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NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determination for individual properties and districts. See instruction in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Nordlund House

other names/site number 5DV5245

2. Location

street & number 330 Birch Street [N/A] not for publication

city or town Denver [N/A] vicinity

state Colorado code CO county Denver code 031 zip code 80220

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this [X] nomination [ ] request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property [X] meets [ ] does not meet the National Register criteria. I recommend that this property be considered significant [ ] nationally [ ] statewide [X] locally.
(See continuation sheet for additional comments [ ].)

James Hartmann State Historic Preservation Officer December 24, 1997
Signature of certifying official/Title Date

State Historic Preservation Office, Colorado Historical Society
State or Federal agency and bureau

In my opinion, the property [ ] meets [ ] does not meet the National Register criteria.
(See continuation sheet for additional comments [ ].)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

[√] entered in the National Register
See continuation sheet [ ].
[ ] determined eligible for the National Register
See continuation sheet [ ].
[ ] determined not eligible for the National Register.
[ ] removed from the National Register
[ ] other, explain
See continuation sheet [ ].

Signature of the Keeper Date
Edson H. Beall 2/13/98

Nordlund House
Name of Property

Denver County, Colorado
County/State

5. Classification

Ownership of Property
(Check as many boxes as apply)

[X] private
[ ] public-local
[ ] public-State
[ ] public-Federal

Category of Property
(Check only one box)

[X] building(s)
[ ] district
[ ] site
[ ] structure
[ ] object

Number of Resources within Property
(Do not count previously listed resources.)

Contributing	Noncontributing	
1	1	buildings
0	0	sites
0	0	structures
0	0	objects
1	1	Total

Name of related multiple property listing.
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register.

0

6. Function or Use

Historic Function
(Enter categories from instructions)

DOMESTIC: single dwelling

Current Functions
(Enter categories from instructions)

DOMESTIC: single dwelling

7. Description

Architectural Classification
(Enter categories from instructions)

MODERN MOVEMENT: Moderne

Materials
(Enter categories from instructions)

foundation CONCRETE
walls CONCRETE
STUCCO
roof ASPHALT
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

Nordlund House
Name of Property

Denver County, Colorado
County/State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

[ ] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

[ ] **B** Property is associated with the lives of persons significant in our past.

[X] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

[ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

[ ] **A** owned by a religious institution or used for religious purposes.

[ ] **B** removed from its original location.

[ ] **C** a birthplace or grave.

[ ] **D** a cemetery.

[ ] **E** a reconstructed building, object, or structure.

[ ] **F** a commemorative property.

[ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
Architecture

Periods of Significance
1938 - 1939

Significant Dates
1939

Significant Person(s)
(Complete if Criterion B is marked above).
N/A

Cultural Affiliation
N/A

Architect/Builder
Groves, Eugene G.
Concreter Corporation

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographic References

Bibliography
(Cite the books, articles and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

[ ] preliminary determination of individual listing (36 CFR 67) has been requested

[ ] previously listed in the National Register

[ ] previously determined eligible by the National Register

[ ] designated a National Historic Landmark

[ ] recorded by Historic American Buildings Survey

#_____

[ ] recorded by Historic American Engineering Record

#_____

Primary location of additional data:

[X] State Historic Preservation Office

[ ] Other State Agency

[ ] Federal Agency

[ ] Local Government

[ ] University

[ ] Other

Name of repository:
Colorado Historical Society

Nordlund House
Name of Property

Denver County, Colorado
County/State

10. Geographical Data

Acreage of Property less than one

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1.	13	505520	4396660
2.			
3.			
4.			

[ ] See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Elizabeth Rada Carver

organization _____ date August 26, 1997

street & number 330 Birch St. telephone 303-394-4419

city or town Denver state CO zip code 80220

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional Items

(Check with the SHPO or FPO for any additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name Elizabeth Rada Carver

street & number 330 Birch telephone 303-394-4419

city or town Denver state CO zip code 80220

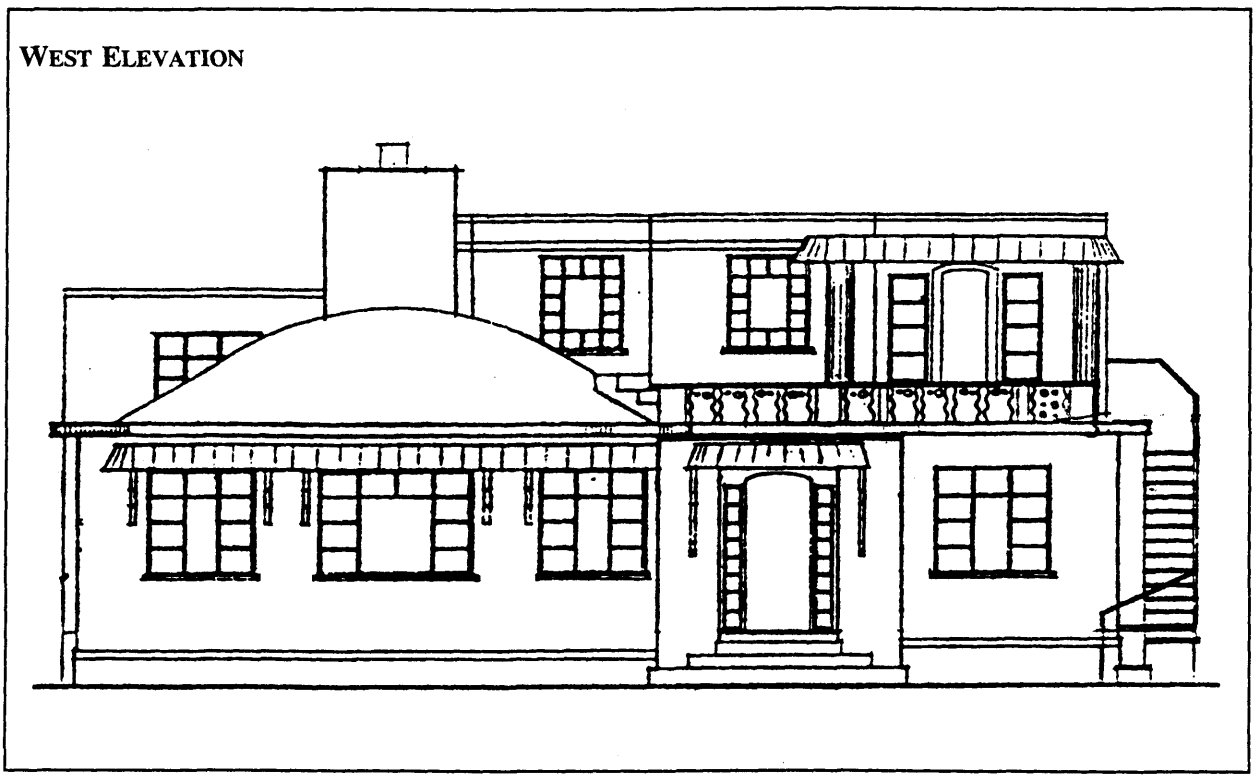
DESCRIPTION

The Nordlund House is a seven-level, precast and poured-in-place, reinforced concrete single family dwelling located in the Hilltop neighborhood, a middle to upper middle class neighborhood in central Denver. The approximately 3,000 square foot house faces west onto Birch Street on a 7,810 square foot lot with mature maple, linden and hackberry trees. The irregular plan, flat-roofed residence is a stuccoed finished building with rounded corners, metal casement and precast concrete multi-light windows, concrete door frames and partially covered front roof-top terrace with free-form geometric balustrade. The fascia of the sheltered entry, living room window and roof-top terrace canopy are of glazed red tile as is the trim around the base of the domed living room roof. Curvilinear precast concrete brackets support the window shade and the outside stair with its highly decorative wrought iron railing which rises along the south elevation to provide access to the terrace. The terrace roof is supported by fluted columns. The design includes a round kitchen extension and upper-level cantilevered extension and two shallow bay windows. The interior walls and ceilings are of concrete stucco. The floors are all poured concrete slabs and are covered with wood, red glazed tile, or carpeting. Precast concrete forms the kitchen cabinet faces and counter tops, recessed hall storage unit fronts and built-in desk frames. Cabinet and drawer fronts are of wood cut with rounded corners to accommodate the rounded edges of the concrete frames. The kitchen contains built-in concrete seating which lines the wall of a round side wall extension. Even the refrigerator occupies a concrete formed niche. All the door frames are also of precast concrete, once again with rounded corners. Numerous recessed bookcases are framed in precast concrete with non-adjustable wood shelves. Massive concrete piers in a simple geometric pattern form the balustrade in the central hall. In the bathrooms, the smooth concrete forms the walls as well as the tub and shower surrounds. The bedrooms contain concrete walled closets with built-in shelving. The focal point of the interior is the domed living room with its fireplace, flanking recessed bookcases, and adjoining reading/work area. The all concrete house remains remarkable intact and fully capable of conveying its architectural significance.

EXTERIOR

The Nordlund House is an irregular plan, precast and poured, reinforced concrete house sitting on a poured concrete foundation faced with flagstone above grade. From the exterior the building appears to be of two-story design but actually contains seven interior levels. The exterior wall finish is concrete stucco over metal mesh. The roof surfaces are flat and all are of concrete covered with asphalt and gravel, except for the domed roof over the living room.

The west (Birch Street) elevation is approached from the street by a flagstone walk. A curved three-step concrete stoop provides access to the main entry which is sheltered by a curved canopy faced with red glazed tile and is supported by large honeycombed precast concrete brackets. The solid wood door is fronted by a screen door and the whole is flanked on each side



with a narrow column of small square side lights. To the north of the entry are three window bays. The center bay contains a large picture window surrounded by four side lights and a divided transom. The flanking bays are composed of a narrow casement window in a metal frame surrounded by four side lights and a transom, all double paned in concrete frames. This casement/concrete frame window combination (henceforth referred to as standard window unit) is used throughout the building. The bays are protected by a concrete canopy edged in red glazed tiles and supported by smaller versions of the brackets used on the entry canopy. A single bay fills the area to the south of the entry. The window system is a variation on the standard window unit in that the center contains a pair of casement windows. The fascia of the flat eave across the full elevation is composed of narrow flutes. The eave wraps around the corners of the house.

The oval domed living room roof rises above the northerly portion of the facade. The second-story consists of a series of four sections with varying setbacks. The northern-most mid-level section contains a standard window unit without the transom element. The next section contains a large round corner chimney and a variation of the standard window unit with a smaller casement window above two small lights matching the divided transom. This window illuminates the reading nook at the top of the stairs. The section over the entry protrudes forward and contains a single window unit matching that in the section to the north and opens off the office area of the study. A slightly protruding belt course runs along these last two sections just above the level of the window openings. The southern-most section consists of a terrace surrounded by a balustrade of

free-form honeycombed concrete balusters and smooth concrete railing; a sheltered area protected by a concrete canopy, similar in design to that over the entry, supported by fluted columns; and the wall of the study consisting of an original glazed metal frame door with turned wood lower decoration, surrounded by side lights.

The south elevation contains the fanciful stairway which begins on the west elevation, wraps around the corner and rises up to the sheltered portion of the terrace where it provides entry through open door frame with unglazed side lights. The open tread stairs are supported by curvilinear honeycombed concrete brackets. Each of the wrought iron stair balusters ends in pig tail scrollwork. The lower level contains the half-round kitchen nook extension with its alternating fixed and casement windows all surmounted by transoms. The upper level over the kitchen contains a double casement and concrete frame window unit for the study. The recessed lower eastern-most section contains two standard window units. The cantilevered area above contains a three-light shallow bay window. The bottom edge of the cantilevered section is accented by a serpentine concrete molding. The deeply recessed area between the two upper level sections contains a chimney for the study fireplace and a bathroom window unit.

The east (rear) elevation contains a centered rear entry door protected by a half-round concrete canopy supported by two small concrete brackets. To the south of the entry is a standard window unit. To the north of the rear entry is a slightly recessed former entry to the two-car garage, now the family room. A centered glazed door is flanked on each side by a set of three wide side lights, the top one of each set being a hopper window. The floor above the family room contains a single standard bedroom window unit. The area above the southern portion of the elevation contains the master bedroom. A centered shallow three-light bay window is situated between two recessed panels with concrete sills. A small portion of the master bedroom area is cantilevered over the family room wall.

The north elevation contains limited fenestration and is located close to the lot line. The western-most portion contains one standard window unit and one of the units with a small casement window completely surrounded by small concrete framed side lights. The eastern-most portion contains a slider window. The upper-level contains one standard window unit for the western bedroom and one short fixed light window for the eastern bedroom.

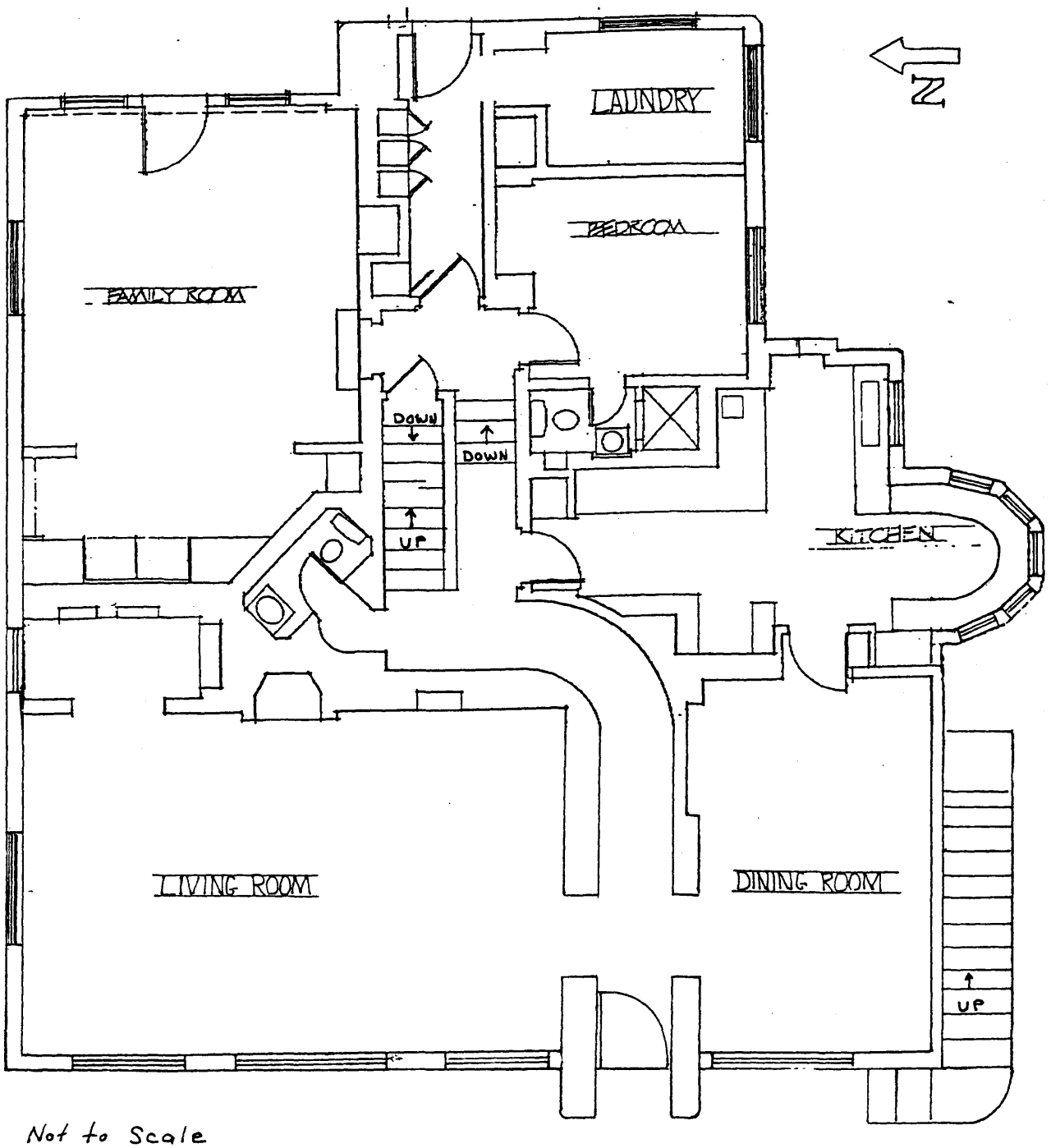
Alterations to the exterior are minimal and consist of the replacement of the garage doors with the pedestrian door and window system and the replacement of the original windows in the upper-story bay windows.

INTERIOR

Concrete is used throughout the interior for walls, ceilings and floor finishes. Several of the rooms contain built in book shelves, desks or bed headboards of precast concrete. All the closets and doorways have concrete frames. The staircase leading to the main bedroom level has concrete treads, risers and balustrade.

The main hall curves off to the left from the entry and leads to the stairway, a small powder room and the hall to the back door. The hall contains original light fixtures and the floors are

FLOOR PLAN


LAUNDRY
BEDROOM
FAMILY ROOM
DOWN
DOWN
UP
KITCHEN
LIVING ROOM
DINING ROOM
UP
N
Not to Scale

covered with glazed red tile. The living room opens to the north off the entry hall. The dominant feature of the living room is the oval domed ceiling highlighted by lighting cast in the ceiling support beam. The living room contains a fireplace with tile front and a secluded reading/work area with built-in concrete bookcases, desk and credenza.

The dining room opens off the south side of the main hall and includes floor to ceiling recesses to accommodate conventional dining room side pieces. Original light fixtures are found on the walls and ceiling. Both the living and dining room walls contain recessed picture rails to allow decorating without damaging the wall surfaces. The floors in the living room and dining room are tongue-and-groove wood over the concrete slab.

The narrow galley-type kitchen has an L-shaped work area with a half-round seating area extension to the south with a built-in concrete bench around the wall. All the features (oven hood, countertops, cabinet frames) are of concrete. The refrigerator stands in a concrete frame.

The lower rear portion of the house contains a small bedroom, which may have originally been a guest or servant's room, and a tiny bathroom with a built-in shower stall. The back hall contains a pantry with concrete storage shelves, pie cooler cabinet, and flour/sugar bins. A small laundry room is also at the back of the house as is the family room which occupies the space of the former two-car garage.

Three bedrooms and one bath are located one level up from the main floor. The study is located one flight up from the bedrooms. A small reading nook occupies the upper stair landing outside the study. The study contains a secluded office/work area with concrete desk and book shelves. The study floor is of stone and the room contains a small fireplace with surrounding recessed bookshelves.

The lowest level of the house contains storage rooms with additional built-it closets and the furnace room with the boiler for the hot water baseboard heating system.

Interior alterations have been minimal. In 1948, when the Nordlunds still occupied the house, some interior spaces were rearranged. The building permit issued for the project summarizes the intended work as "remove non-bearing and rearrange bedrooms - no structural change."

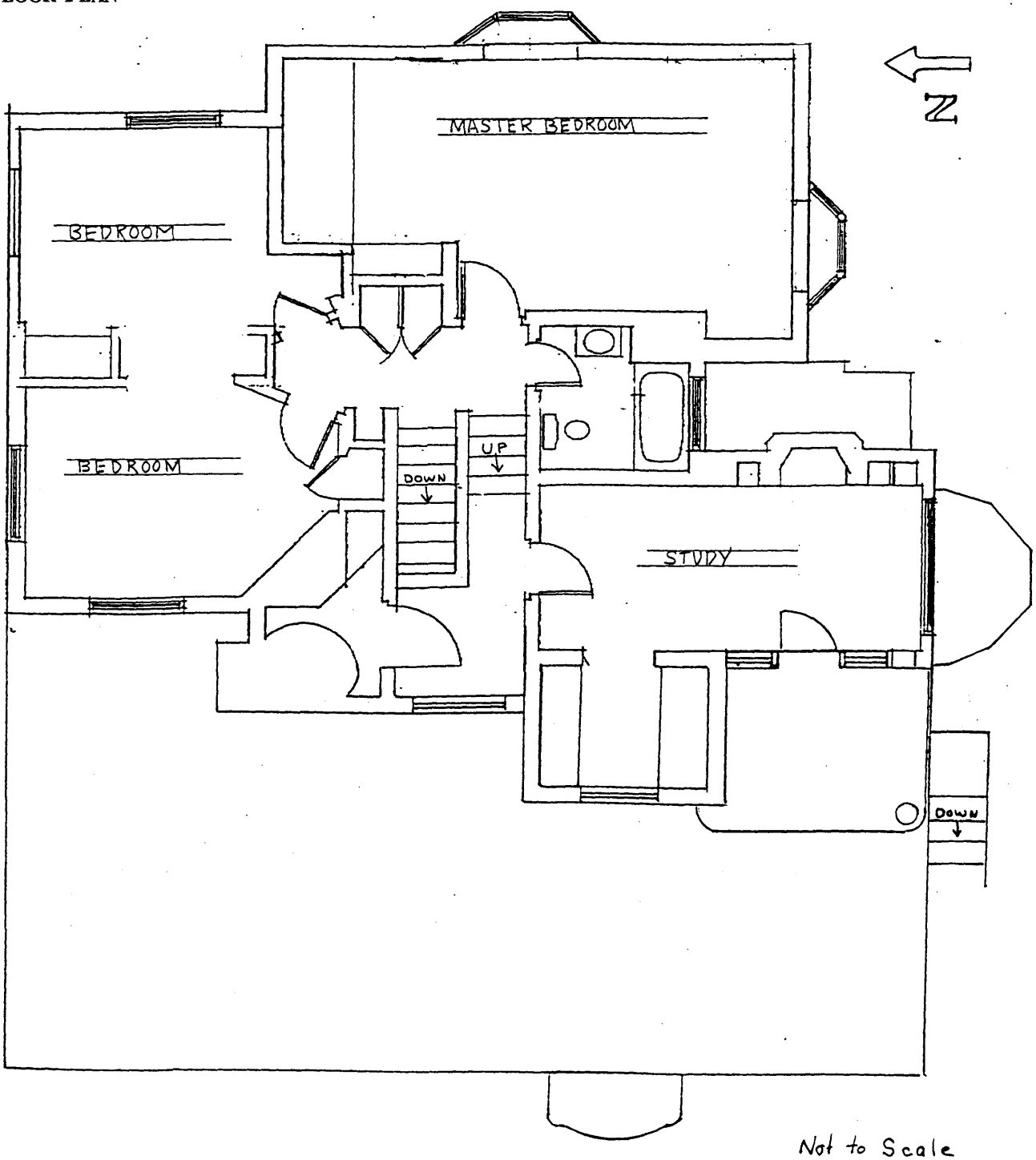
The original forced air coal fired heating system was replaced, through no small amount of work, with a hot water baseboard system. The original coal bin remains in the basement and the coal chute door exists on the north elevation.

The original linoleum floor in the entry hall was replaced with glazed red tile and the kitchen counter tops, at one time of linoleum, were recently redone in colored concrete.

The biggest change occurred in 1990 with the conversion of the original two-car garage into a large family room. The garage had been accessible by a gravel driveway from the alley. Original garage built-in cabinets remain and the finish of the room is compatible with the rest of the house.

The house has been well maintained and its architectural integrity respected since its 1939 completion. The residence is in excellent condition.

FLOOR PLAN


MASTER BEDROOM
BEDROOM
BEDROOM
UP
DOWN
STUDY
DOWN
N
Not to Scale

GARAGE

The property also contains a modern, free-standing, two-car garage. Architect Christopher Craven designed the building in 1990 to replace the original garage space incorporated in the house. The garage's exterior is of corrugated steel topped by a stepped hip roof. Flagstone covers the lower elevations and blends with the flagstone path to the front door, the flagstone patio and the planting beds in the back yard. The garage is considered to be a noncontributing resource due to its recent construction.

STATEMENT OF SIGNIFICANCE

The Nordlund House is architecturally significant as an important work of the prolific Denver architect, Eugene G. Groves. Groves practice spanned five decades during which he completed noteworthy commissions involving schools, college buildings, government offices, and commercial buildings. He was widely recognized for his experimental and futuristic use of poured, cast and reinforced concrete. The Nordlund House utilized an innovative all concrete construction technique on which Groves received a patent in 1937.

EUGENE G. GROVES, ARCHITECT

Born in Dana, Indiana, Eugene G. Groves (1882-1967) won a scholarship to Harvard. Poor health brought him to Denver in 1914. He maintained an active practice for five decades and was responsible for the design of numerous educational and municipal facilities throughout Colorado. Groves exhibited his design talent through a variety of architectural styles. For example, his 1927, Moderne style, Cañon City Municipal Building (5FN596) and his 1922, Italian Renaissance Revival, Ammons Hall (5LR472), located on the Colorado State University campus in Fort Collins, are listed in the National Register. His 1929, Colonial Revival, Lowell School (5ME4001.1), located in Grand Junction, is a contributing building within a National Register District. In Golden, he designed the 1924 Golden High School building and the 1936 Art Deco style Mitchell Elementary school. Groves developed a long term association with Colorado State University where he was responsible for the design of numerous buildings and additions from the 1920s through 1950.

The list below includes known Groves designs in Colorado and their National and State Register status:

Building Name	Location	Site No.	Date	Status
Running Track for Colo. Agricultural College	Colo. State University Fort Collins		1915	N.R. eligible district
I & M Building	223 Main Street Sterling	5LO152	1920	N.R. listed
Ammons Hall	Colo. State University Fort Collins	5LR472	1922	N.R. listed
Mesa County Courthouse	Grand Junction	5ME4164	1922	
Weber Building	Colo. State University Fort Collins	5LR2075	1922	N.R. eligible district
Cañon City High School	Main Street Cañon City	5FN1003	1924	N.R. eligible
Golden High School	710 10th Street, Golden	5JF653	1924	State Register
Field House/College Avenue Gym	Colo. State University Fort Collins	5LR2084	1924	N.R. eligible district
Administration Building	Colo. State University Fort Collins	5LR2089	1924	N.R. eligible district
Fairview School	2715 W. 11th Avenue Denver	5DV2097	1924	
Cañon City Municipal Building	612 Royal Gorge Blvd. Cañon City	5FN596	1927	N. R. listed
Music Building	Colo. State University Fort Collins	5LR2076	1927	N.R. eligible district
Military Science Building	Colo. State University Fort Collins	5LR2094	1927	N.R. eligible district
Archuleta County Courthouse	San Juan and Pagosa Sts. Pagosa Springs	5AA745	1928	
Lowell Elementary School	310 N. 7th Street Grand Junction	5ME4001.1	1929	Within N.R. district
Grand Junction High School	624 N. 9th Street Grand Junction	5ME4153	1929	N.R. eligible

Building Name	Location	Site No.	Date	Status
L.L. Gibbons Building Addition	Colo. State University Fort Collins	5LR1961	1929	N.R. eligible district S.R. listed
Farmers State Bank	300 Main Street Fort Morgan	5MR411	1930	N.R. listed
Coop Units, Botanical Lab	Colo. State University Fort Collins	5LR2082	1930	N.R. eligible district
Botany Greenhouses	Colo. State University Fort Collins	5LR2083	1930	N.R. eligible district
Holland House	2340 Josephine Denver		1932	
Sherman House	2733 W. 41st Street Denver		1935	
Mitchell Elementary School	700 12th Street Golden	5JF658	1936	N.R. eligible
Johnson Hall	Colo. State University Fort Collins	5LR2088	1936	N.R. eligible district
Vocational Education Addition to Soils Lab	Colo. State University Fort Collins	5LR1967	1936	N.R. eligible district S.R. listed
Forestry Building	Colo. State University Fort Collins	5LR2090	1937	N.R. eligible district
Nordlund House	330 Birch Street, Denver	5DV5245	1938	N.R. eligible
College Avenue Gym Addition	Colo. State University Fort Collins	5LR2084	1938	N.R. eligible district
Student Union Addition	Colo. State University Fort Collins	5LR2088	1938	N.R. eligible district
Braiden Hall	Colo. State University Fort Collins	5LR2085	1946	N.R. eligible district
Forestry Building Addition	Colo. State University Fort Collins	5LR2090	1947	N.R. eligible district

Building Name	Location	Site No.	Date	Status
Student Services Building	Colo. State University Fort Collins	5LR2085	1948	N.R. eligible district
Administration Annex	Colo. State University Fort Collins	5LR2086	1950	N.R. eligible district

Groves was widely recognized for his expertise in the use of poured, cast, and reinforced concrete. In addition to large civic and educational structures, Groves experimented with concrete residential construction in the 1930s. During this period he patented a concrete construction technique, established a separate concrete construction firm, and erected three all concrete houses in Denver.

DEVELOPMENT OF CONCRETE CONSTRUCTION

Concrete is a versatile construction material, favored by builders for centuries due to its ready availability, simplicity, and its durability. Concrete consists of varying combinations of sand, gravel, crushed stone, or other course material, bound together with various kinds of cementitious materials, such as lime or cement. With the addition of water, the mixture undergoes a chemical reaction and hardens.

Concrete was first used by the Romans in the construction of bridges and aqueducts. Builders in Spain and Africa kept the technology alive during the Middle Ages. The Spanish introduced a form of concrete to the New World in the first decades of the sixteenth century. Spanish and English settlers used the product along the coast of America from Florida to South Carolina. They poured the liquid material into forms for walls rising in layers of about a foot per application.

Orson S. Fowler advocated the use of "gravel wall" construction, another name for concrete aggregate, in his 1853 book, *A Home for All*. This type of building construction appeared across the U.S. The military used the "lime-grout" construction technique to improve many of its frontier post, including Fort Laramie in Wyoming.

A significant improvement to concrete construction came in 1860 when S.T. Fowler obtained a patent for a reinforced concrete wall. The inclusion of metal rods within the concrete provided the material with greater stability and load bearing capabilities.

As the technology for the use of concrete evolved, the production of cement also underwent improvements. Between 1900 and 1903 several dramatic new improvements in the grinding and firing techniques for Portland cement resulted in reduced costs and a standardized, reliable product. The invention of the horizontal rotary kiln was one such industry innovation.

As the quality of concrete improved, architects, builders, and independent experimenters searched for improved ways to employ the product in modern construction. Advances in concrete construction followed two distinct paths. The first led toward the production and use of concrete building blocks. Builders explored the possibility of forming concrete blocks into block masonry

applications. Advances included the invention of machines to fabricate ornamental concrete blocks both on the job site and in centralized factories. Experimentation in materials and methods brought the introduction and wide-spread use of cinder blocks and standardized concrete masonry units (CMUs) in use today.

The other path of concrete development focused on using concrete in poured forms for an increasing array of uses. Concrete reinforced with metal mesh and rods gave structures greater strength and adaptability. In 1906 Thomas Edison announced that, "I am going to live to see the day when a working man's house can be built of concrete in a week." Edison came to this vision down a circular path that led from his entry into the Portland cement business in an effort to find a use for the heavy equipment and giant crushing rolls he developed for an ill-fated iron-ore enterprise. Always sensitive to the need to find applications for his inventions, and to enjoy some economic return for the effort as well, Edison developed a number of improvements in concrete production practices.

Edison was fascinated by the ability of concrete to mold into highly durable products in a wide variety of shapes. He began to wonder about the possibility of molding and pouring an entire house in one operation to form a single monolithic concrete structure. Individual monolithic concrete houses were being built one at a time for wealthy clients. In fact, the first reinforced concrete house in the U.S. (Ward's Castle in Port Chester, New York) was constructed in 1870. What Edison envisioned was a process to build inexpensive houses on an industrial scale. Reinforcing rods, pipes, and electrical conduit would be molded right in, as would everything from staircases and window sills to picture frames, closets, bathtubs, hinges and fireplaces–even the roof and exterior decorations. The molds could be removed after six days of curing, another day would be devoted to finishing work (addition of windows, doors, and light fixtures, and installation of the furnace), and the house would be ready for occupancy the following day. Edison felt an efficient crew with four sets of molds could build a house every two days. If this rate could be achieved, Edison estimated the houses should sell for about $1,200 each, or about one-third the usual price for a house at that time.

The Edison method proved to be considerably harder to achieve than describe. Trying to establish the correct formula for the concrete mix was daunting. After flowing fifty feet or more and sitting for six hours, the heavier aggregates, such as gravel and course sand, tended to separate from the cement and lighter materials. Edison finally found a solution through the use of bentonite clay and quickly filed a patent on the entire process in 1908 (the patent was not awarded until 1917).

The molds for the first house were impossibly unwieldy. A finished mold set contained over 2,300 structural parts and weighed more than 450,000 pounds–hardly lending itself to quick, easy assembly by unskilled labor. Edison managed to successfully produce one marketable house in New Jersey in 1911. Edison offered to license the process to others but removed himself from active participation.

The fabricator of the Edison house molds, Frank Lambie, kept experimenting with the process. He simplified the house design, and thus the mold, and eventually was ready for a full scale test in Union, New Jersey. After a slow start, the workers got the hang of the process and

began moving with something approaching the speed Edison envisioned. Technically the houses were a success, but from a marketing standpoint they were a failure. Even when priced at the $1,200 price Edison planned, not a single house sold the first month. Eventually the first block of eleven houses sold but not before Lambie lost his financial backing spelling the end of attempts to build Edison poured concrete houses.

While Edison focused on pouring monolithic concrete houses, other innovators explored a different type of concrete application–pre-cast concrete. Pre-casting concrete in molds at off-site fabricating facilities afforded the opportunity to create uniform products of high quality in a multitude of structural, finish, and decorative applications.

A formal definition of architectural precast concrete is any precast concrete element that through application, finish, shape, color, or texture contributes to a structure's architectural form and finished effect. Components may be standard or custom size, load-bearing or non-load-bearing, and conventionally reinforced or prestressed. Hardware for connection to the structure may consist of structural steel shapes, bolts, threaded rods, and reinforcing bars. Generally, connections are bolted or welded. Architectural precast concrete gained prominence in the late 1950s and continues to be widely used.

The first documented use of architectural precast concrete was in the Cathedral Notre Dame (1923) in Raincy, France. The precast elements consisted of screen walls and infill in an otherwise cast-in-place concrete structure. In the United States the depression years limited development of large-scale precast components. Not until World War II ended did the architectural use of precast concrete begin to flourish.

Colorado architects participated in the experimentation with concrete building systems. Pueblo architect William A. Fry advertised himself in the 1910 *Colorado State Business Directory* as a specialist in concrete construction and the "holder of patents for concrete construction." He based his claim on a 1908 filing and the subsequent award of a patent on a devise for molding concrete walls.

One of Colorado's most innovative experimenters in concrete construction was Eugene Groves. Groves experimented extensively with reinforced and precast concrete construction throughout his career. We do not know how closely he followed developments in concrete construction technology, but due to the extensive publicity given to concrete construction in the early twentieth century, particularly in building trade publications, we may safely assume that he was familiar in at least a general way with advances in concrete construction methods across the United States. His own experiments and innovations in precast concrete during the 1930s lead to the formation of the Concreter Corporation and the construction of the Nordlund House.

CONCRETER CORPORATION

In December, 1936, Groves submitted a patent application for a new concrete construction technique. The U.S. Patent Office awarded the patent in June, 1937. The architect/inventor summarized the objectives of the new technique in the patent introduction:

> This invention relates to an improvement in building construction and has for its principal object the provision of a building in which all woodwork is eliminated; in which all of the structural members are pre-formed so that no concrete forms are necessary on the job; which will provide a durable, permanent, fireproof construction; and which will be adaptable to any type of building.
>
> Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency.

The new system involved extensive use of precast reinforced concrete studs and beams which form the complete building and provide support for concrete slab floors and wire mesh and concrete stucco walls (Fig. 1). For the basement walls a series of paired stud members are employed. These inner and outer stud members are set so the gap between each pair later forms part of a continuous concrete wall. These stud members are wider at their inner faces than at their outer, so that they may eventually become dovetailed in the wall. The basement walls are finished by attaching form boards (not quite the total elimination of forms Groves claimed in his introduction) to the inner and outer faces of the stud wall. The boards are clamped against the studs by means of vertical channel bars (Fig. 4) secured by attachment bolts. The entire basement wall is filled with concrete which imbeds the dovetailed stud members permanently in place.

The form boards and supporting channels can be removed leaving the nuts of the attachment bolts imbedded in the concrete to be used latter to attach shelves and other structures to the inner face of the basement walls. The concrete filling acts to increase the compressive strength of the entire wall and as a water proof retaining wall for the outer earth. The studs act as reinforcing for the concrete. The form boards are the only members not permanently incorporated in the wall. No supporting frames or braces are needed to support the form boards as this is done by the studs which later become a permanent part of the wall.

The lower stud members are secured at the top by a channel beam and metal bolts. The channel member acts as a sill for supporting metal floor trusses over which a concrete floor is poured (Fig. 1). The basement stud members support an L-shaped inner cross beam and outer straight beam member. These beam members engage with the bottom of the notched studs (Fig. 2) which form the upper level framing.

The upper studs are formed with a series of heavy cross wires at vertically spaced intervals (#23, Figs. 2 & 3). After the studs are in position, these wires are bent outward to receive a sheet of wire lath. The wire extremities are then turned upward against the wire lath to permanently hold it in place. This technique is used on both the inner and out wall surfaces. The wall is finished by plastering a heavy coat of water-proof cement plaster on both faces. The lower edge of the plaster is brought against the upper edges of the beam members to form a continuous wall.

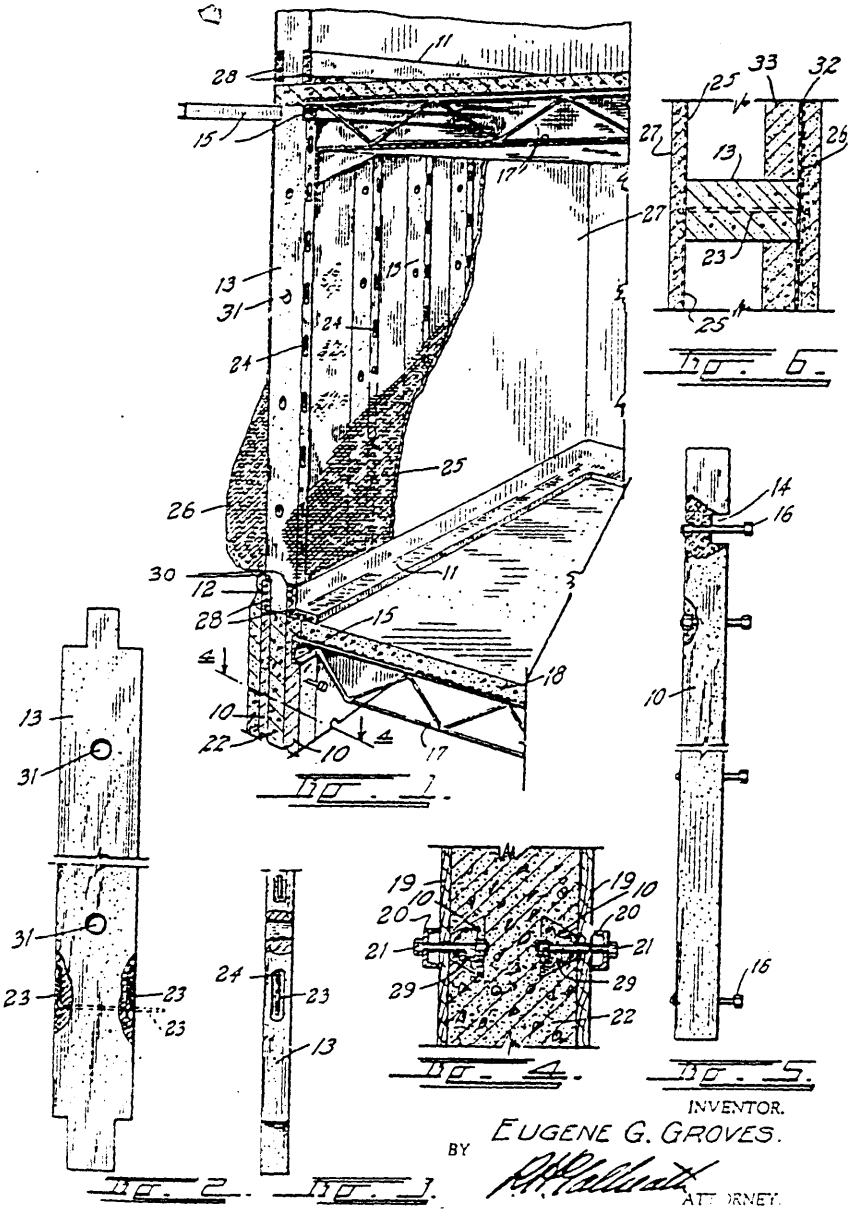
The basement and upper level studs are precast and delivered to the job ready for installation. Both of these members are formed with internal reinforcing to form a column structure for supporting the load placed upon them. The beams are also precast and delivered ready for

EUGENE GROVES PATENT ILLUSTRATIONS

June 15, 1937. E. G. GROVES 2,083,781

BUILDING CONSTRUCTION

Filed Dec. 14, 1936



installation. They are also formed with suitable reinforcing so as to form a beam structure for supporting the weight of the studs.

The studs are furnished with laterally extending holes through which the usual pipes, electrical conduits, wires, etc. of the building may be run. These holes also serve to allow air to circulate throughout the entire wall structure to dry out the structure and prevent moisture condensation.

Groves established a separate design and construction firm outside his architectural practice to build structures using his process. Christened the Concreter Corporation, the company set up shop in 1936 at 1261 Delaware. In 1938 the business relocated to 1919 Lawrence and remained there until its demise about 1943. During this period Groves maintained his architectural practice first at 2047 Champa and later in the Temple Court Building at 15th and California Streets. Groves served as corporate president and Roy B. Reed held the position of secretary and, for at least one project, functioned as the general contractor. Reed lived at 2730 W. 43rd Ave. at this time. The city directories listed Reed as a carpenter prior to 1936 and again after 1941.

Existing records indicate that the Concreter Corp. erected only three buildings during its seven year existence. The first was a residence for Mary Holland constructed in 1932 at 2340 S. Josephine Street. The second was a residence for Donald and Susan Sherman completed in 1935 at 2733 W. 41st. Concreter Corp. began work on the final residence in 1938. The house for local attorney Julian Nordlund and his wife Florette rose at 330 Birch Street and was ready for occupancy in 1939. The building permit indicated an approximate cost of $10,000 for the project. No records exist explaining Nordlund's motivation to live in a concrete house. What if any involvement the family may have had in the design is unknown.

All three of the residential structures employed the Groves concrete stud and plaster technique. The earliest construction on South Josephine is the more restrained of the three examples. The facade is notable for its projecting covered entry with engaged fluted columns and its molded fascia. The house uses multi-light metal casement windows of varying sizes. The roof is mostly flat but rises in a shallow dome over the entry hall. The building does include an outside stair to a roof terrace, an element repeated in the other Concreter houses.

The West 41st Avenue, Sherman residence exhibits Groves design flair, resulting in what, according to Denver architectural commentator Don Etter, has been called "both exciting and ridiculous." In a fuller description of Groves concrete houses, Etter notes:

> Even his built-in cupboards were concrete. Such modern features as thermolpane windows, recessed lighting and exterior electric outlets were incorporated into his houses. He designed with an incredible flair, connecting rooms with outside terraces and stairs, producing variety and a sense of volume with bay windows, domes and awnings (made of concrete, of course), and embellishing the result with fluted columns, Mediterranean tiles, iron railings and concrete lattice. While direct precedents are difficult to find, Groves' work partakes of early

20th century Art Nouveau designs, as well as later expressionistic and futuristic concoctions.

NORDLUND HOUSE

The Nordlund House exemplifies the culmination of Groves' experimentation with concrete residential construction. As the final house built by the Concreter Corp., it takes advantage of previous design and construction experience. The house was as much sculpted as built and Groves took advantage of the flexibility of his mesh and stud structural form to create a highly irregular massing of stacked shapes. The soft rounded corners and stucco finish produces an overall effect somewhat reminiscent of southwestern pueblo design. Yet the modernity of the design is expressed in the variety of materials, including Mediterranean tile, glass block, and decorative wrought iron, and the interesting use of free form precast brackets and balusters, bay windows, and cantilevered sections with serpentine molding applied like frosting on a cake. Groves expanded his use of concrete window frames with the Nordlund House, surrounding most of his single and double metal casements with multi-light double-paned windows in precast concrete frames.

Groves extended the use of his precast concrete stud, mesh and plaster wall system to the floor construction in the Nordlund House. The concrete studs are laid horizontally as floor joists to support the metal mesh and rebar web on which the concrete floor slab is poured.

The interior of the Nordlund House illustrates Groves design genius, both from his innovative use of concrete as a structural and finish material and in his ability to create living spaces that continue to be highly functional in the rather inflexible medium of concrete. He clearly demonstrated the technical possibilities of precasting concrete to form cabinet frames and faces, built-in desks, door and window frames, recessed book shelves, stair balusters, and built-in seating. The domed ceiling in the living room with electrical lighting cast into the surrounding support beam gives the room a light and spacious feeling. The tall recessed niches in the dining room allows for traditional wood furniture to blend into the overall form of the room. The thoughtful inclusion of a recessed picture rail around the walls allows decoration without scarring the concrete wall finish.

The curving entry hall and the multi-level construction give the house a sense of mystery and interest. The inclusion of such spaces as the work area off the living room, the west-lighted reading nook at the top of the stairs (complete with recessed concrete bookcase), and the secluded office off the upstairs study with its adjoining roof-top terrace give the house a very modern feel. The outside stair leading to the top floor terrace and study allowed a previous owner to use the study as a psychiatric office accessible to patients without interrupting the private family areas.

From a technical standpoint, the Nordlund House is a success. Groves demonstrated the viability of his concrete construction technique, even going beyond the design specifications set out in his patent application. However, as Thomas Edison found out before him, technical viability does not insure economic viability. While Groves showed how concrete could be precast into a wide variety of finished forms, he was never able to achieve the economies of scale possible through mass producing a limited number of forms. Anecdotal history indicates that Groves actually cast all

his concrete forms on the construction site. Despite these precast elements, the houses built by Concreter more closely resembled the construction techniques employed by early concrete house fabricators than what has came to be known as prefabricated construction. The highly labor intensive nature of the Groves designs kept the cost high relative to conventional wood construction.

The Concreter Corp. never achieved financial success and was kept afloat by infusions of cash from Groves. He might have been able to build a client base for his company had not the start of America's involvement World War II in 1941 brought the end of nearly all non-military construction for the duration. The Nordlund House was the last building constructed by Concreter and the company failed to appear in city directories after 1942. Groves continued to practice architecture and received a number of important commissions from Colorado State University after the war.

The Nordlund House is both a tribute to modern materials and technology (the kitchen feels much like a sleek car on a streamliner train) and a rejection of austerity and standardization. The concrete embellishments are whimsical and theatrical. The structural details in the house create a final effect which has a flamboyant pastiche of southwestern, Miami Deco and Baroque styles. One writer characterized the house as "Bombshelter Baroque."

The house represents an exciting but failed attempt to produce prefabricated houses. The house is an excellent example of the pre-World War use of concrete, and shows the conflict between the notion of concrete as an expressive, plastic medium and the uniformity that is necessary for economic success with a prefabricated technique.

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GEOGRAPHICAL DATA

Verbal Boundary Description

Lot 2, Block 5, Eastern Capitol Hill Subdivision, Denver City and County, Colorado.

Boundary Justification

The nomination boundaries include all the land historically associated with the Nordlund House.

PHOTOGRAPH LOG

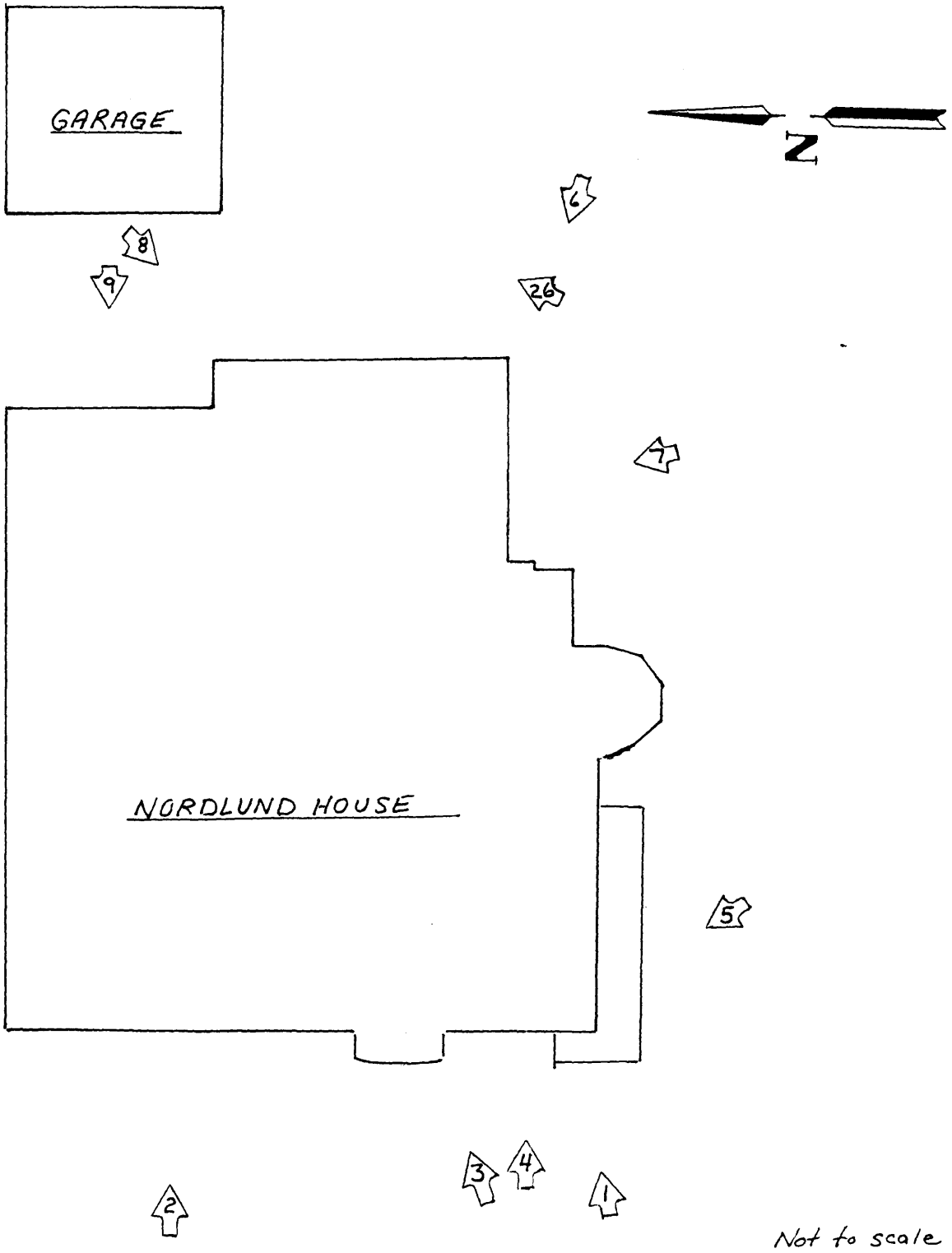
The following information pertains to all photographs below:

Name of Property:	Nordlund House
Location:	Denver County, Colorado
Photographer:	Elizabeth Carver
Date of Photographs:	September, 1997
Negatives:	Possession of photographer

Photo No.	Information
1	West elevation, view to the east.
2	West elevation, view to the east.
3	West elevation, entry detail, view to the east.
4	West elevation, view to the east.
5	South elevation, stair detail, view to the northwest.
6	South and east elevations, view to the northwest.
7	South elevation, window detail, view to the northwest.

Photo No.	Information
8	East (rear) elevation, view to the southwest.
9	East (rear) elevation, family room entry, view to the west.
10	South elevation, roof-top terrace detail, view to the southeast.
11	Main entry hall, view to the west.
12	Main entry hall, view to the east.
13	Living room, view to the north from entry hall.
14	Reading nook off living room, view to the northeast from living room.
15	Dining room detail showing recessed picture rail and furniture niche.
16	Kitchen from center hall, view to the south.
17	Kitchen detail showing concrete refrigerator surround and adjacent cabinets.
18	Kitchen detail showing concrete cabinet frame and wood drawer system.
19	First floor main stair balustrade detail.
20	Rear hall toward rear entry with built-in cabinets, view to the east.
21	Rear hall with built-in pie cabinet and flour and sugar bins, view to the west.
22	Master bedroom closet detail, view to the north.
23	First floor structure detail showing precast joists (studs) with wire and rebar mesh supporting concrete slab.
24	Concrete window frame detail.
25	Built-in concrete desk detail.
26	Garage, south and west elevations, view to the northeast.

SITE PLAN AND PHOTOGRAPHIC VIEWS



Not to scale

USGS TOPOGRAPHIC MAP
Englewood, Colo.
7.5 Minute Quad
1965, Revised 1994