during the construction of the three buildings. At the level of building operations efficient construction depended upon achieving a state of harmony, where the action of one individual worker reinforces, or compliments the endeavor of the other workers. Responsive construction supervision and refined building methods have brought greater capability.

Making Residential Energy Use Compatible with Local Community Development

Ultimately, the success of any community initiated development effort depends upon the individuals in that community. Matters of who would sign Corporation checks, what working hours should be, and who would do security maintenance and minor repairs still had to be decided and carried out. The expediency with which decisions are made and enacted depends upon what commitments the members of the rehab group have to the collective, and those which they have personally. If the group is deeply committed to reaching its collective objectives, as the 519 Corporation and other sweat-equity cooperatives have been, then the plans and procedures that have to be organized, and the technical assistance that has to be coordinated for construction efforts will not prove troublesome. On the other hand, the members of the 519 crew had individual commitments and motivations which not only urged them to quickly master construction skills and proficiently contribute to the progress of thw work, but also urged them to want the individual expression of and identification with the housing they occupied. Sometimes collective resolutions



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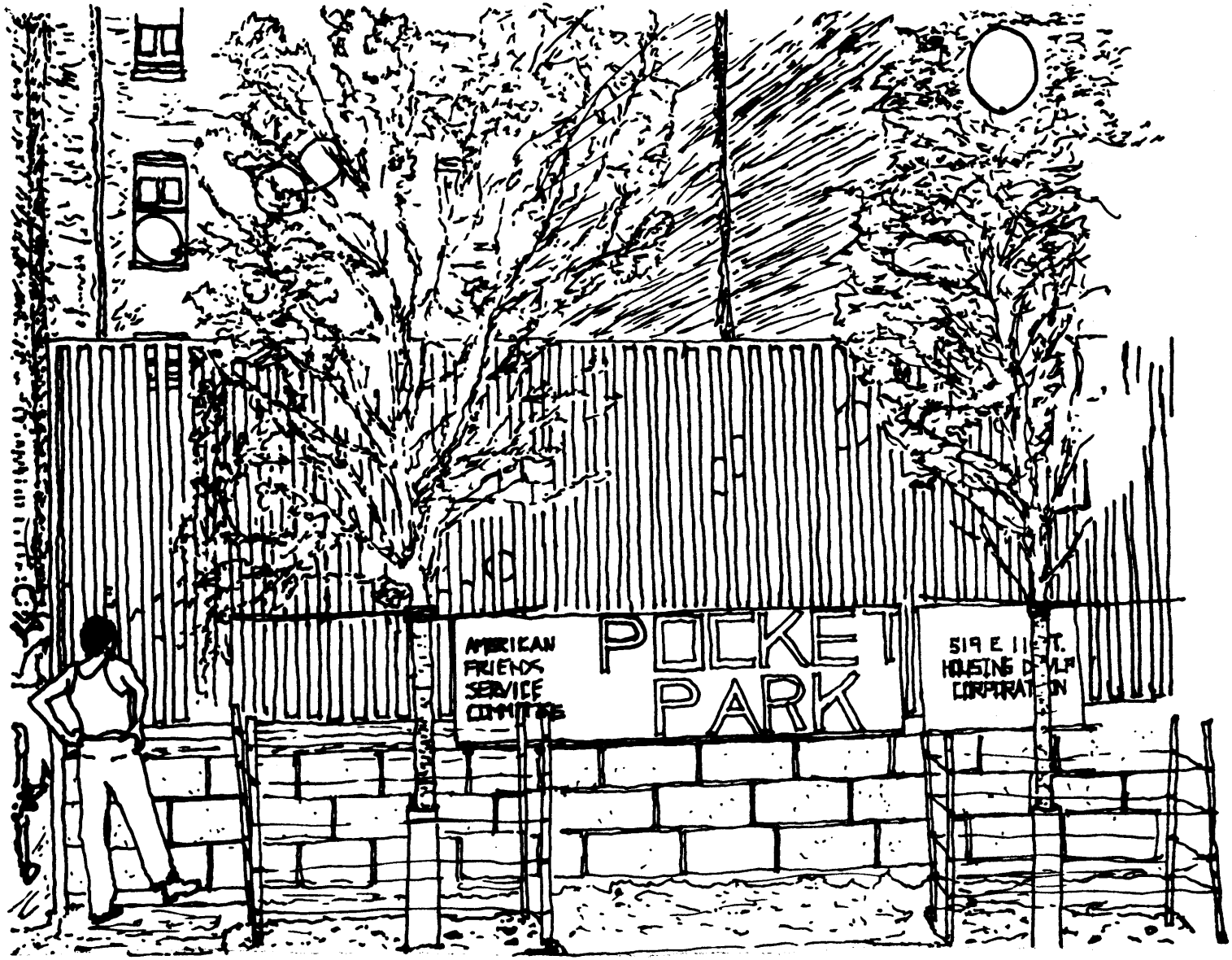
conflicted with individual preferences. When conflicts arose they were always somehow overcome through action taken by the 519 Corporation members.

In subsequent community housing development projects these principle considerations must be addressed: low-cost construction skills, financial and legal procedures must be learned thoroughly enough so that long-term building maintenance can be performed by tenants, and even jobs requiring construction expreience can be taken on to provide economic self-sufficiency; strong collective leadership has to be founded to coordinate development projects, and the technical assistance that is needed to maximize the projects' contribution to the neighborhoods' renewal; low-energy techniques that will reduce rents and operating costs, such as energy conservation and solar heating must be adopted in construction plans, and the principles of conservative resource use should be implemented throughout the neighborhood; subsidiary projects such as cooperative business, vest-pocket parks, cultural affairs, and food growing greenhouses can supply the opportunities that discouraged, yet concerned, residents need to get involved in the life and growth of their urban homesteads.



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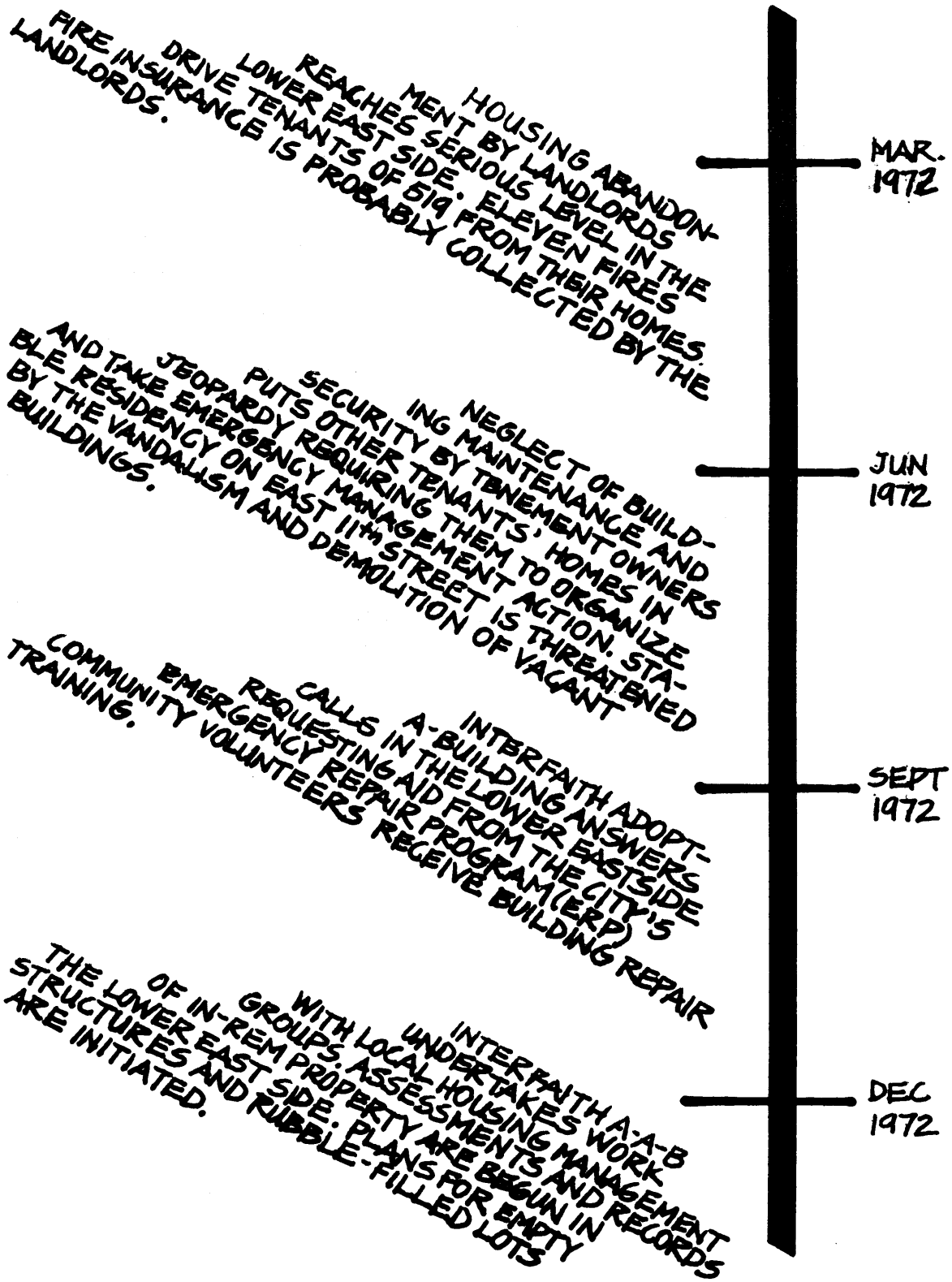
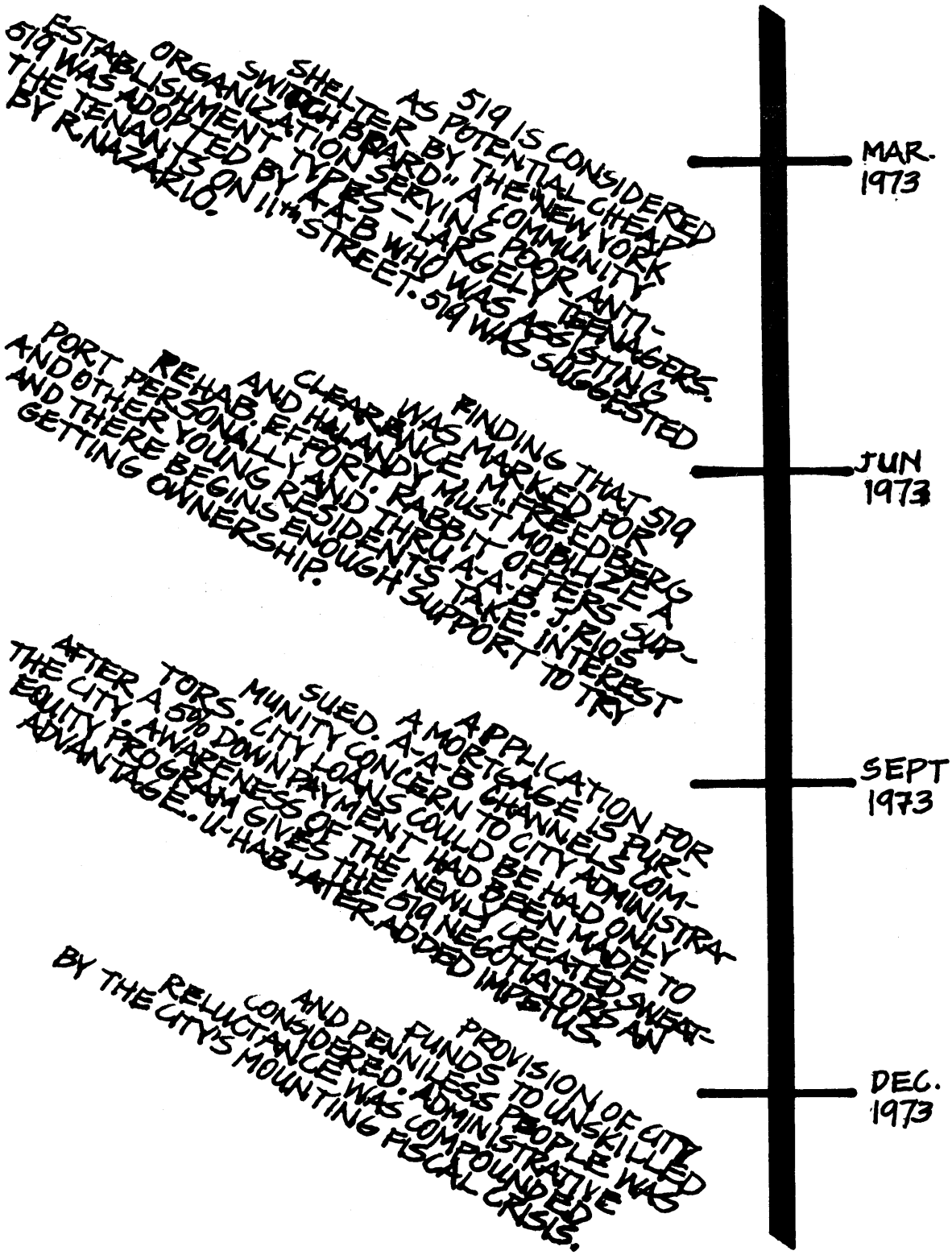
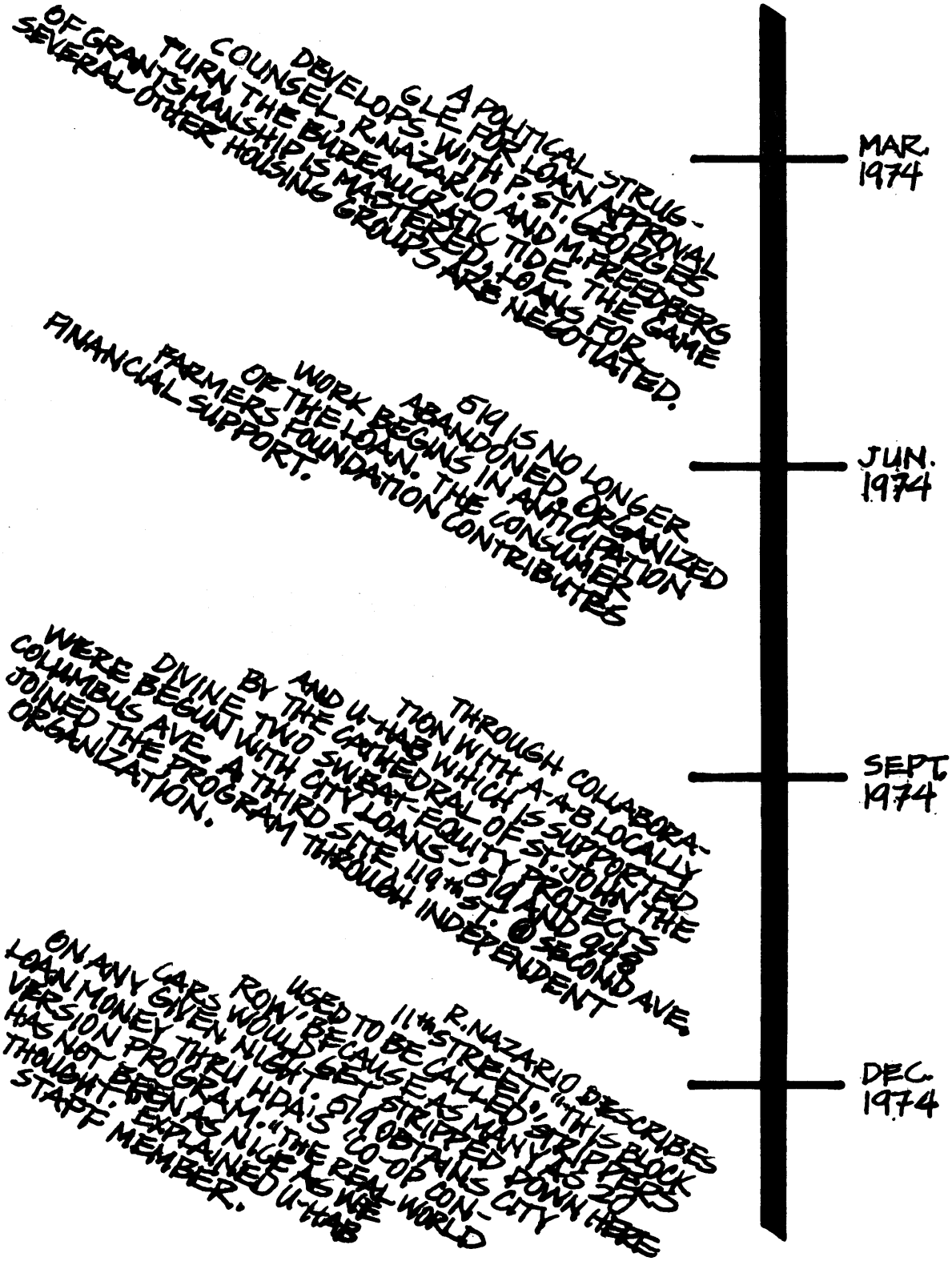
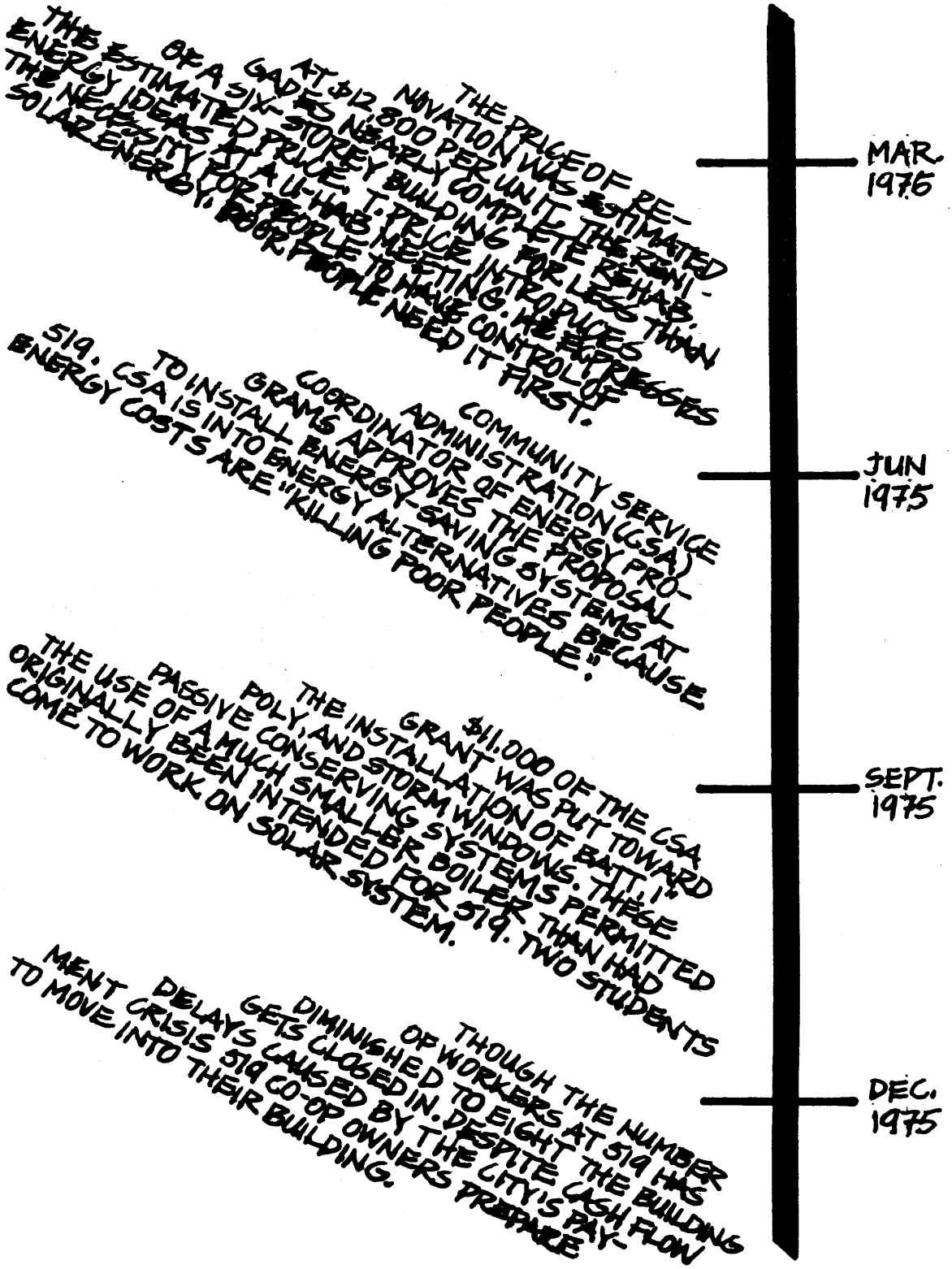
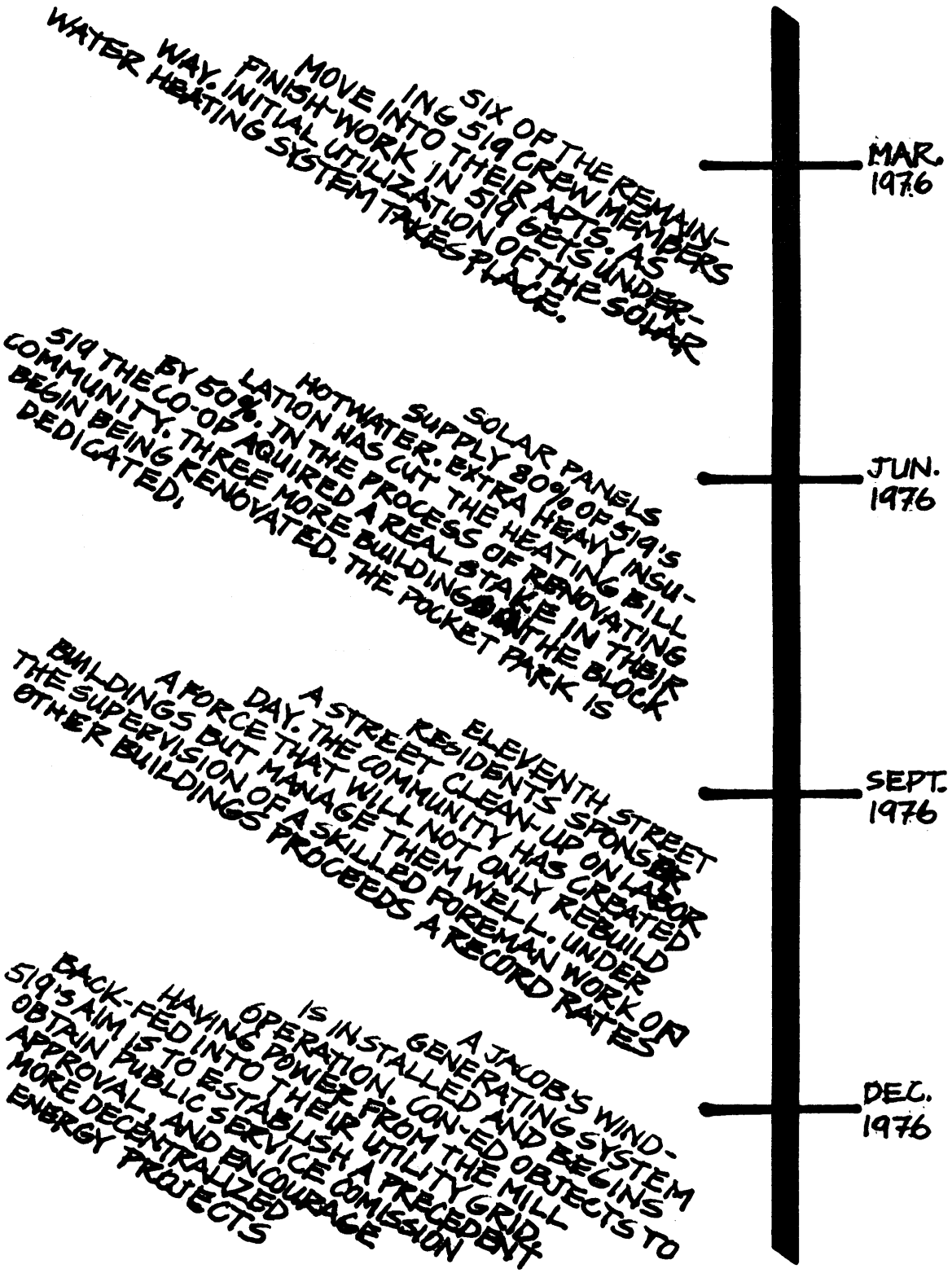

HOUSING ABANDONMENT BY LANDLORDS REACHES SERIOUS LEVEL IN THE LOWER EAST SIDE. ELEVEN FIRES DRIVE TENANTS OF 619 FROM THEIR HOMES. FIRE INSURANCE IS PROBABLY COLLECTED BY THE LANDLORDS.
MAR. 1972
NEGLECT OF BUILDING MAINTENANCE AND SECURITY BY TENEMENT OWNERS PUTS OTHER TENANTS' HOMES IN JEOPARDY REQUIRING THEM TO ORGANIZE AND TAKE EMERGENCY MANAGEMENT ACTION. STABLE RESIDENCY ON EAST 11TH STREET IS THREATENED BY THE VANDALISM AND DEMOLITION OF VACANT BUILDINGS.
JUN 1972
INTERFAITH ADOPT-A-BUILDING ANSWERS CALLS IN THE LOWER EASTSIDE REQUESTING AID FROM THE CITY'S EMERGENCY REPAIR PROGRAM (ERP). COMMUNITY VOLUNTEERS RECEIVE BUILDING REPAIR TRAINING.
SEPT 1972
INTERFAITH A-A-B UNDERTAKES WORK WITH LOCAL HOUSING MANAGEMENT GROUPS. ASSESSMENTS AND RECORDS OF IN-REM PROPERTY ARE BEGUN IN THE LOWER EAST SIDE. PLANS FOR EMPTY STRUCTURES AND RUBBLE-FILLED LOTS ARE INITIATED.
DEC 1972


MAR. 1973
519 IS CONSIDERED AS POTENTIAL CHEAP SHELTER BY THE NEW YORK SWITCH BOARD" A COMMUNITY ORGANIZATION SERVING POOR ANTI-ESTABLISHMENT TYPES — LARGELY TEENAGERS. 519 WAS ADOPTED BY A-A-B WHO WAS ASSISTING THE TENANTS ON 11TH STREET. 519 WAS SUGGESTED BY R. NAZARIO.
JUN 1973
FINDING THAT 519 WAS MARKED FOR CLEARANCE M. FREEDBERG AND HUANDY MUST MOBILIZE A REHAB. EFFORT. RABBIT OFFERS SUPPORT. PERSONALLY AND THRU A-A-B. J. RIOS AND OTHER YOUNG RESIDENTS TAKE INTEREST AND THERE BEGINS ENOUGH SUPPORT TO TRY GETTING OWNERSHIP.
SEPT 1973
APPLICATION FOR MORTGAGE IS PURSUED. A-A-B CHANNELS COMMUNITY CONCERN TO CITY ADMINISTRATORS. CITY LOANS COULD BE HAD ONLY AFTER A 5% DOWN PAYMENT HAD BEEN MADE TO THE CITY. AWARENESS OF THE NEWLY CREATED SWEAT EQUITY PROGRAM GIVES THE 519 NEGOTIATORS AN ADVANTAGE. U-HAB LATER ADDED IMPETUS.
DEC. 1973
PROVISION OF CITY FUNDS TO UNSKILLED AND PENNILESS PEOPLE WAS CONSIDERED. ADMINISTRATIVE RELUCTANCE WAS COMPOUNDED BY THE CITY'S MOUNTING FISCAL CRISIS.


A POLITICAL STRUGGLE FOR LOAN APPROVAL DEVELOPS. WITH P.S.T. GEORGES COUNSEL, R.NAZARIO AND M.FREEDBERG TURN THE BUREAUCRATIC TIDE. THE GAME OF GRANTSMANSHIP IS MASTERED. LOANS FOR SEVERAL OTHER HOUSING GROUPS ARE NEGOTIATED.
MAR. 1974
614 IS NO LONGER ABANDONED. ORGANIZED WORK BEGINS IN ANTICIPATION OF THE LOAN. THE CONSUMER FARMERS FOUNDATION CONTRIBUTES FINANCIAL SUPPORT.
JUN. 1974
THROUGH COLLABORATION WITH A-A-B LOCALLY AND U-HAB WHICH IS SUPPORTED BY THE CATHEDRAL OF ST. JOHN THE DIVINE TWO SWEAT-EQUITY PROJECTS WERE BEGUN WITH CITY LOANS - 614 AND 618 COLUMBUS AVE. A THIRD SITE 119 ST. & SECOND AVE. JOINED THE PROGRAM THROUGH INDEPENDENT ORGANIZATION.
SEPT. 1974
R.NAZARIO DESCRIBES 11TH STREET "IT USED TO BE CALLED 'STRIP ROW' BECAUSE AS MANY AS 20 ON ANY GIVEN NIGHT GET STRIPPED DOWN HERE LOAN MONEY THRU HDA'S 614 OBTAINS CITY VERSION PROGRAM. "THE REAL WORLD HAS NOT BEEN AS NICE AS WE THOUGHT. BRENDA EXPLAINED U-HAB STAFF MEMBER.
DEC. 1974


MAR. 1976
THE PRICE OF RENOVATION WAS ESTIMATED AT $12,800 PER UNIT. THE RENOVATION OF A SIX-STOREY BUILDING FOR LESS THAN THE ESTIMATED PRICE. THE PRICE INTRODUCES ENERGY IDEAS AT A U-HABS MEETING. HE EXPRESSES THE NECESSITY FOR PEOPLE TO HAVE CONTROL OF SOLAR ENERGY. POOR PEOPLE NEED IT FIRST.
JUN 1975
COMMUNITY SERVICE ADMINISTRATION (CSA) COORDINATOR OF ENERGY PROGRAMS APPROVES THE PROPOSAL TO INSTALL ENERGY-SAVING SYSTEMS AT 519. CSA IS INTO ENERGY ALTERNATIVES BECAUSE ENERGY COSTS ARE "KILLING POOR PEOPLE."
SEPT. 1975
$11,000 OF THE CSA GRANT WAS PUT TOWARD THE INSTALLATION OF BATT.'I' POLY, AND STORM WINDOWS. THESE PASSIVE CONSERVING SYSTEMS PERMITTED THE USE OF A MUCH SMALLER BOILER THAN HAD ORIGINALLY BEEN INTENDED FOR 519. TWO STUDENTS COME TO WORK ON SOLAR SYSTEM.
DEC. 1975
THOUGH THE NUMBER OF WORKERS AT 519 HAS DIMINISHED TO EIGHT THE BUILDING GETS CLOGED IN. DESPITE CASH FLOW DELAYS CAUSED BY THE CITY'S PAYMENT CRISIS 519 CO-OP OWNERS PREPARE TO MOVE INTO THEIR BUILDING.


MAR. 1976
JUN. 1976
SEPT. 1976
DEC. 1976
SIX OF THE REMAINING 519 CREW MEMBERS MOVE INTO THEIR APTS. AS FINISH-WORK IN 519 GETS UNDERWAY. INITIAL UTILIZATION OF THE SOLAR WATER HEATING SYSTEM TAKES PLACE.
SOLAR PANELS SUPPLY 80% OF 519'S HOTWATER. EXTRA HEAVY INSULATION HAS CUT THE HEATING BILL BY 50%. IN THE PROCESS OF RENOVATING 519 THE CO-OP AQUIRED A REAL STAKE IN THEIR COMMUNITY. THREE MORE BUILDINGS ON THE BLOCK BEGIN BEING RENOVATED. THE POCKET PARK IS DEDICATED.
ELEVENTH STREET RESIDENTS SPONSOR A STREET CLEAN-UP ON LABOR DAY. THE COMMUNITY HAS CREATED A FORCE THAT WILL NOT ONLY REBUILD BUILDINGS BUT MANAGE THEM WELL. UNDER THE SUPERVISION OF A SKILLED FOREMAN WORK ON OTHER BUILDINGS PROCEEDS A RECORD RATE
A JACOBS WIND-GENERATING SYSTEM IS INSTALLED AND BEGINS OPERATION. CON-ED OBJECTS TO HAVING POWER FROM THE MILL BACK-FED INTO THEIR UTILITY GRID. 519'S AIM IS TO ESTABLISH A PRECEDENT TO OBTAIN PUBLIC SERVICE COMMISSION APPROVAL AND ENCOURAGE MORE DECENTRALIZED ENERGY PROJECTS

PERSONAL INTERVIEWS — APPENDIX II

Karen Berman, a 519 resident and 519 crew member

Joe Barnes, a 519 resident and 519 crew member

Tony Bruno, a 519 resident and 519 crew member

Johnny Ocasio, a 519 resident and 519 crew member

Kiki Ocasio, a 519 resident and 519 crew member

Carlos Garcia, chief plumber of 519 crew and resident of Loisaida

Chino Garcia, President of Charas, Inc.,a local organization in Loisaida

Eduardo Rivera, a Loisaida resident

Lee, a worker in 507-509 East 11th Street

Edgardo Caraballo, a 519 resident and 519 crew member

Lue Rodriguez, a native of Loisaida

Santiago Gonzales, a 519 resident

Ann Gonzales, a 519 resident

Fred and Ethel Good, a yound couple who cooperatively own their apartment building in Loisada

Ernie Winston, an architect for 519

Ron Shiffman, a teacher at Pratt Institute where architectural assistance is given to sweat-equity projects

Rafaela Padilla, a native Loisada

Michael Freedberg, a 519 resident

Phil Johnson, an administrator at HDA

Maria Figaroa, a resident of Loisaida, and a worker at Adopt-A-Building

Dukie, a sandwich shop owner on 11th Street

Miriam Charnow, an administrator at the Community Service Administration

Dick Saul, an administrator at the Community Service Administration

Juan Rios, a native of Loisaida, and a 519 crew member

Carmen Rios, a former resident of 519 before its abandonment

Randolph Lake, construction supervisor

Arnie Abramowitz, a landscape architecture student who worked on the design and construction of the vest-pocket park

George Shaw, a member of the first Puerto Rican family to live on East 11th Street

Andy Rojas, a landscape architecture student who assisted in designing and building the vest-pocket park

Edwin Sosa, a resident of Loisada who was engaged in securing a loan for the renovation of 518 East 11th Street

Ruthie Nazario, a resident of 519, and a worker at Adopt-A-Building

Roberto Nazario, a resident of 519, and president of Adopt-A-Building also a native of Loisaida

I.D. Terner, director of the Urban Homesteading Assistance Board

CONTRIBUTOR'S TO 519's REDEVELOPMENT

Dairy Consumer Cooperative Fund (Consumer Farmers Foundation) loan contributions - $7500

Interfaith Adopt-A-Building, utilizing available government resource in neighborhoods

Housing and Development Administration, municipal sponsor of city development

100 Worst Building Committee, representatives of buildings in need of repairs

Emergency Repair Program (E.R.P.), city program providing funds for emergency repairs

United Tenants Community Management Group, organization for tenant planning and action

Department of Real Estate, supervises activities concerning city property, (pilot rehab projects on East 8th and 11th St.)

Association of Neighborhood Housing Developers, 40 groups city-wide, organized local developers and executed community housing projects

Coop Conversion Program, HDA program assisting self-help rehab and making sweat-equity loans

"As Is" program, conducts sale of city-owned buildings

Chemical Bank, loaned 519 project seed money, $10,000

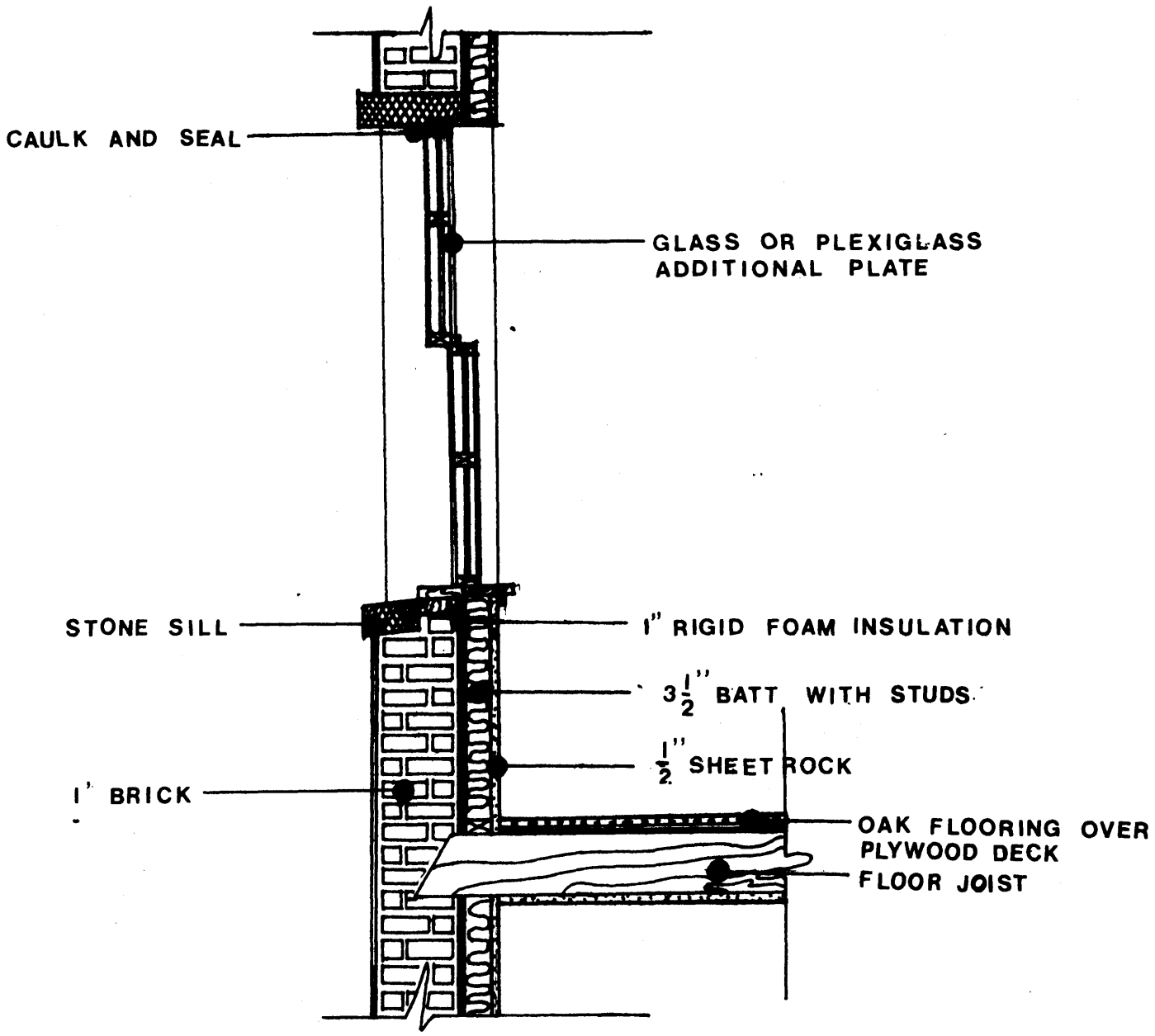
Private Foundations, granted funds for specific segments of the 519 project, $19,350 of $27,350 used for maintenance and labor costs

Community Service Administration, only federal level urban development agency to grant 519 $43,000 for energy gonservation

Neighborhood Service Association "Friends", provided $8000 and assistance in construction of the vest-pocket park

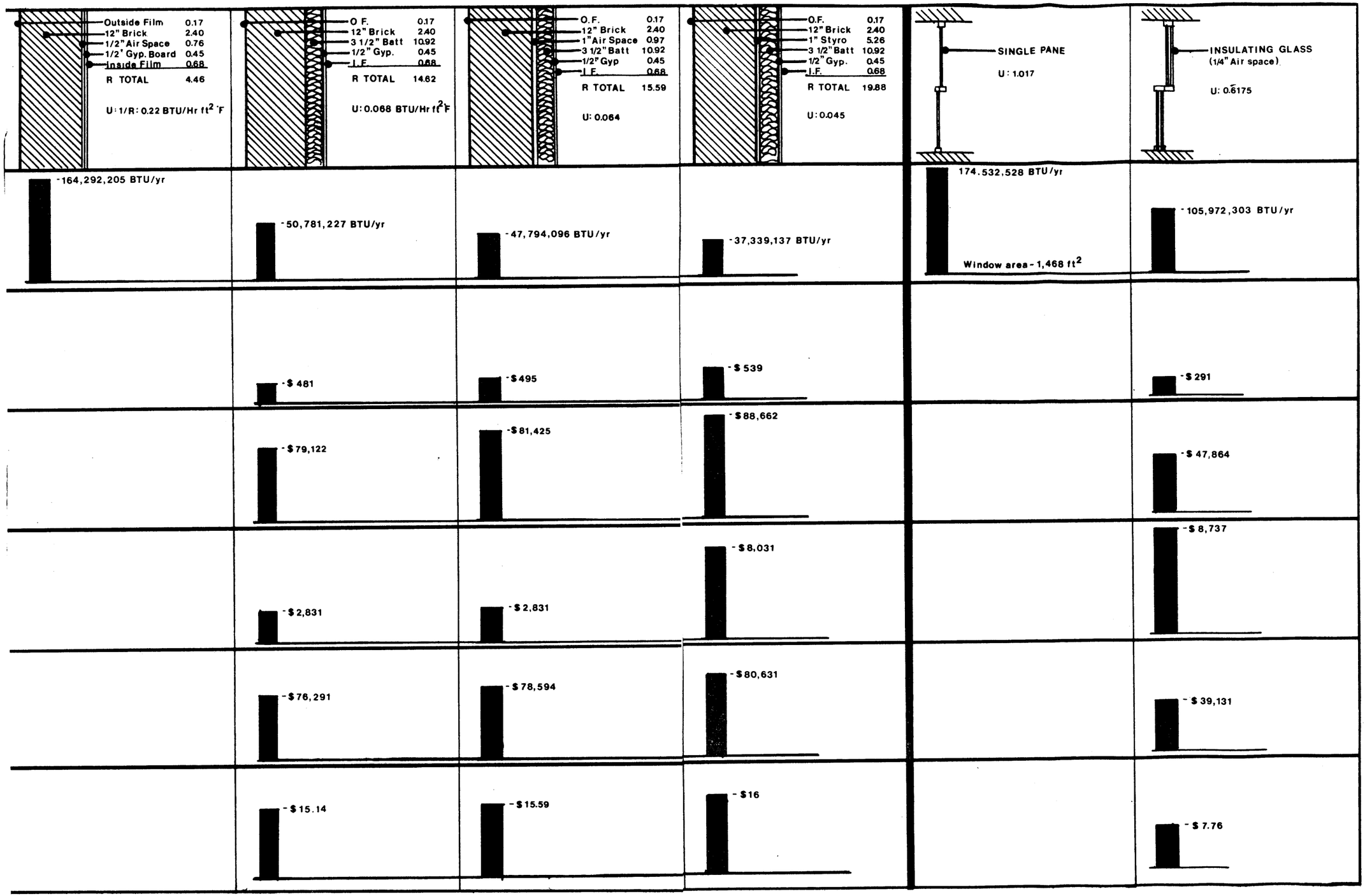
Charas, a community collective pursuing housing and cultural needs of Loisaida, erected geodesic domes in vacant lots with assistance of Buckminster Fuller

Total cost of 519 Renovation - $247,844 = $177,494 (loan) + $27,350 (private grants) + $43,000 (federal grant)



TYPICAL WALL SECTION

ILLUS. 14


Outside Film 0.17
12" Brick 2.40
1/2" Air Space 0.76
1/2" Gyp. Board 0.45
Inside Film 0.68
R TOTAL 4.46
U: 1/R: 0.22 BTU/Hr ft² °F
O F. 0.17
12" Brick 2.40
3 1/2" Batt 10.92
1/2" Gyp. 0.45
I. F. 0.68
R TOTAL 14.62
U: 0.068 BTU/Hr ft² F
O.F. 0.17
12" Brick 2.40
1" Air Space 0.97
3 1/2" Batt 10.92
1/2" Gyp 0.45
I. F. 0.68
R TOTAL 15.59
U: 0.064
O.F. 0.17
12" Brick 2.40
1" Styro 5.26
3 1/2" Batt 10.92
1/2" Gyp. 0.45
I.F. 0.68
R TOTAL 19.88
U: 0.045
SINGLE PANE
U: 1.017
INSULATING GLASS
(1/4" Air space)
U: 0.6175
-164,292,205 BTU/yr
-50,781,227 BTU/yr
-47,794,096 BTU/yr
-37,339,137 BTU/yr
174.532,528 BTU/yr
Window area - 1,468 ft²
-105,972,303 BTU/yr
-$ 481
-$495
-$ 539
-$ 291
-$ 79,122
-$81,425
-$88,662
-$ 47,864
-$2,831
-$2,831
-$8,031
-$ 8,737
-$76,291
-$78,594
-$80,631
-$ 39,131
-$15.14
-$15.59
-$16
-$ 7.76

BUILDING SHELL LIFE-COST WORKSHEET

PROJECT 519 East 11th Street HEATING ZONE II COOLING ZONE I

CONSTRUCTION DATA
WALLS: 6390 ft.² CONSTRUCTION Masonry COLOR Dark U-FACTOR .224
ROOF: 1770 ft.² CONSTRUCTION Built-Up COLOR Light U-FACTOR .215
GLASS: TYPE Single Pane (U=1.17) SHADING

	NORTH/~~NORTHEAST~~ WALL	NORTH/~~NORTHEAST~~ GLASS	EAST/~~SOUTHEAST~~ WALL	EAST/~~SOUTHEAST~~ GLASS	SOUTH/~~SOUTHWEST~~ WALL	SOUTH/~~SOUTHWEST~~ GLASS	WEST/~~NORTHWEST~~ WALL	WEST/~~NORTHWEST~~ GLASS	ROOF	TOTAL
1. ELEMENT AREA	873 ft.²	320 ft.²	3319 ft.²	108 ft.²	879 ft.²	314.8 ft.²	1318 ft.²	109.7 ft.²	1770 ft.²	
2. ELEMENT FIRST COST/SQ FT	$2.10	$3.00	$2.10	$3.00	$2.10	$3.00	$2.10	$3.00	$3.00	A
3. ELEMENT FIRST COST (Line 1 × Line 2)	$1833.30	$962.40	$6970	$324	$1846	$944.40	$2768	$329.10	$5310	$21,287
4. HEATING EQUIPMENT COST/100 SQ FT	$16.30	$184	$16.30	$184	$16.30	$184	$16.30	$184	$16.30	
5. COOLING EQUIPMENT COST/100 SQ FT										
6. Line 4 + Line 5										
7. U-FACTOR / 0.10	2.24	11.7	2.24	11.7	2.24	11.7	2.24	11.7	2.15	
8. EQUIPMENT COST/100 SQ FT (Line 6 × Line 7)	$36.52	$2162.80	$36.52	$2162.80	$36.52	$2162.80	$36.52	$2162.80	$35	
9. ELEMENT AREA ÷ 100 SQ FT	8.73 ft.²	3.208 ft.²	33.19 ft.²	1.08 ft.²	8.79 ft.²	3.148 ft.²	13.18 ft.²	1.09 ft.²	17.70 ft.²	B
10. EQUIPMENT FIRST COST (Line 8 × Line 9)	$318.82	$6936.26	$1212.10	$2335.85	$321.	$6808.50	$481.33	$2357.45	$619.50	$21,392.78
11. HEATING FUEL COST/100 SQ FT	$1.60	$16.60	$1.60	$10.40	$1.60	$2.10	$1.60	$11.90	$1.10	
12. COOLING FUEL COST/100 SQ FT										
13. Line 11 + Line 12										
14. U-FACTOR / 0.10	2.24	11.7	2.24	11.7	2.24	11.7	2.24	11.7	2.15	
15. ANNUAL FUEL COST/100 SQ FT (Line 13 × Line 14)	$13.55	$734.15	$6.05	$459.95	$13.55	$92.57	$13.55	$526.29	$8.94	
16. ELEMENT AREA ÷ 100 SQ FT	8.73 ft.²	3.208 ft.²	33.19 ft.²	1.08 ft.²	8.79 ft.²	3.148 ft.²	13.18 ft.²	1.09 ft.²	17.70 ft.²	
17. ANNUAL FUEL COST (Line 15 × Line 16)	$118.27	$2355.15	$200.73	$496.75	$119.10	$292.37	$178.56	$573.66	$158.23	

18. LIFE-CYCLE FUEL COST MULTIPLIER:
- ☐ New Construction, Life-Cycle = 40 years, Fuel Cost Multiplier = 40
- ☒ Modernization, Life-Cycle = 20 years, Fuel Cost Multiplier = 20
- ☐ Escalating Fuel Costs, 30 years, 10 % annual escalation; from Table II; Fuel Cost Multiplier = 181 → D 181

C $4492.83

19. LIFE-CYCLE FUEL COST (Line 17 × Line 18) E $13,201.50

20. ESTIMATED LIFE-CYCLE OWNING COSTS (BOX A + BOX B + BOX E) F $55,881

BUILDING SHELL LIFE-COST WORKSHEET

PROJECT 519 East 11th Street with insulation and storm windows HEATING ZONE ____ COOLING ZONE ____

CONSTRUCTION DATA WALLS: ____ CONSTRUCTION ____ COLOR ____ U-FACTOR .045

ROOF: ____ CONSTRUCTION ____ COLOR ____ U-FACTOR .044

GLASS: TYPE ____ SHADING ____

	NORTH/~~NORTHEAST~~ WALL	NORTH/~~NORTHEAST~~ GLASS	EAST/~~SOUTHEAST~~ WALL	EAST/~~SOUTHEAST~~ GLASS	SOUTH/~~SOUTHWEST~~ WALL	SOUTH/~~SOUTHWEST~~ GLASS	WEST/~~NORTHWEST~~ WALL	WEST/~~NORTHWEST~~ GLASS	ROOF	TOTAL
1. ELEMENT AREA	873 ft.²	320.8 ft.²	3319 ft.²	108 ft.²	879 ft.²	314.8 ft.²	1318 ft.²	109.7 ft.²	1770 ft.²	
2. ELEMENT FIRST COST/SQ FT	$2.55	$7.50	$2.55	$7.50	$2.55	$7.50	$2.55	$7.50	$3.30	A
3. ELEMENT FIRST COST (Line 1 × Line 2)	$2226.15	$2406	$8463.45	$810	$2241.45	$2361	$3360.90	$822.75	$5841	$28,533
4. HEATING EQUIPMENT COST/100 SQ FT										
5. COOLING EQUIPMENT COST/100 SQ FT										
6. Line 4 + Line 5										
7. U-FACTOR / 0.10	.45	6.18	.45	6.18	.45	6.18	.45	6.18	.44	
8. EQUIPMENT COST/100 SQ FT (Line 6 × Line 7)	$7.34	$1137.12	$7.34	$1137.12	$7.34	$1137.12	$7.34	$1137.12	$7.17	
9. ELEMENT AREA ÷ 100 SQ FT	8.73 ft.²	3.208 ft.²	33.19 ft.²	1.08 ft.²	8.79 ft.²	3.148 ft.²	13.18 ft.²	1.09 ft.²	17.70 ft.²	B
10. EQUIPMENT FIRST COST (Line 8 × Line 9)	$64.08	$3647.88	$243.61	$1228.09	$64.52	$3579.65	$96.74	$1239.96	$126.91	$10,290.44
11. HEATING FUEL COST/100 SQ FT	$1.60	$16.60	$1.60	$10.40	$1.60	$2.10	$1.60	$11.40	$1.10	
12. COOLING FUEL COST/100 SQ FT										
13. Line 11 + Line 12										
14. U-FACTOR / 0.10	.45	6.18	.45	6.18	.45	6.18	.45	6.18	.44	
15. ANNUAL FUEL COST/100 SQ FT (Line 13 × Line 14)	$2.72	$387.78	$2.72	$242.95	$2.72	$49.06	$2.72	$277.99	$1.83	
16. ELEMENT AREA ÷ 100 SQ FT	8.73 ft.²	3.208 ft.²	33.19 ft.²	1.08 ft.²	8.79 ft.²	3.148 ft.²	13.18 ft.²	1.09 ft.²	17.70 ft.²	
17. ANNUAL FUEL COST (Line 15 × Line 16)	$23.76	$1244.78	$90.33	$69.41	$23.92	$154.43	$35.87	$303.	$32.38	

18. LIFE-CYCLE FUEL COST MULTIPLIER:
- ☐ New Construction, Life-Cycle = 40 years, Fuel Cost Multiplier = 40
- ☒ Modernization, Life-Cycle = 20 years, Fuel Cost Multiplier = 20
- ☐ Escalating Fuel Costs, 30 years, 10 % annual escalation; from Table II; Fuel Cost Multiplier = 18.1

C $1977.88 → D 18.1

19. LIFE-CYCLE FUEL COST (Line 17 × Line 18) E $35796

20. ESTIMATED LIFE-CYCLE OWNING COSTS (BOX A + BOX B + BOX E) F $3962.89

30 YEAR SAVINGS = $459592

SOLAR WATER HEATING

SYSTEM SIMULATION

The performance of the hot-water heating system can be closely approximated by a set of numerical expressions that were developed from test data taken during system component operations. The numbers used in these simulations are chosen to most closely reflect the actual conditions in the New York region, and of the water heating system:

$$\text{Collector Efficiency} = \frac{T_{stor} - T_{amb}}{\text{Insol.}}\left(\begin{matrix}\text{overall system}\\ \text{efficiency}\end{matrix}\right) + \left(\begin{matrix}\text{maximum collector}\\ \text{efficiency}\end{matrix}\right)$$

$$\text{System Net Heat Gain} = \left(\begin{matrix}\text{collector}\\ \text{efficiency}\end{matrix} \times .9\right)(\text{Insolation})\left(\begin{matrix}\text{collector}\\ \text{area}\end{matrix}\right) +$$

$$\left(\begin{matrix}\text{Tank Heat}\\ \text{Loss Factor}\end{matrix}\right)(T_{\text{boiler room}} - T_{stor})$$

Under conditions considered average for the yearly New York climate this daily weather profile represents typical system operating conditions.

	8 am	9	10	11	12 pm	1	2	3	4
T_{stor} =	40°	53.4°							
T_{amb} =	30°	33°	36°	39°	42°	42.8°	42.8°	42.8°	
Insol. rate =	160	160	196	226.25					

On a typical day with the hourly conditions listed above the solar water heating system operation is simulated as follows:

FIRST HOUR GAIN

$$\text{First hour gain} = (.687)(.9)(160)(618) + (8.58)(60^{\circ}-40^{\circ})$$

$$= 61{,}137.5 + 171.6$$

$$= 61{,}309 \text{ btu's} \quad \therefore \text{ the storage temperature}$$

$$= \frac{61{,}309 \text{ btu's}}{4581.5 \text{ lbs}} + 40^{\circ} = 53.4^{\circ}F$$

SECOND HOUR GAIN

$$\text{Second hour gain} = (.635)(.9)(160)(618) + (8.58)(60^{\circ}-40^{\circ})$$

$$= 65{,}495 + 56.7$$

$$= 56{,}552 \text{ btu's} \quad \therefore \text{ the storage temperature}$$

$$= \frac{56{,}552 \text{ btu's}}{4581.5 \text{ lbs}} + 53.4^{\circ} = 65.7^{\circ}F$$

THIRD HOUR GAIN

$$\text{Third hour gain} = (.614)(.9)(196)(618) + (8.58)(60^{\circ}-65.7^{\circ})$$

$$= 66{,}952 + (-48.9)$$

$$= 66{,}903 \text{ btu's} \quad \therefore \text{ the storage temperature}$$

$$= \frac{66{,}903 \text{ btu's}}{4581.5 \text{ lbs}} + 65.7 = 80.3^{\circ}F$$

FOURTH HOUR GAIN

Fourth hour gain = $(.57)(.9)(196)(618) + (8.58)(60^{\circ}-80.3^{\circ})$

$= 62,264.9 + (-174.1)$

$= 62,090.7$ btu's $\therefore$ the storage temperature

$= \frac{62,090.7 \text{ btu's}}{4581.5 \text{ lbs}} + 80.3 = 93.9^{\circ}$

FIFTH HOUR GAIN

Fifth hour gain = $(.532)(.9)(226.25)(618) + (8.58)(60^{\circ}-93.9^{\circ})$

$= 66,962 + (-290.8)$

$= 60,454$ btu's $\therefore$ the storage temperature

$= \frac{60,454 \text{ btu's}}{4581.5 \text{ lbs}} + 93.9 = 108.4^{\circ}F$

SIXTH HOUR GAIN

Sixth hour gain = $(.48)(.9)(226.25)(618) + (8.58)(60^{\circ}-108.4^{\circ})$

$= 60,502.5 + (-48.4)$

$= 60,454$ btu's $\therefore$ the storage temperature

$= \frac{60,454 \text{ btu's}}{4581.5 \text{ lbs}} + 108.4 = 121.6^{\circ}F$

SEVENTH HOUR GAIN

Seventh hour gain = $(.432)(.9)(226.25)(618) + (8.58)(60^{\circ}-121.6^{\circ})$

$= 54,350.3 + (-528.5)$

$= 53,821.7$ btu's $\therefore$ the storage temperature

$= \frac{53,821.7 \text{ btu's}}{4581.5 \text{ btu's}} + 121.6 = 133.3^{\circ}F$

EIGHTH HOUR GAIN

Eighth hour gain = $(.388)(.9)(226.25)(618) + (8.58)(60^{\circ}-133.3^{\circ})$

$= 48,849 + (-628.9)$

$= 48,220$ btu's $\therefore$ the storage temperature

$= \frac{48,220 \text{ btu's}}{4581.5 \text{ lbs}} + 133.3 = 143.8^{\circ}F$

HOT WATER USE

$$\left[\left(\frac{(8.3)(\text{Half daily requirement})(\text{no. of users})(T_{\text{city water}})}{(\text{lbs. of water in storage})} + \frac{(\text{lbs. of water in storage} - \text{lbs. of water used})(T_{stor})}{(\text{lbs. of water in storage})}\right) - (T_{stor})\right] \times (\text{lbs. of water in storage})$$

= the amount of heat lost from storage after some how water use.

$$\left[\left(\frac{(83)(23)(40^{\circ}) + (4581.5-1909)(143.8^{\circ})}{4581.5}\right) - (143.8^{\circ})\right]$$

x (4581.5) = 198,379 btu's .˙. the storage temperature becomes:

$$143.8^{\circ} - \frac{198{,}379 \text{ btu's}}{4581.5 \text{ lbs}} = 143.8^{\circ} - 43.3^{\circ} = 100.5^{\circ}F$$

This estimate is based on the presumption that half of the daily hot water requirement (20 gals/person/day) is used on the evening of the day that it is collected. The remainder of the hot water requirement would then be used the following morning:

$$\left[\left(\frac{(83)(23)(40^{\circ}) + (4581.5-1909)(100.5)}{4581.5}\right) - (100.5)\right] \times (4581.5$$

= 11,549.5 btu's .˙. the storage temperature becomes: 100.5°

$$- \frac{11{,}549.5 \text{ btu's}}{4581.5 \text{ lbs.}} = 100.5^{\circ} - 25.2^{\circ} = 75.3^{\circ}F$$

CONCLUSIONS OF SIMULATION

After an average day of collection the solar water heating system cannot provide 100% of the daily hot water requirements assuming that the minimum hot water temperature allowable is 125°F. If the system stores a total of 476,020.7 btu's after an average day of collection, and 477,250 btu's are necessary to meet the daily demand for hot water at the allowable temperature, then the solar water heating system provides 99% of the daily demand on an average day.

The yearly availability of sun in the New York region has been observed as .49% of the year. Half of the annual available sun is capable of providing enough hot water to last through 70% of a cloudy day. Therefore the yearly amount of hot water that can be expected from the solar water heating system is:

$(365)(.49 + (.24x.7))(.99x477,250) = (365)(.658)(472,477.5)$

$= (365)310,890$

= 113,474,921 btu's per year

This quantity of heat is equivalent to:

$$\frac{113,474,921}{98,000} = 1158 \quad \text{gallons of oil.}$$

If the price of this oil is assumed at $.48 per gallon, then the fuel savings are:

$$1150.9 \times \$.48 = \$555$$

After one year of solar water heating the savings of course increase as the price of oil rises, which it shall. In order to roughly approximate

how fuel cost escalation over the thirty year period of the mortgage will contribute toward greater fuel savings the first year's savings are multiplied by a fuel cost multiplies.* By omitting the installation of adequate insulation f19 would have saved: $28,002 - $21,287 = $6715. $6715 was roughly 4% of the rehab loan amount.

The inflated 30 year fuel savings are:

$555 x $181 = $100,455.

The cost of components and materials for the solar water heating system was approximately:

Flat plate copper collectors, 615 sq.ft.	$6000
Wooden mounting frames	1200
Solar storage tank with heat exchanger	3600
Additional plumbing	1300
Circulating pumps	350
Armaflex pipe insulation	250
Electronic controls, relays, and sensors	150
Masonry (rack stabilization)	75
Paint	150
Flashing	160
Miscellaneous	120
Total	$13,355

Assuming that in addition to the solar water heating systems first cost there is a yearly system maintenance cost of $600 the thirty year cost of the system becomes:

$13,355 + ($600 x 29) = $30,755

*fuel cost multipliers for inflating fuel cost according to The Educational Facilities Laboratories, Inc.

Therefore, the net savings made possible by the solar water heating system are:

$100,455 - $30,755 = $69,700.

REFERENCES

1. Jean Gottman, Megalopolis, MIT Press, Cambridge, 1964, p. 436.

2. Ibid., p. 435

3. Christopher Tunnard and Boris Pushkarev, Man-Made America, Yale University Press, New Haven, 1963, p. 58.

4. Ibid., p. 57.

5. Ivan Illich, Energy and Equity, Harper & Row, New York, 1974, p. 15.

6. Government Survey, The Bureau of Labor Statistics, 1976.

7. George Shaw, member of the first Pierto Rican family on 11th St.

8. Barry Commoner, The Poverty of Power, A. A. Knopf, Inc., New York, 1976, p. 34.

9. UDC, Reports on New York Housing Projects, 1974.

10. Michael Freedberg, "Save the Lower East Side," 1975.

11. Urban Homesteading Assistance Board, 1975 report on Homesteading Projects.

12. Charas Inc., Proposal for Plaza Cultural, New York, 1977.

13. Charas Inc., Proposal for an Environmental Education Program, Submitted to the Department of Health, Education and Welfare, February, 1977.

14. Adopt-A-Building, 'Five Year Report', New York, 1975.

15. Chino Garcia, Chairman of Charas, Inc., personal discussions.

16. Roger Starr, Administrator in the Housing and Development, statement in Adopt-A-Building 5-year report, New York, 1975.

17. Roberto Nazario, President of Adopt-A-Building, New York, personal discussions.

18. Ibid.

19. Edgardo Caraballo, President of the 519 Housing Development Corporation, New York.

REFERENCES (Continued)

20. These tenements predate the first zoning regulations first made in New York City in 1916.

21. Housing and Development Administration, Office of Rehabilitation Financing, Design Standards for Rehabilitation.

22. Sweat-Equity tenants were expected to finish their own apartments after the materials they requested were provided by the 519 Cooperative.

23. Normal building practice was to omit adequate insulation and incur large operating cost annually.

24. Energy Task Force, Comparisons of 30 year savings of insulated and uninsulated walls and windows.

25. Travis Price, Founder of the Energy Task Force, personal discussions.

26. New York Times, Real Estate Section, July 6, 1975.

27. By 1977 the Energy Task Force was requested by the 519 Corporation to leave their office in the building because of "conflicting interest".

28. Community Service Administration's Energy Program approves a grant of $43,000 for energy additions to 519 East 11th St.

29. 519 East 11th St. Housing Development Corporation meetings, personal interviews.

30. Disputes with the 519 crew emerge from opinions that M. Freedberg and R. Nazario are spending too much time with bureaucratic affairs.

31. Finish work normally represents 20% of the total construction time;at 519 this was much greater.

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