WEBSTER SCHOOL
10th & H STREETS, NW
WASHINGTON, DC

*   *   *

CONDITION SURVEY

*   *   *

Tadjer Cohen Edelson Associates, Inc.
Silver Spring, MD 20910

Tadjer-Cohen-Edelson Associates, Inc.
Consulting Structural Engineers

November 12, 1999

National Treasury Employees Union
c/o Joel Schenk
JM Zell Partners, Ltd
555 13th Street, NW, Suite 650 East
Washington, DC 20004

Re: Webster School
10th and H Streets, NW
Washington, DC

Dear Mr. Schenk:

In accordance with our agreement we visited the Webster School at 10th and H Streets, NW, Washington, D.C. on November 2, 1999. This investigation is a followup to our preliminary September, 1999 investigation and TCE report dated September 29, 1999. The purpose of our visit was to observe existing structural conditions, perform exploratory investigation, analyze structural components for conformance with current building codes, and provide a written report of findings, including budget cost estimates for recommended remedial structural reinforcement and repair work. Our observations were limited to visual observation of exposed portions of the construction, and there is no guarantee, either expressed or implied, that all conditions were observed. Following are our findings, analysis, and recommendations:

EXECUTIVE SUMMARY

- The existing lumber floor joists do not meet strength requirements for current local building codes with allowable stresses and design procedures in effect today.
- Significant structural repairs are required in the wood roof framing due to deterioration caused by moisture from roof leaks.
- All three framed floor levels in the Southeast wing of the building have collapsed and must be completely rebuilt. There is significant structural damage to floor framing at other locations of the building.
- Several widespread and costly maintenance repairs are required.
  Flooring and underlayment may have to be replaced throughout the entire building.
  The entire slate roofing must be removed, repaired and possibly replaced.
  The entire exterior masonry facade must be tuckpointed.
  There are many additional repair requirements that are necessary because of the deteriorated condition of the structure. The cumulative cost of these repairs is significant. See Appendix C at the end of this report for a preliminary budget estimate of repair costs.
- Repair costs may increase after removal of finish materials due to hidden conditions which

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were not observed during the limited exploratory investigation.

- Non-structural criteria from other disciplines could increase repair costs several fold, if th restrict the material selection or implementation of the required repairs.
- We must be given the opportunity to review and comment on any recommendations made l other disciplines to verify that strength, safety, and serviceability have not been compromise

FINDINGS (see photographs in Appendix A)
The most prevalent damage to the existing structure appeared in the form of water damage due to ro leaks. In addition, cracks were observed at plastered masonry walls and exterior masonry facade Finish materials were removed for closer examination where water and crack damage were observe as indicated in the "key to photographs" located in Appendix A. A total of 13 explorato investigations were performed at the locations indicated. Finish materials were removed, and existin structural members were probed with a hammer to determine soundness. Structural members were n damaged during the investigations.

The greatest number of exploratory investigations were done at the third floor level where the mo water damage was observed. Observed water damage dissipated at each successive lower level.

The locations for exploratory investigation at lower levels were chosen to get a representative samplin in order to determine the structural systems for analysis. The basic construction features of th structural floor system and masonry walls are summarized in the "existing construction features located in Appendix B.

CURRENT BUILDING CODE REQUIREMENTS
The current Washington, DC building code design live load requirements for office use are summarize below. Pertinent section numbers of the code are indicated in the left margin.

DESIGN LOADS [PER BOCA-1990 EDITION REQUIREMENTS, AND CURRENT WASHINGTON, DC AMENDMENTS]
1106.1---FLOOR LIVE LOADS
100 PSF---SLABS-ON-GRADE, FIRST FLOOR CORRIDORS AND LOBBIES
80 PSF---CORRIDORS ABOVE FIRST FLOOR
50 PSF [PLUS 20 PSF PARTITION DL]---PROPOSED OFFICE AREAS
125 PSF---LIGHT STORAGE [AT FRAMED FLOORS]
1111.1---ROOF LIVE LOAD
30 PSF
1111.1---ROOF SNOW LOAD---P_g---30 PSF GROUND SNOW
1 P_f---21 PSF FLAT ROOF SNOW
2 C_e---0.7 SNOW EXPOSURE FACTOR

3 I---1.0 SNOW IMPORTANCE FACTOR

1112.0---WIND LOAD

1 80 MPH BASIC WIND SPEED
2 I---1.0 WIND IMPORTANCE FACTOR
3 EXPOSURE B
4 P---DESIGN PRESSURE VARIES DEPENDING UPON AREA OF BUILDING BEING CONSIDERED---MINIMUM 20 PSF WIND PRESSURE PER WASHINGTON, DC AMENDMENTS TO BOCA BUILDING CODE.

1113.0---EARTHQUAKE DESIGN DATA

1 A_v=0.05
2 I=1.0
3 K=1.33
4 C=0.12
5 $S=S_3$=1.5
6 MASONRY LOADBEARING WALL STRUCTURAL SYSTEM
7 EQUIVALENT LATERAL FORCE DESIGN PROCEDURE [MAIN WIND FORCE RESISTING SYSTEM SATISFIES SEISMIC REQUIREMENTS OF CODE]

1201.3--- ASSUMED 2000 PSF ALLOWABLE SOIL BEARING FOR DESIGN OF FOOTINGS

BUILDING CODE AND LUMBER STRENGTH ANALYSES

Current live load requirements and existing material weights are indicated in the "design load summary tables". There are several important distinctions in the chronology and development of minimum building design loads and lumber allowable stresses and their application in building codes over the years. The following assumptions were made in our lumber strength analyses which are summarized in the "lumber stress summary table":

1 In the 1880's, design load requirements varied considerably. In addition, lumber was rough sawn, and not "grade stamped"---thus, there was some variability in the lumber product.

2 Although it is possible to visually grade the existing lumber according to modern standards, this would involve complete removal of finish materials for examination of all sides of each piece of lumber by a certified lumber grader. Our observations were limited to small samplings. We used an assumed value for #2 grade Southern Pine as the baseline for our calculations. This is reasonable, in our opinion, because it is the code minimum for use in buildings today, and it is unlikely that all existing lumber would meet grading requirements for higher strength lumber, even if it were to be formally graded.

3 The earliest allowable stresses for lumber published by the American Forest and Paper Association---AFPA (formerly the National Forest Products Association---NFPA), is a document published in August 1943 under the supervision of the Conservation Division, War

Production Board, Washington, DC. We used the allowable stresses and design procedures indicated in that document for #2 grade Longleaf Southern Pine for our analysis of the original design condition for the 1880 time period---design criteria in use during the 1880's were not available to us. In addition, we assumed a 40 psf design live load for classroom use. Note the "original classroom load" heading in the "lumber stress summary table". Analysis under this heading was done using the 1943 published allowable stresses and design criteria. A comparison analysis was done using current design criteria.

4 The current Washington, DC building code uses BOCA model building code, 1990 edition, with special amendments. One of the Washington, DC amendments allows for existing structures to be "grandfathered" in at a reduced design load if the building was built before July 1, 1925. Thus: although the current building code minimum design live load for office use is 50 psf, a reduction to 40 psf design live load is permitted under Washington, DC amendments if placards are posted by the building official indicating this reduced live load. Actual material dead weights and 20 psf partition dead load must also be considered. Note that "reduced office load" is one of the headings in the "lumber stress summary table". Analyses under this heading were done using both old and current published allowable stresses and design criteria for comparison.

5 A minimum 30 psf uniformly distributed design live load was used for analysis of sloped wood roof joist framing, in accordance with Washington, DC amendments---this requirement is more stringent than BOCA code. 10 psf uniform live load (or 300 pound man load, whichever is greater) was used for analysis of ceiling joists at the roof level. The design load requirement for roofs is assumed to be unaffected by occupancy.

6 We have assumed that exceptions, such as more stringent design load requirements for emergency facilities, do not apply to this building.

7 The current wood design standard is National Design Standard (NDS) for Wood Construction, 1997 edition, and the Supplement. Design criteria are included in the NDS, and allowable lumber stresses are included in the Supplement.

- Deflection, although related to strength and stiffness, is really a serviceability requirement. Nevertheless, none of our analyses for lumber were limited by deflection criteria---all were limited by strength. Floor framing is limited by the deflection criteria of L/360 (joist length in inches/360) for superimposed live load and L/240 for total load. Roof framing is limited by the deflection criteria of L/180 for superimposed live load at sloped joists with no finish ceiling, and L/360 for ceiling joists with plaster.
- First, we checked existing undamaged wood floor framing with the lower floor design loads and higher allowable stress values in effect when the building was originally built. Our analysis indicates that the existing lumber meets the assumed original design load and allowable stress criteria for strength, but would not meet current design criteria.

- Next, we checked the existing wood floor framing for reduced live load per Washington, DC amendments. The typical joist spans meet this loading requirement under the older design criteria, but not under current design criteria.
- Finally, we checked the existing wood floor framing for full (unreduced) office design load requirements. None of the office floor area joists meets these requirements under either the old or new design criteria.
- Storage areas, with 3"x10" joists at 16" o.c., span only 8'-0"+/-, and meet all current design criteria for the required 125 psf storage live load.
- Existing wood floor joists with up to 3 inches of rotten wood at the top edge are clearly deficient, and would require reinforcement under any of the design load conditions described.

WOOD ROOF FRAMING

The current condition of the existing wood roof framing is more fully documented in our preliminary condition survey dated September, 1999. Common joist framing is adequately sized, but has rotted where exposed to prolonged moisture due to active roof leaks. Most of the moisture damage occurs at sloped joist bearing ends and the wood sill plates. In addition to structural reinforcement, these areas may also require extensive repair and/or replacement of existing wood cornices. Many of the wood outriggers supporting the decorative wood cornice are embedded in the masonry wall and the outriggers have also rotted. Some termite damage was observed at individual wood members of the wood truss system at the NE section of the building. These members will have to be reinforced or replaced.

MOISTURE CONTENT OF WOOD

Moisture content of wood was randomly sampled with a Delmhorst moisture meter. Wet areas of wood subfloor and wood joists ranging from 80 to 100% moisture content immediately after removal of finish flooring, were measuring only 40 to 50% moisture content by the end of the day. This illustrates that the "free" water in wood evaporates rather quickly when it is exposed to air. The moisture, below 30% moisture content, takes substantially longer to evaporate because it first has to diffuse through the cell walls of the wood. Reduction of moisture content below 30% moisture content results in wood shrinkage, and can also cause the wood to split and warp. The threshold for decay and fungal growth is about 20% moisture content. The existing dry wood members have a moisture content of less than 12%. Although drying can be hastened by using fans and heaters, it may take more than a year for existing wet lumber to dry out to 12% moisture content after being exposed to air by removing finish materials (after repairing leaks).

DESIGN LOAD SUMMARY TABLES

Webster School
10th H Street, NW, Washington, DC
November, 1999

WOOD FRAMED FLOOR DESIGN LOADS

PSF	MATERIAL ITEM
8.0	1" nominal plaster ceiling finish
8.0	3"x14"at 16" o.c.
3.0	1" nominal thickness wood planking [1st layer]
8.0	1" nominal thickness plaster infill
3.0	1" nominal thickness wood planking [2nd layer]
3.0	1" nominal thickness wood planking [3rd layer]
1.1	3/8" nominal thickness plywood sheathing
0.2	linoleum tile or carpet
1.5	misc. wiring, partitions, etc.
36	TOTAL MATERIAL WEIGHT (PSF)

40	LIVE LOAD (PSF)
76	**TOTAL LOAD (PSF)**
	WOOD FRAMED FLOOR DESIGN LOADS

CORRIDOR DESIGN LOADS

PSF	MATERIAL ITEM
8	1" nominal plaster ceiling finish
40	clay brick arch
75	concrete infill—average 6" thickness
3.0	1" nominal thickness wood planking [1st layer]
3.0	1" nominal thickness wood planking [2nd layer]
1.1	1/2" nominal thickness fiberboard
0.2	linoleum tile
130	TOTAL MATERIAL WEIGHT (PSF)

80	LIVE LOAD (PSF)
210	**TOTAL LOAD (PSF)**
	CORRIDOR DESIGN LOADS

ROOF DESIGN LOADS

PSF	MATERIAL ITEM
	SLOPED JOISTS
10.0	1/4" thickness slate roofing
0.3	two layers 15# building felt
3.0	1" nominal thickness wood planking
2.5	2"x10" at 24" o.c.
16	NORMAL WEIGHT (sloped joists)
	slope = 8 = slope/12 roof slope
23	DEAD LOAD (sloped joists on horizontal projection)
	CEILING JOISTS
3	2"x8" at 16" o.c.
8.0	1" nominal plaster finish ceiling
1.5	misc., wiring, etc.
13	DEAD LOAD (ceiling joists)
35	TOTAL MATERIAL WEIGHT (PSF)

30	LIVE LOAD AT SLOPED JOISTS (PSF)
65	**TOTAL LOAD (PSF)**
	ROOF DESIGN LOADS

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LUMBER STRENGTH SUMMARY TABLE

JOIST SIZE/SPACING	LOCATION	JOIST DESIGN SPAN	SPECIES/GRADE COMBINATION	ALLOWABLE STRESS CRITERIA	LOAD CRITERIA MET: ORIGINAL CLASSROOM LOAD	LOAD CRITERIA MET: REDUCED OFFICE LOAD	LOAD CRITERIA MET: FULL OFFICE LOAD
3"X14"@16"	EAST [REAR] CLASSROOM FLOORS	26'-6"	#2 SO. PINE	ORIGINAL	YES	YES	NO
				CURRENT	NO	NO	NO

November 12, 1999

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WOOD FLOORING

Most floors are covered with vinyl tile flooring. Directly below the vinyl flooring is plywood underlayment or fiberboard underlayment. Presumably, the fiberboard underlayment was used at corridors to reduce structure borne sound transmission due to foot traffic. The vinyl flooring and underlayment are moisture damaged and will probably have to be replaced (or at least removed) throughout the entire building. In several areas (below roof leaks), the tongue and groove wood flooring is also rotted and will have to be replaced. It is possible that the second layer of tongue and groove wood flooring is not part of the original construction, since both layers of wood flooring appear to be lacquered, and this is normally only done on the finish layer. Wood flooring could be removed to reduce dead weight, if this is permitted. This may be necessary to help meet floor joist strength requirements for current design loads.

MASONRY ARCH FLOORS

The corridors at all floor levels, and additional lobby areas at the first floor level are constructed of shallow clay brick masonry arches supported by steel beams. The masonry arches are covered with concrete infill and several layers of wood flooring nailed to wood sleepers embedded in the concrete fill. In general, the loadbearing capacity of this arched floor system appears to be adequate. Maintenance repairs are required in several areas. At the third floor, and isolated areas at other levels, water from roof leaks has deteriorated the concrete fill (in addition to the wood flooring). The steel beams and masonry arches are covered with plaster at the ceiling of upper floors. Below the first floor, at the ceiling above the basement, some of the exposed steel beams are rusted, and the sprayed on fireproofing which covers the entire steel and masonry ceiling surface in some areas is delaminating.

FOUNDATIONS

Step cracking at mortar joints and cracks through brick units were observed within a few feet of each of the four major building corners (at the H Street and opposite alley facades). The observed cracks continue full wall height, interrupted by window openings. These cracks could have been caused by thermal expansion and contraction, but may have been caused by local bearing subgrade settlement. These areas warrant additional investigation. If it is found that the bearing subgrade is deficient, repair solutions may be very costly. Additional cracks at the South alley facade occur at the foundation level. These cracks were possibly due to settlement caused by former excavations for utilities. Portions of the masonry stoop are currently undermined and damaged due to erosion and settlement of bearing subgrade.

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Washington, DC

Deteriorated brick and mortar joints were observed at exposed locations in the basement. This is due to moisture infiltration from the soil backfill. Many areas of masonry basement walls are covered by finish materials, but we anticipate that the extent of damage is widespread.

Interior non-loadbearing masonry walls are cracked above door openings near the 10th Street facade. These door openings have 3" thick wood lintels, or were simply built on the wood door frames. Although this could explain the observed cracks, it is possible that local bearing subgrade settlement could be occurring at these locations.

MASONRY WALLS

As indicated in the photographs and in the "Foundation" section of this report, there are signs of distress which may be indicative of foundation bearing subgrade failure. Our analysis indicates that the original masonry bearing walls and non-loadbearing shearwalls are generally of adequate strength. However, due to the indicated damage, there are many strength deficiencies which require repair.

Cracked and loose brick courses were observed at the facade of the SE wing of the building where three floor levels are completely collapsed. This damage may have occurred when the floors pulled loose from the exterior walls. Some of the loose bricks look like they are ready to fall, and pose an immediate hazard to workers or pedestrians. The global stability of the remaining walls at the collapsed floor area is in question, and warrants further investigation.

ADDITIONAL CONSIDERATIONS

Architectural and historical considerations are beyond the scope of this structural investigation, and should be considered separately to get an accurate picture of the scope of work and repair costs involved. We must be given the opportunity to review and comment on any contradictory recommendations made by other disciplines to verify that strength, safety, and serviceability of the structure have not been compromised.

RECOMMENDATIONS

Repair recommendations are indicated in the "preliminary cost estimate" spreadsheet located in Appendix C. These are intended to identify major structural repair items, and some maintenance repair items. **Note that some of the observed defects may require additional structural repairs which have not been included in the cost estimates.** For example, if indicated live load reductions and partition dead load waivers are not accepted, **ALL** of the typical floor joists would need to be strengthened at considerable extra cost. Quantities and scope of work indicated in the "preliminary cost estimate" spreadsheet may increase dramatically after removal of finish materials due to hidden conditions which were not observed during the limited destructive investigation, and may also be affected by architectural and historical considerations.

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10th and H Streets, NW
Washington, DC

ADDITIONAL INVESTIGATION

It is our understanding that asbestos abatement study, historical and architectural evaluations are already planned. Recommendations for additional investigation (some of which have already been indicated in other sections of this report) are as follows:

1 Investigate bearing subgrade at locations of cracked masonry foundation walls.
2 Termite (and other insect infestation) inspection and certification.
3 Mortar testing (chemical analysis) to provide baseline for mortar joint tuckpointing and other masonry repair specifications.

Please call if you have any questions, or if you require further assistance.

Yours truly,

J. Mark Bartel, PE
Project Manager

Eric L. Edelson, P.E.
Vice President

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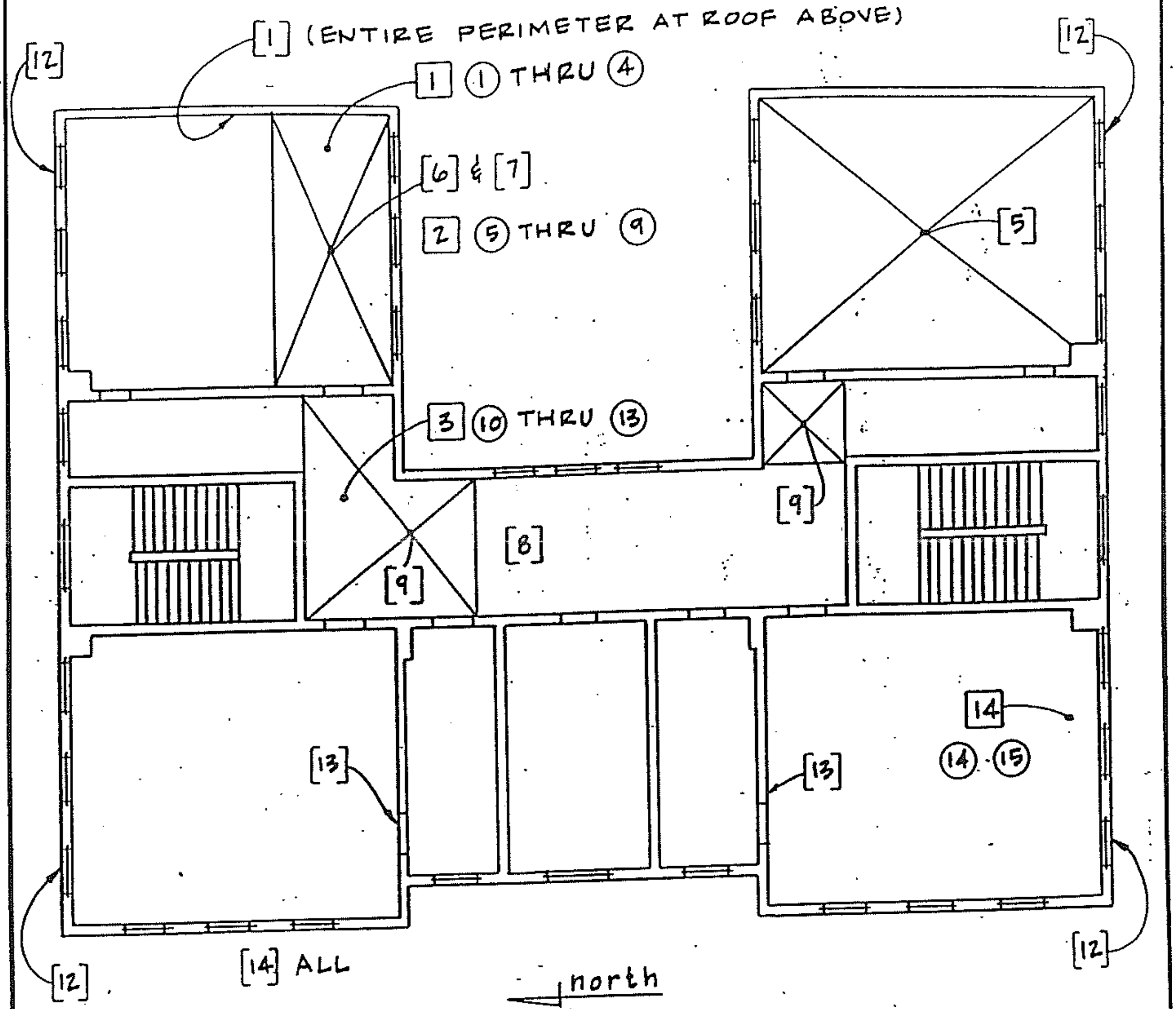
Appendix A
Photographs



THIRD FLOOR
1/16" = 1'-0" (±)

Notes:

1 Circled numbers, indicated thus: ① on plan indicate numbered photographs
---see Appendix A

2 Boxed numbers, indicated thus: [2] on plan, indicate locations of destructive investigation

3 Bracketed numbers, indicated thus: [2] on plan, indicate work items
---see "Repair Cost Estimate" spreadsheet, Appendix C

A-1

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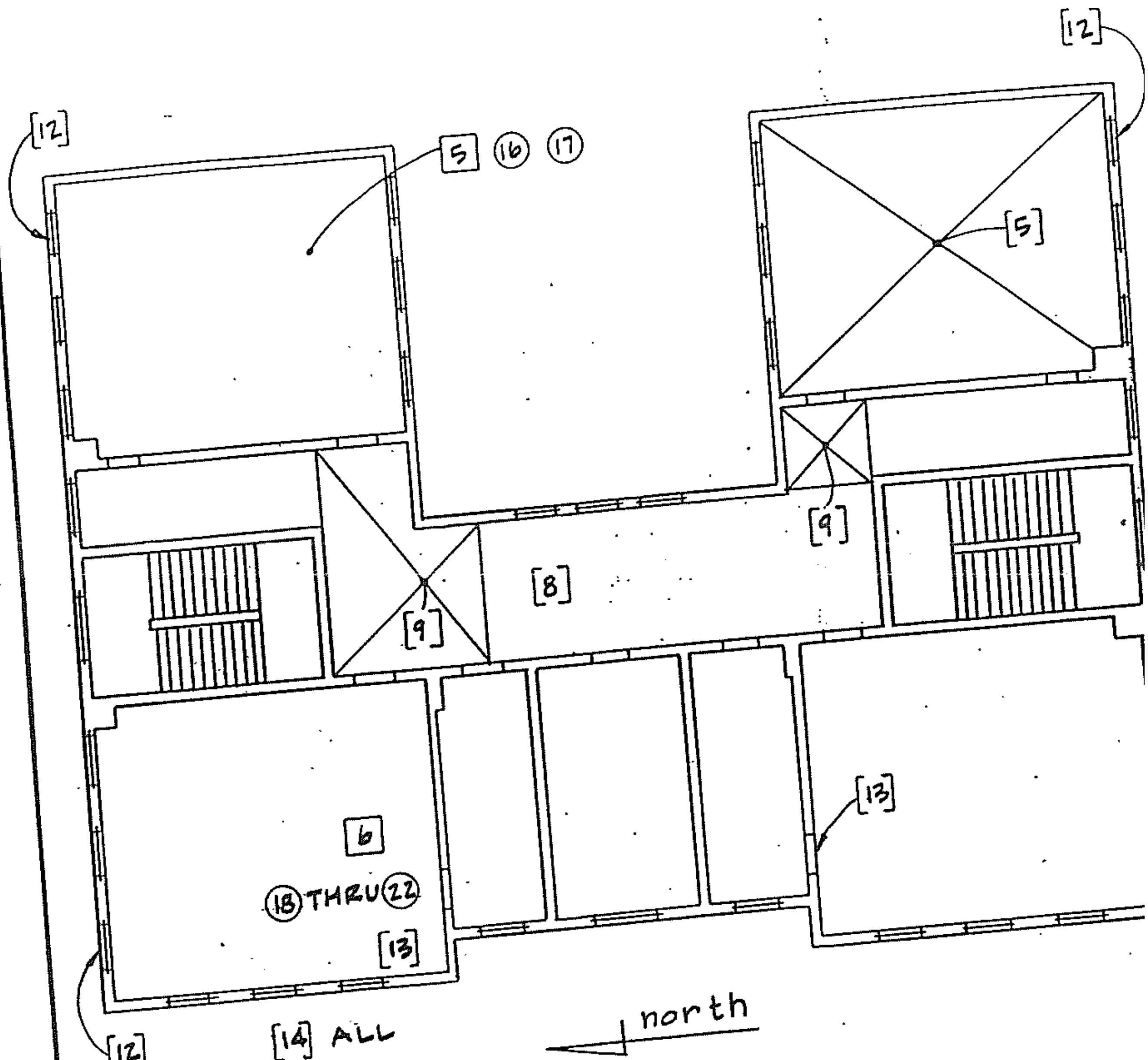
PROJECT: WEBSTER SCHOOL
KEY TO PHOTOGRAPHS, ETC.

DATE: NOVEMBER, 1999 | PROJ. NO: 299297.00



SECOND FLOOR
1/16" = 1'-0" (±)

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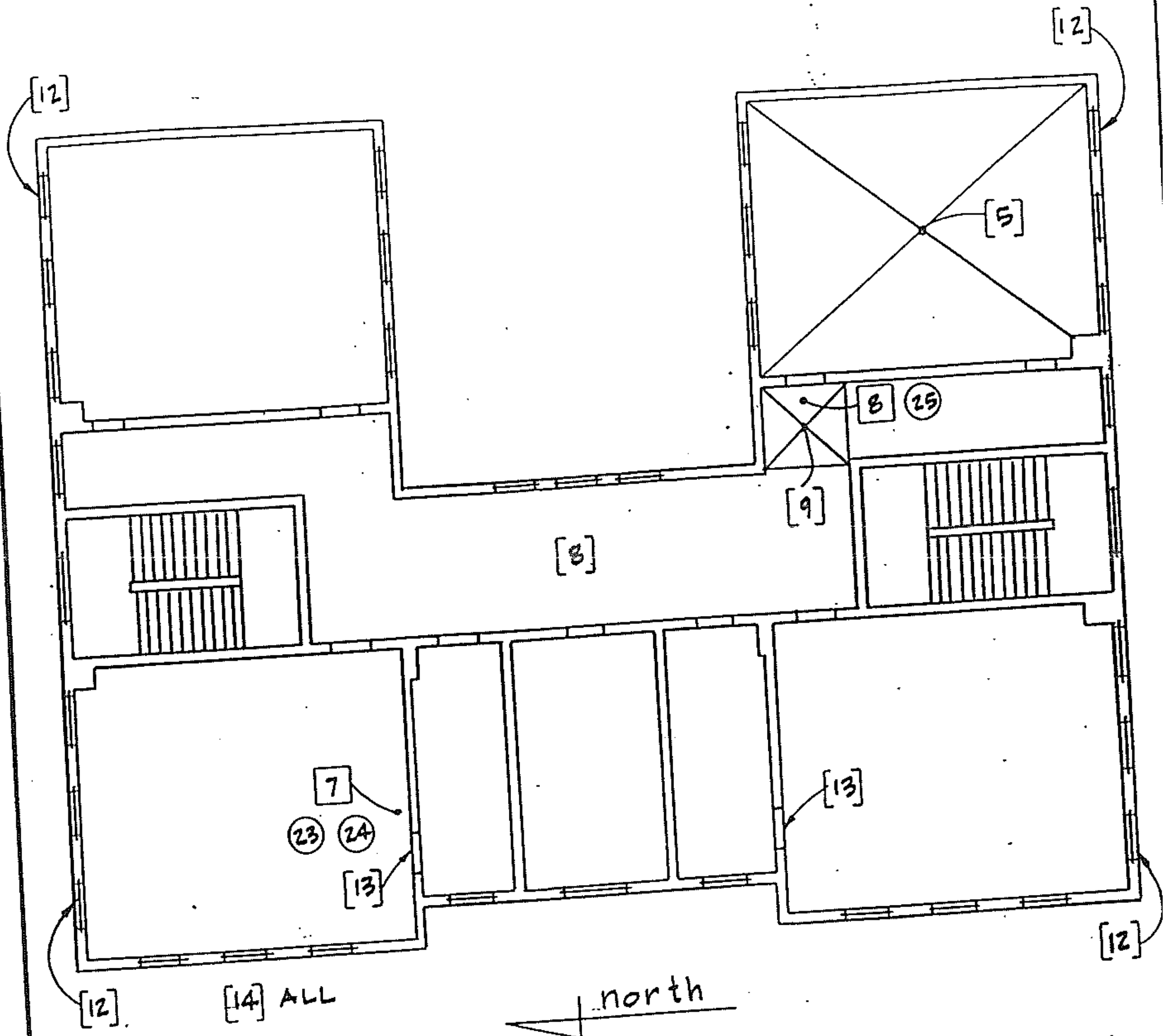
PROJECT: WEBSTER SCHOOL
KEY TO PHOTOGRAPHS, ET
DATE: NOVEMBER, 1999 PROJ. NO: 29929



FIRST FLOOR

1/16" = 1'-0" (±)

A-3

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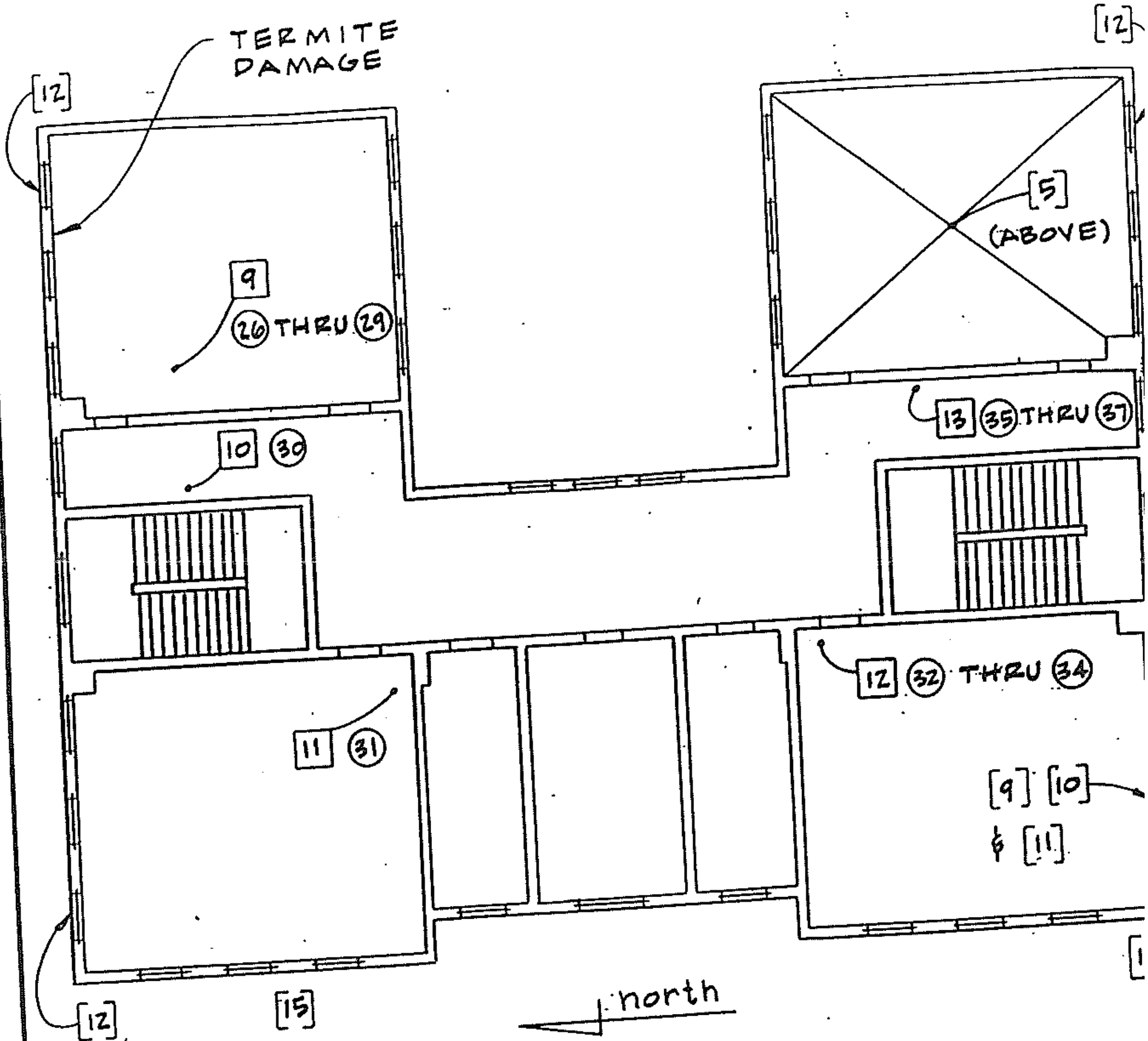
PROJECT: WEBSTER SCHOOL
KEY TO PHOTOGRAPHS, ETC.

DATE: NOVEMBER, 1999 | PROJ. NO: 299297.00



BASEMENT

1/16" = 1'-0" (±)

A-

TADJER COHEN EDELSON ASSOC INC.
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PROJECT: WEBSTER SCHOOL

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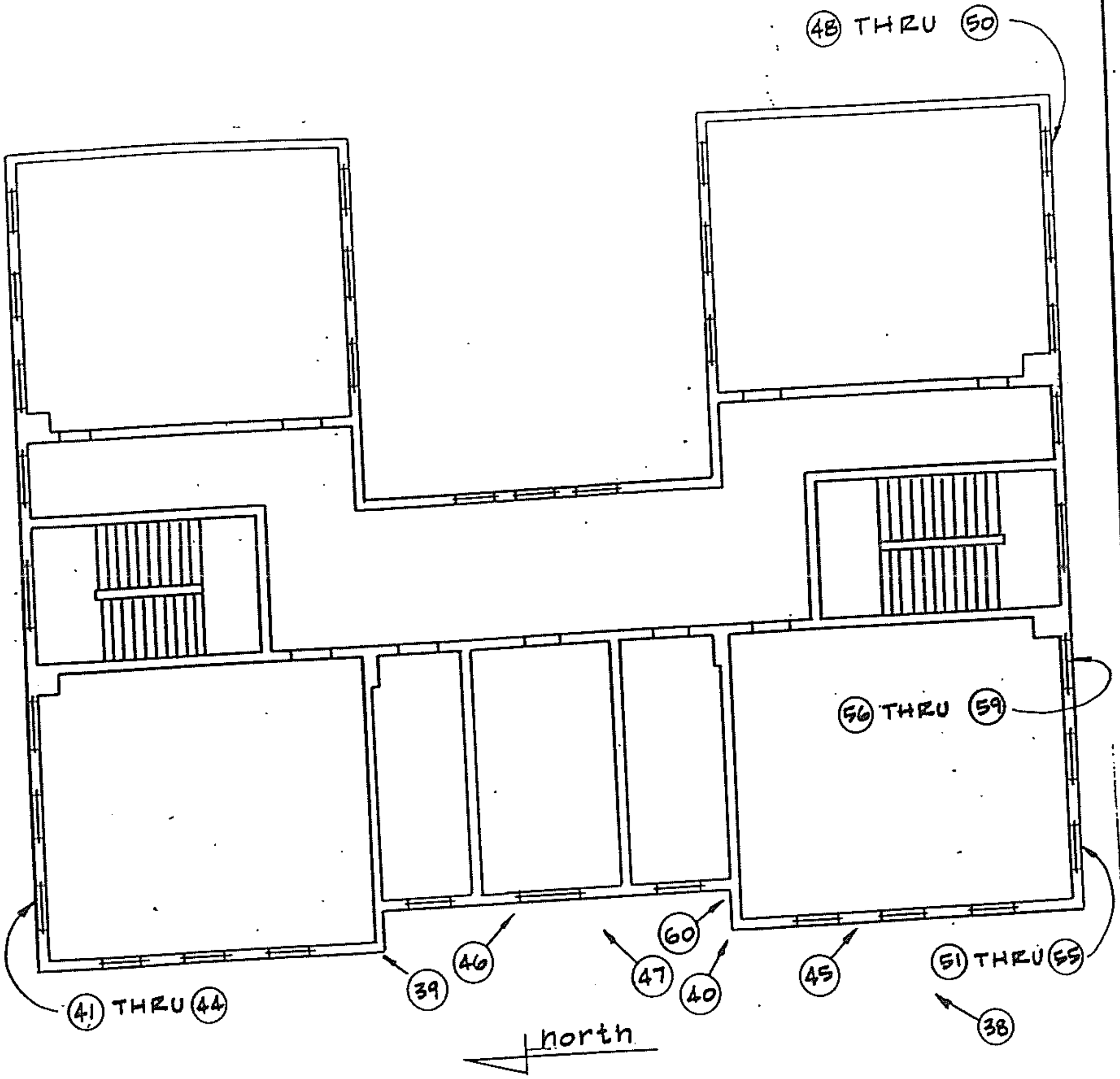
DATE: NOVEMBER, 1999 | PROJ. NO: 299297.0



FACADE

A-5

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PROJECT: WEBSTER SCHOOL	
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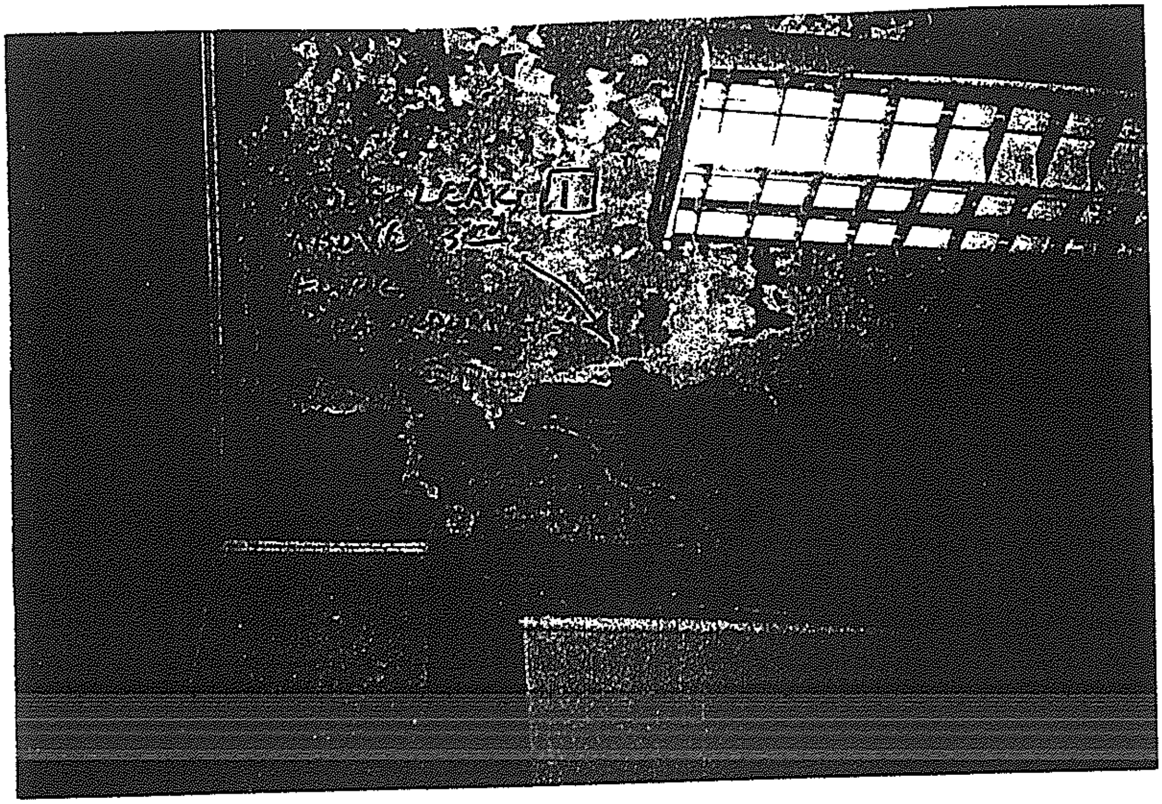
DATE: NOVEMBER, 1999	PROJ. NO: 299297.00



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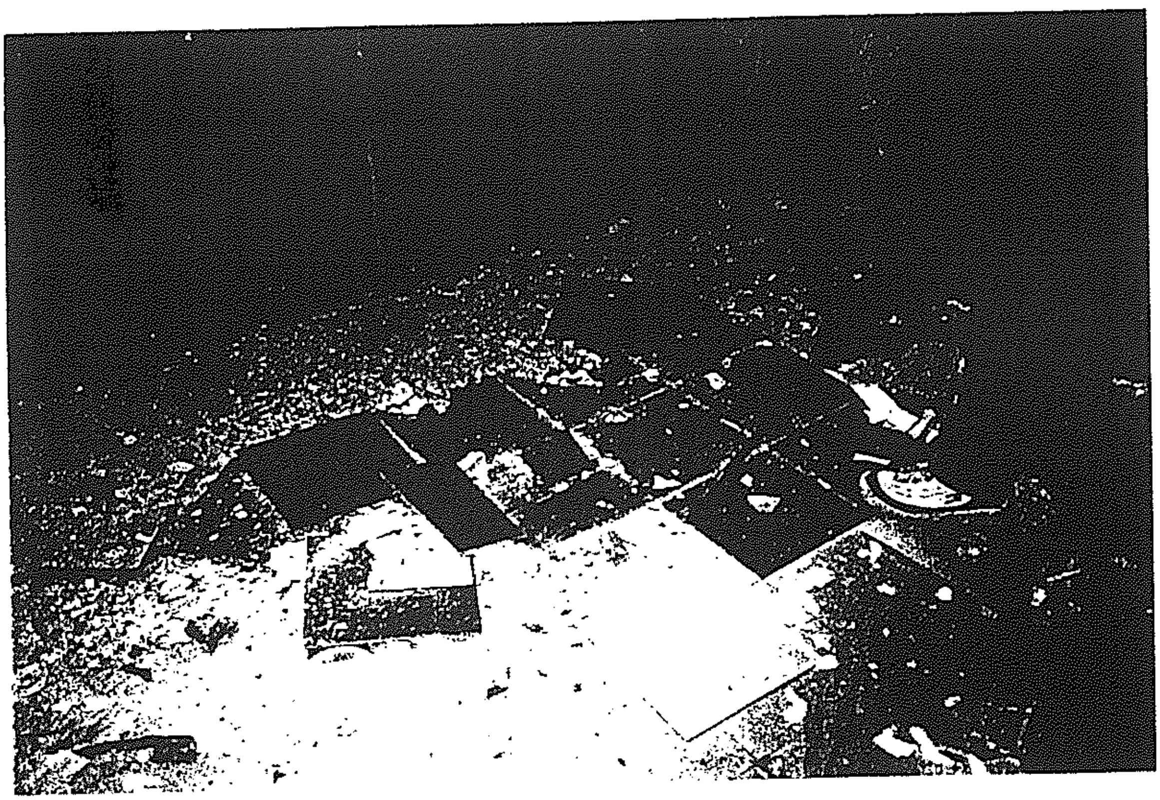

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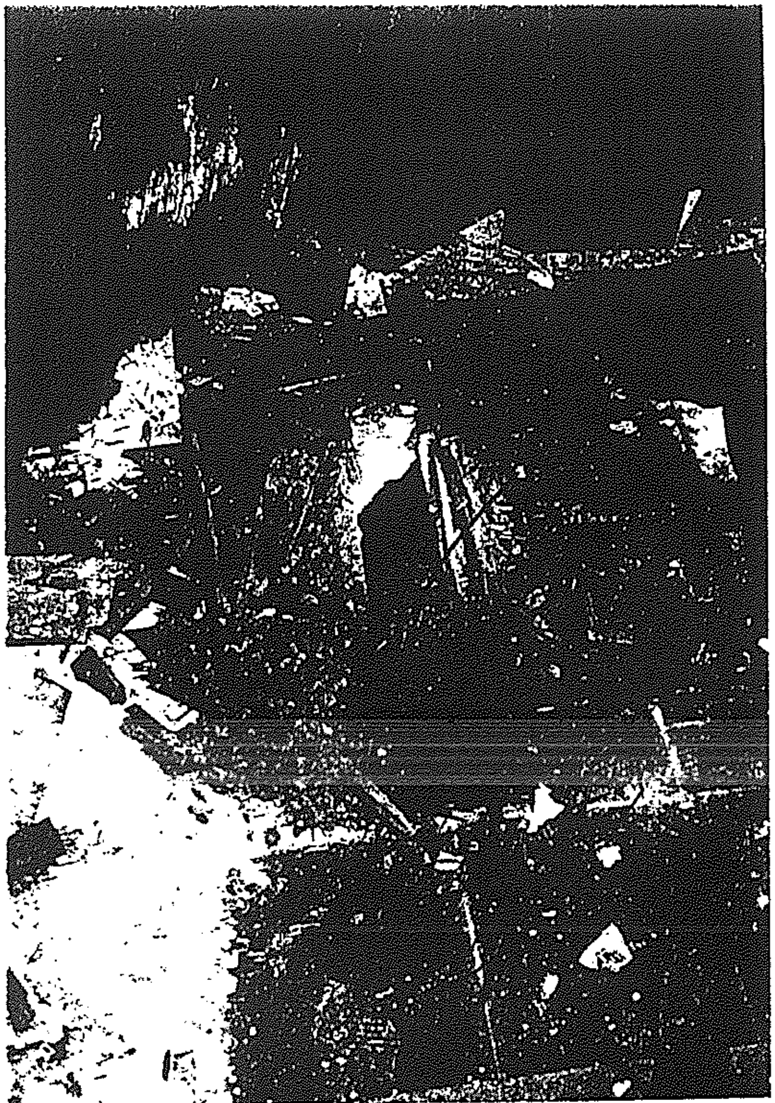
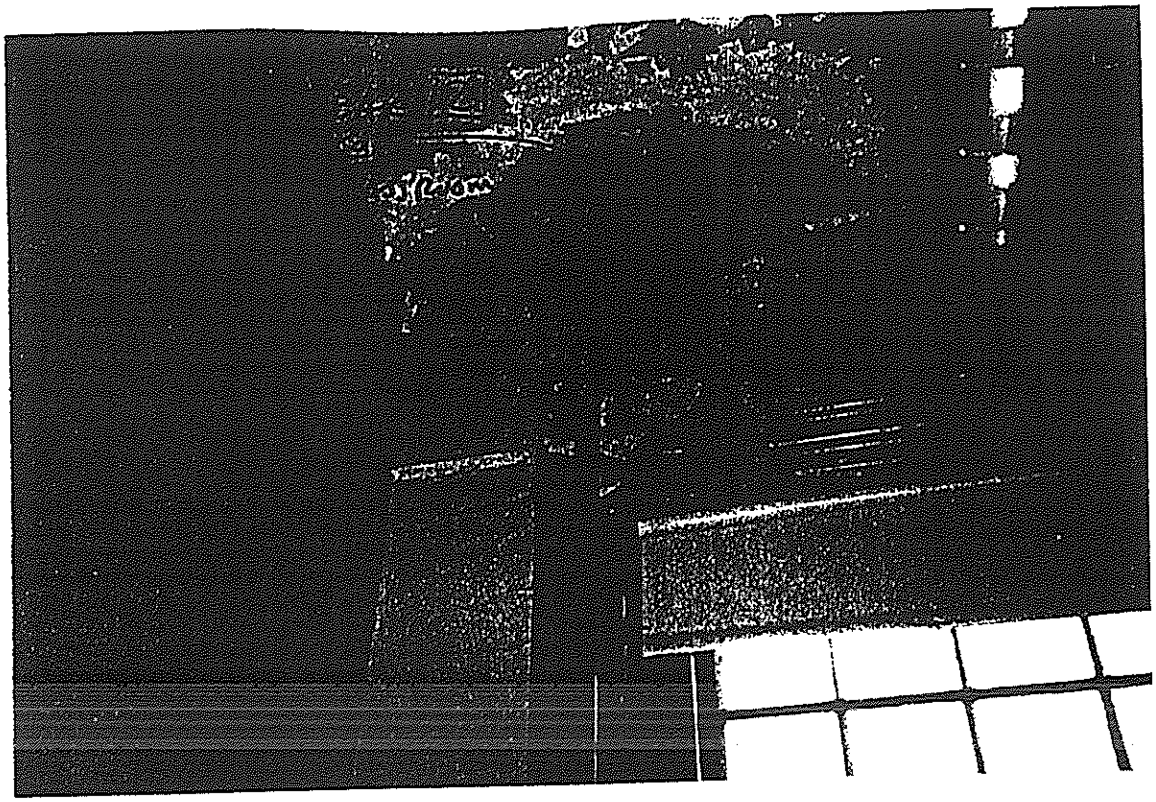


Photo #3

Photo #4



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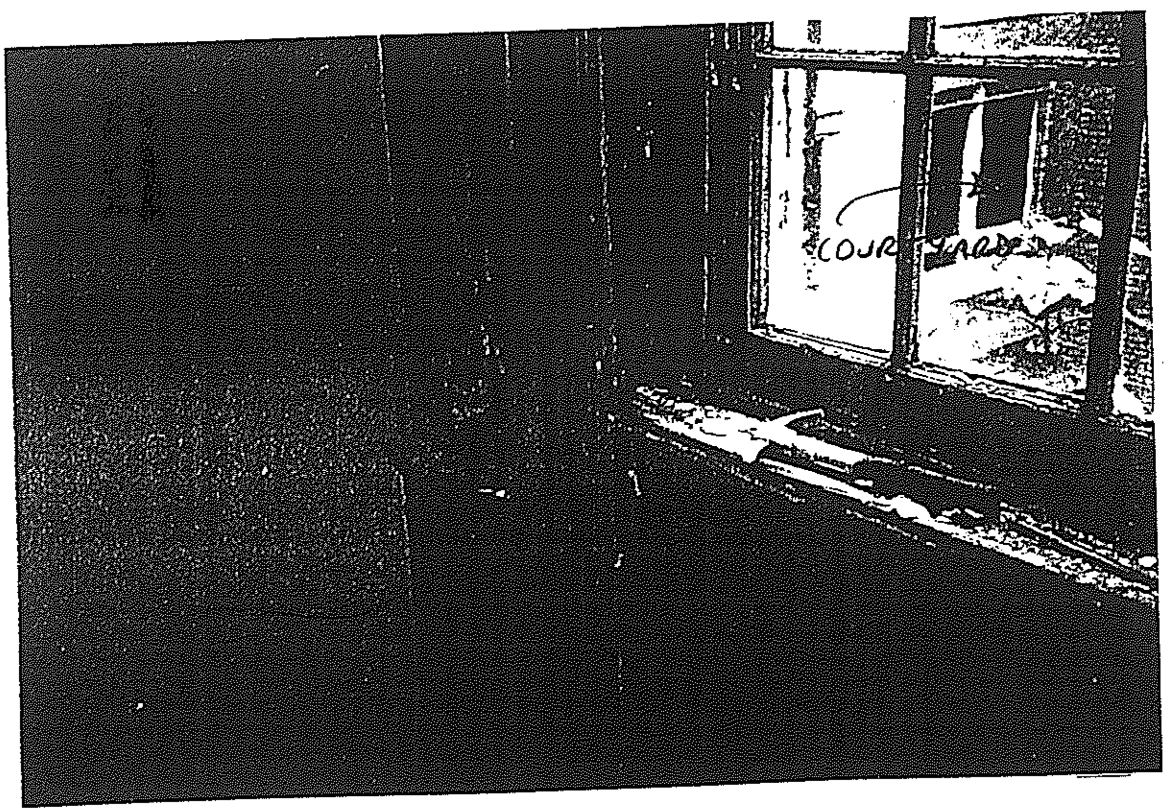

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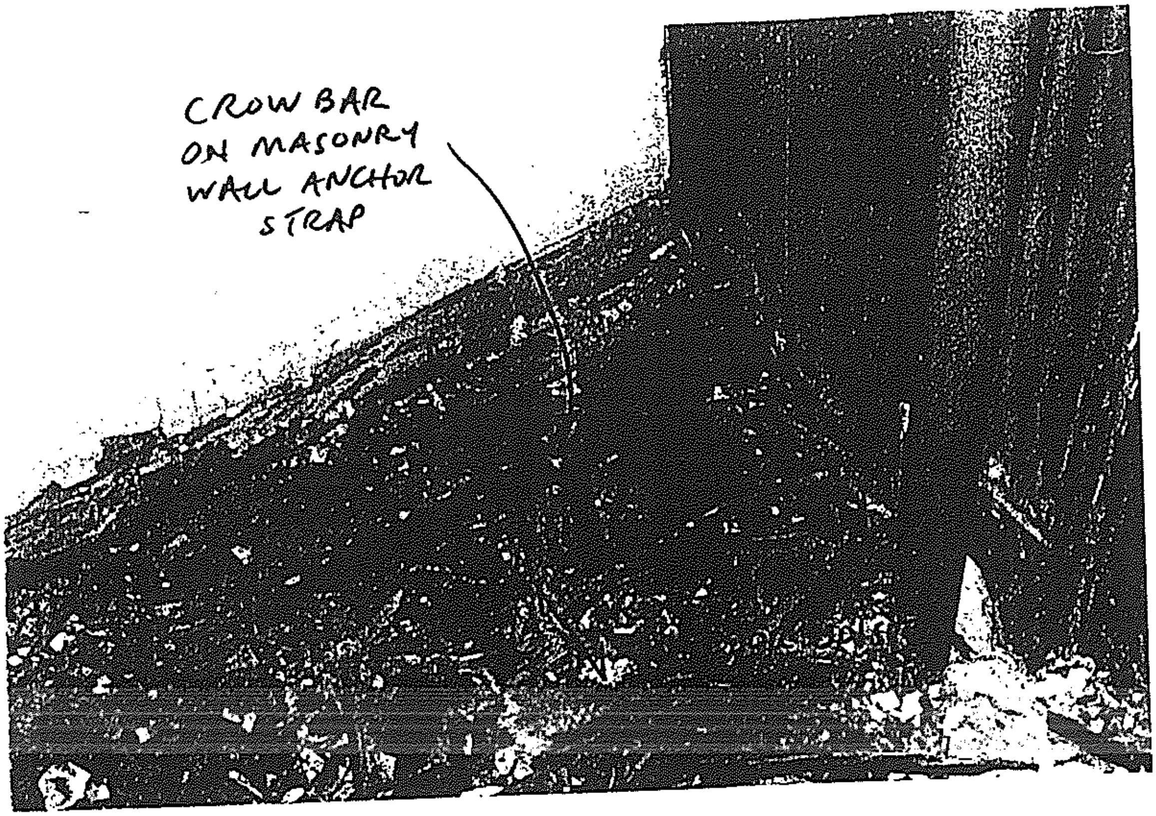
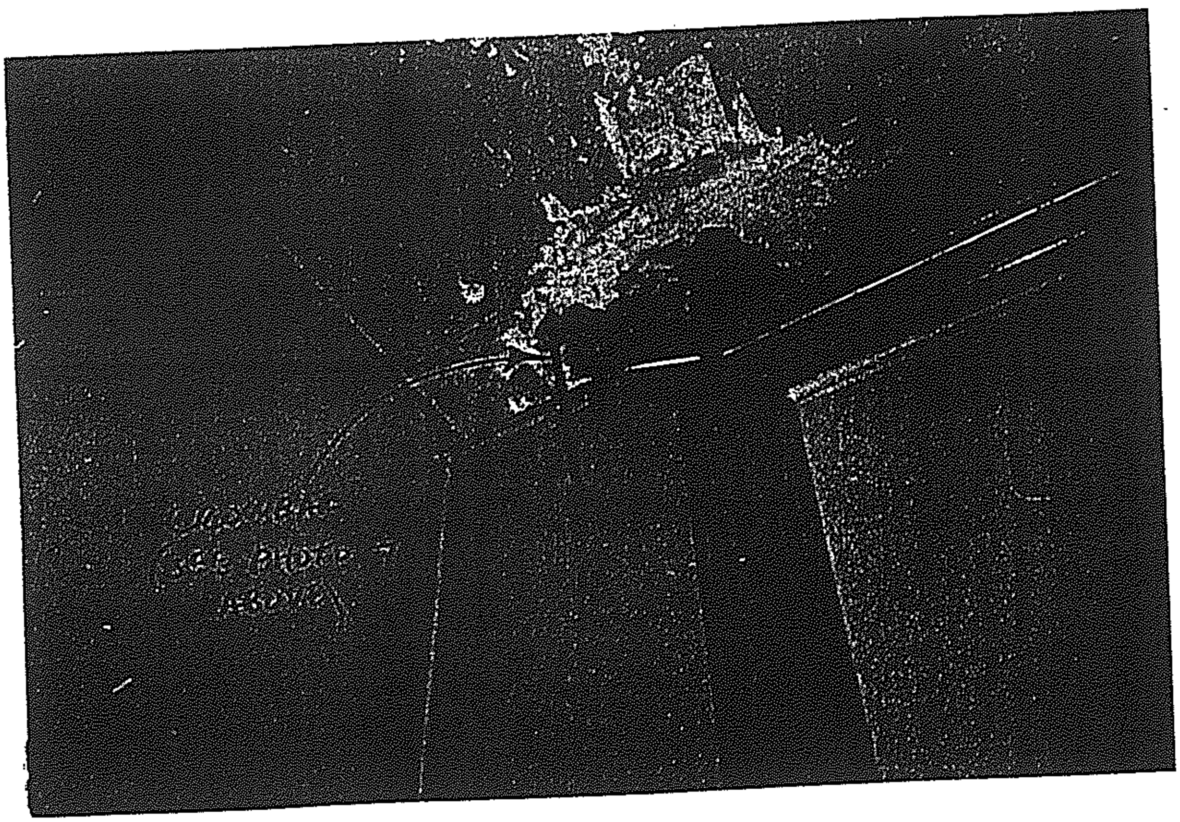
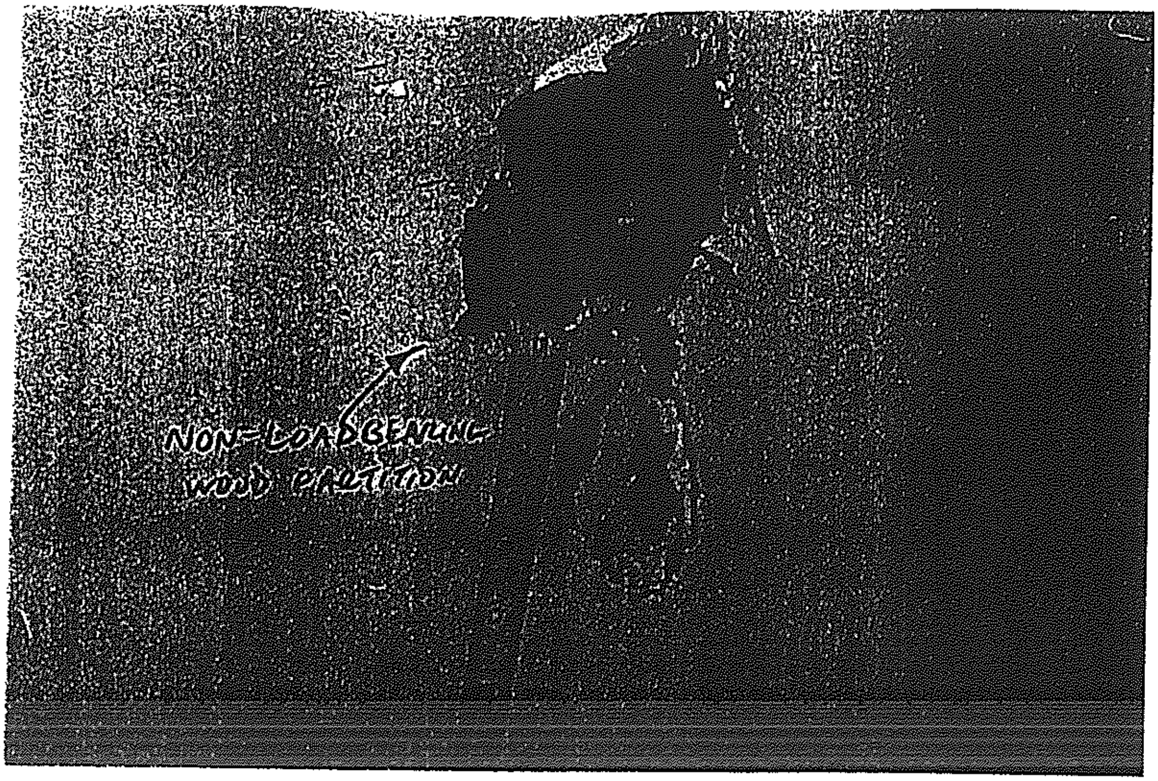

CROW BAR
ON MASONRY
WALL ANCHOR
STRAP





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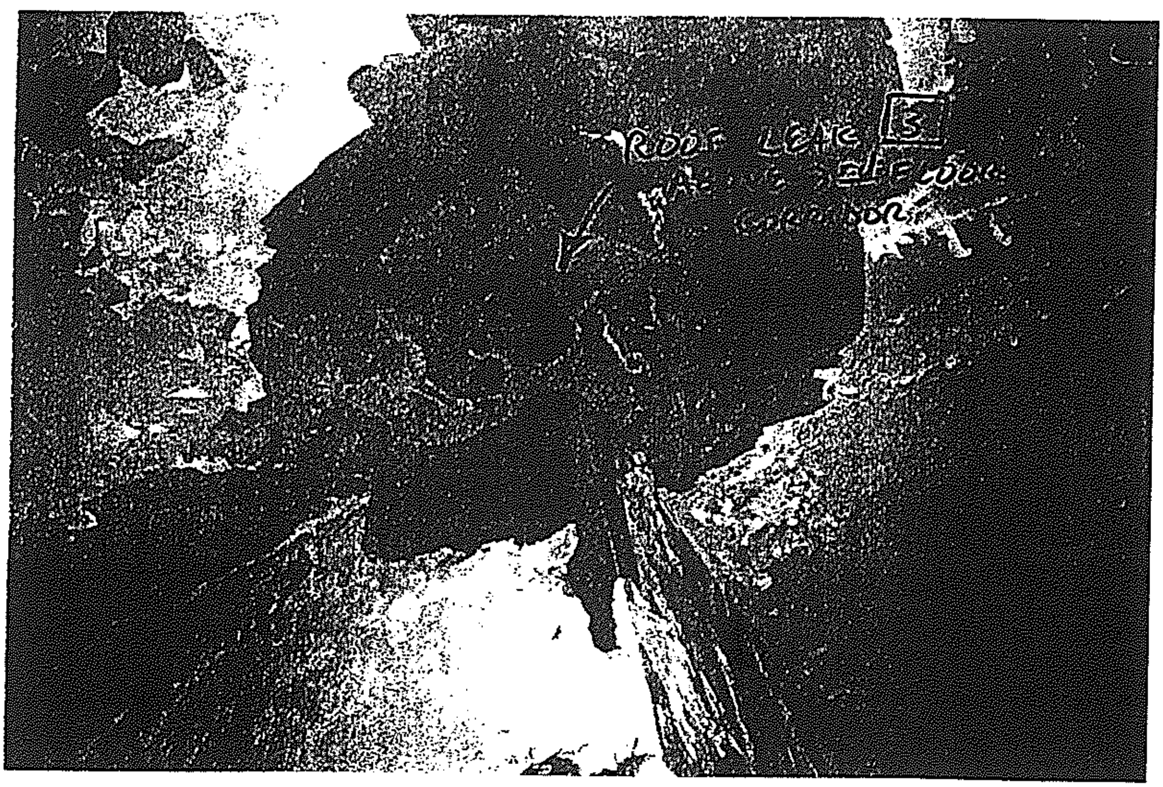

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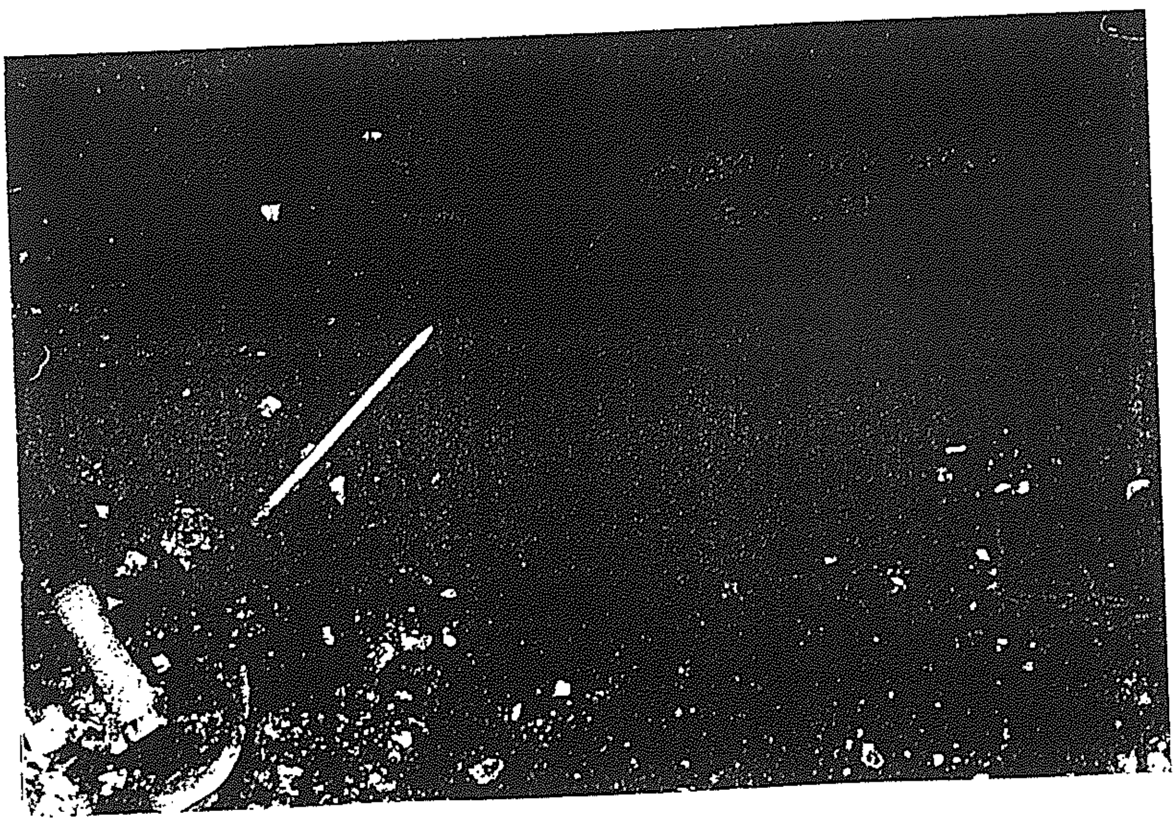

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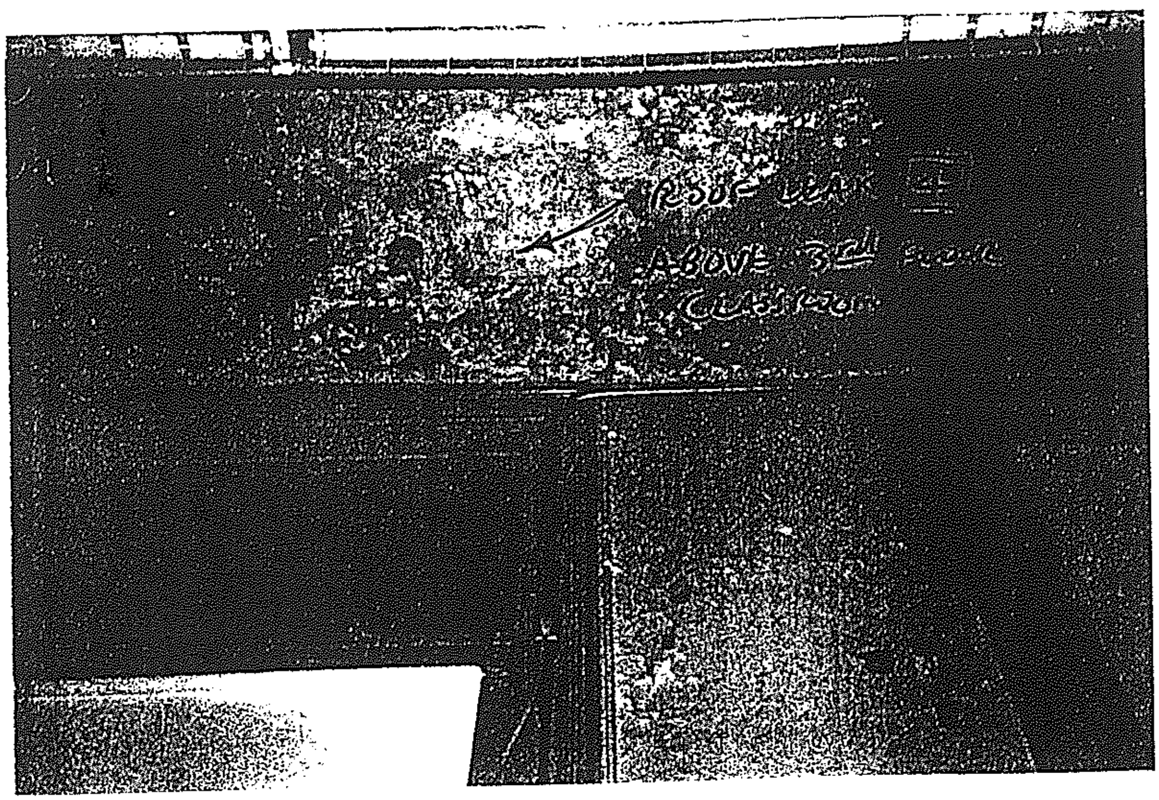
Photo #13



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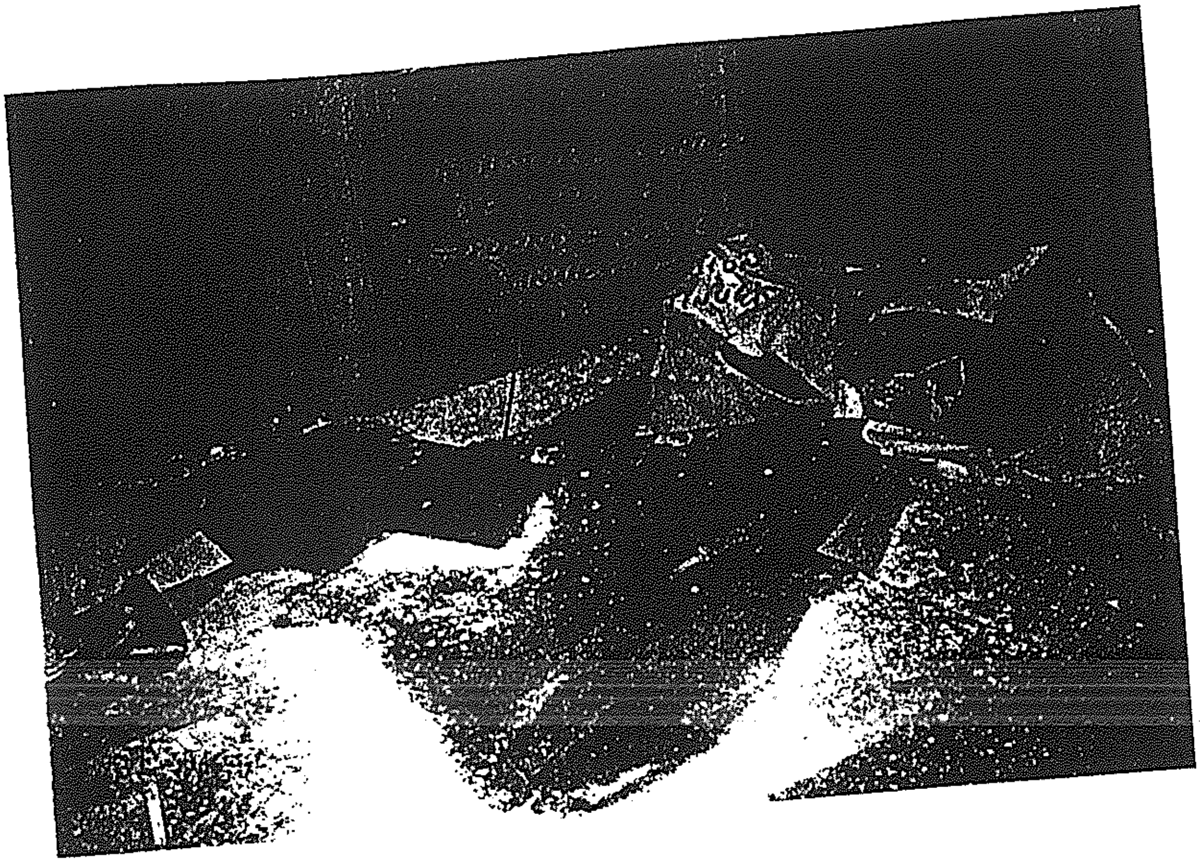

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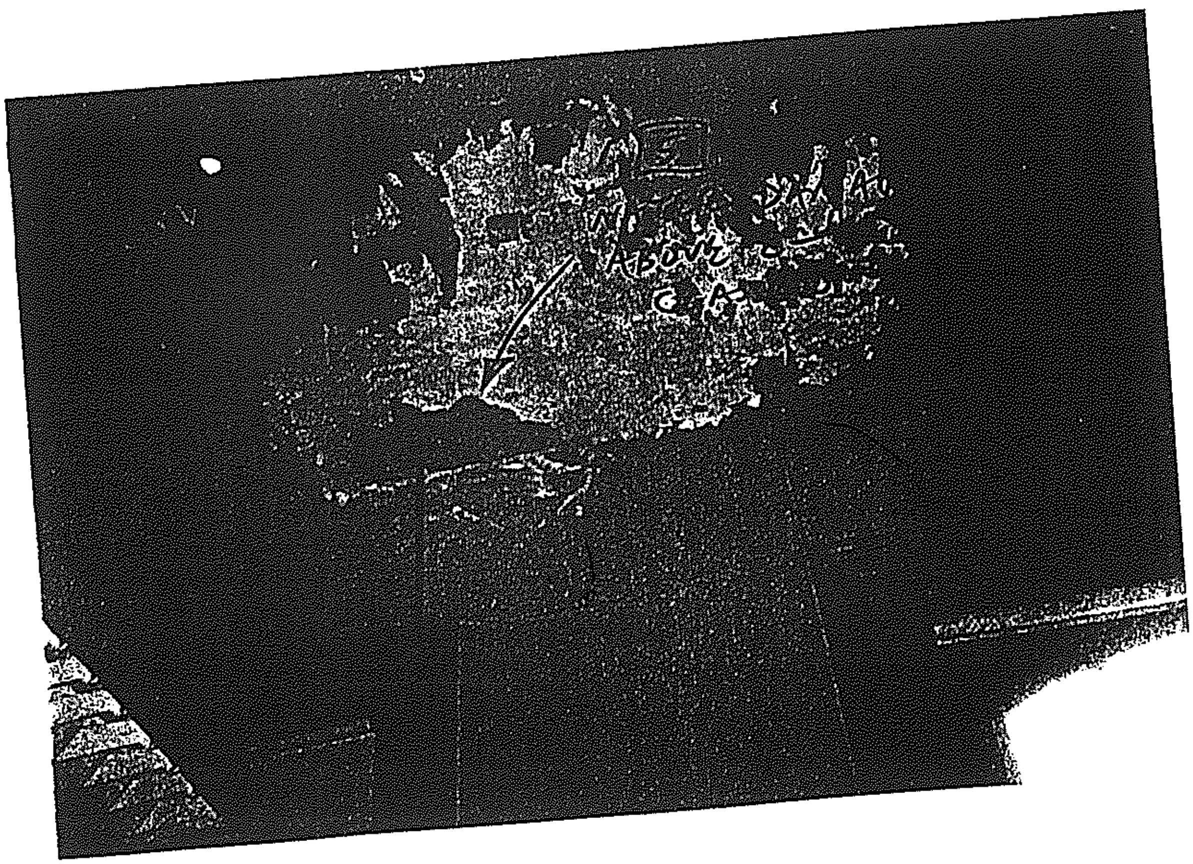

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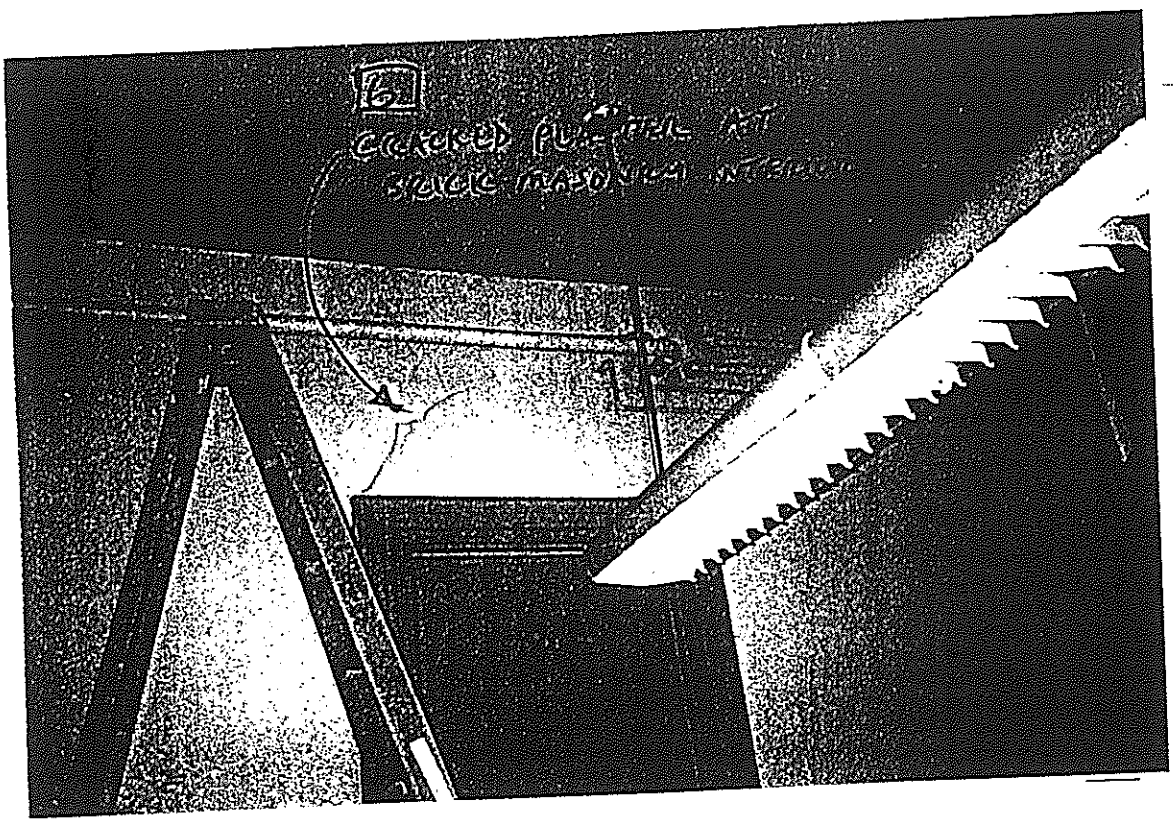

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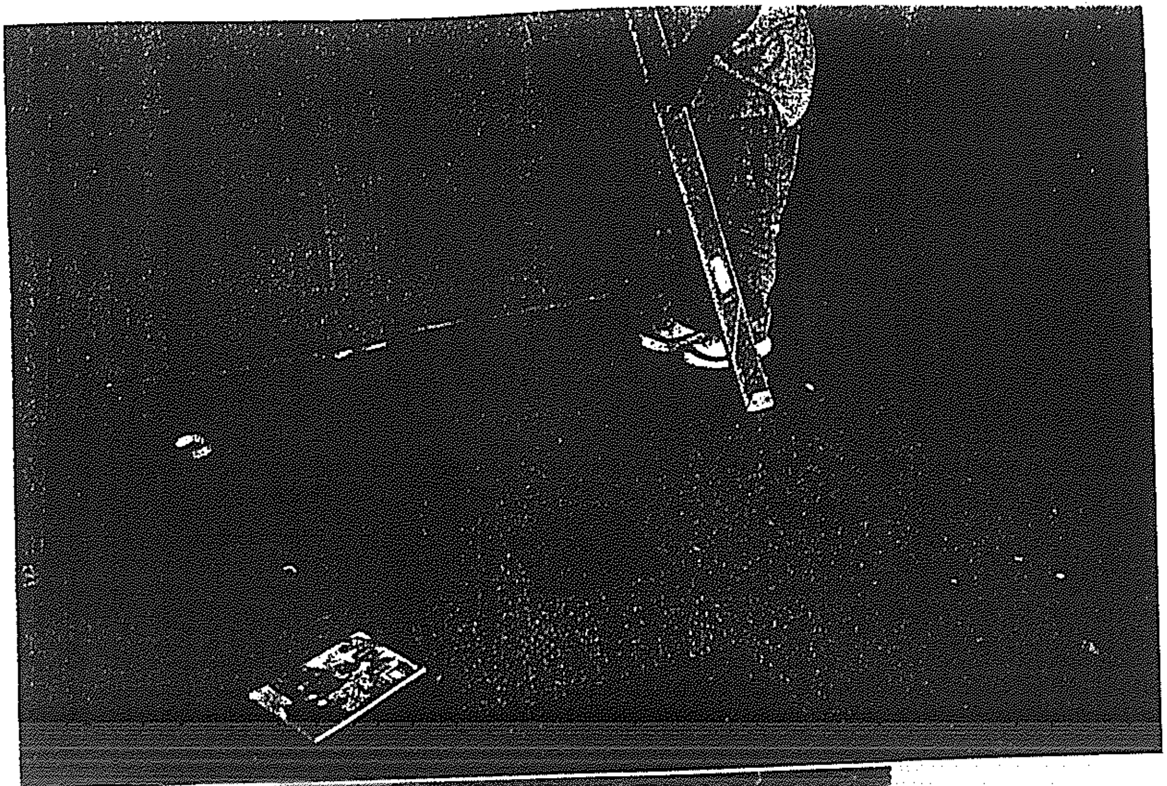

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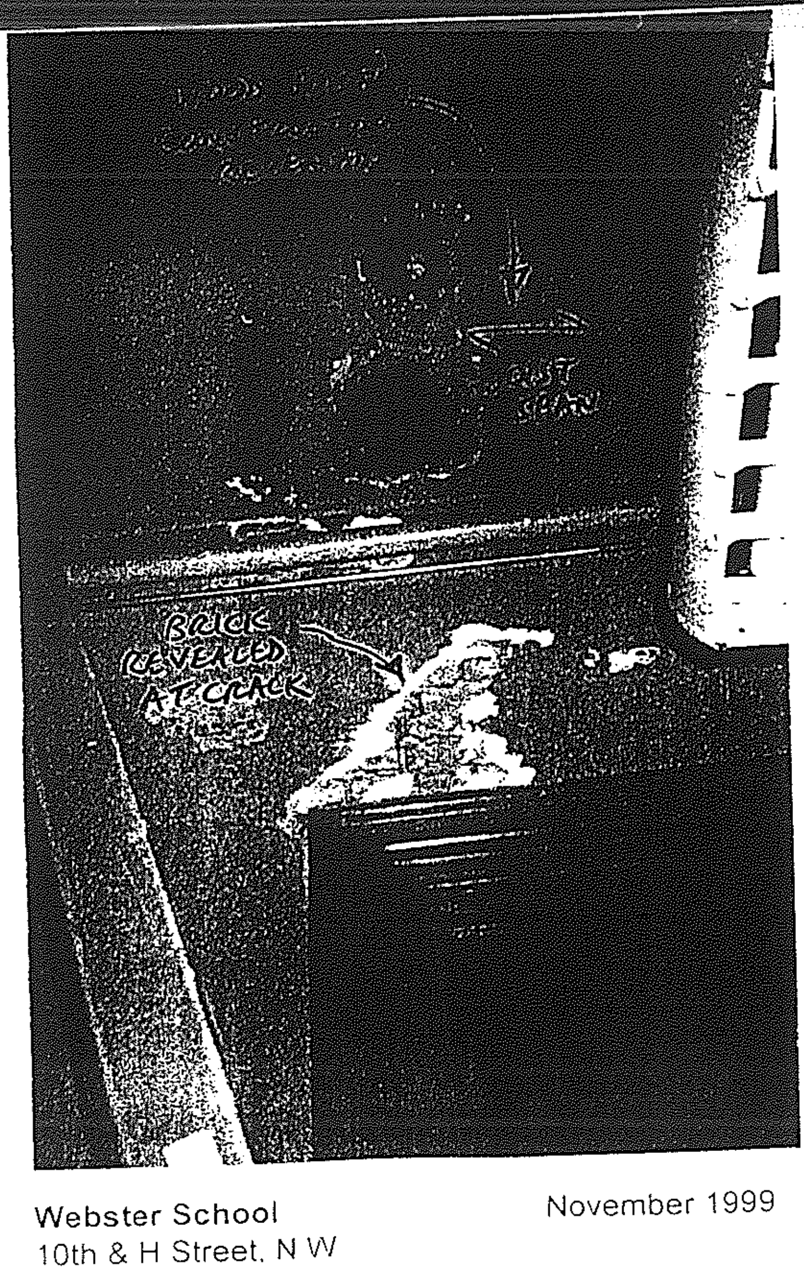

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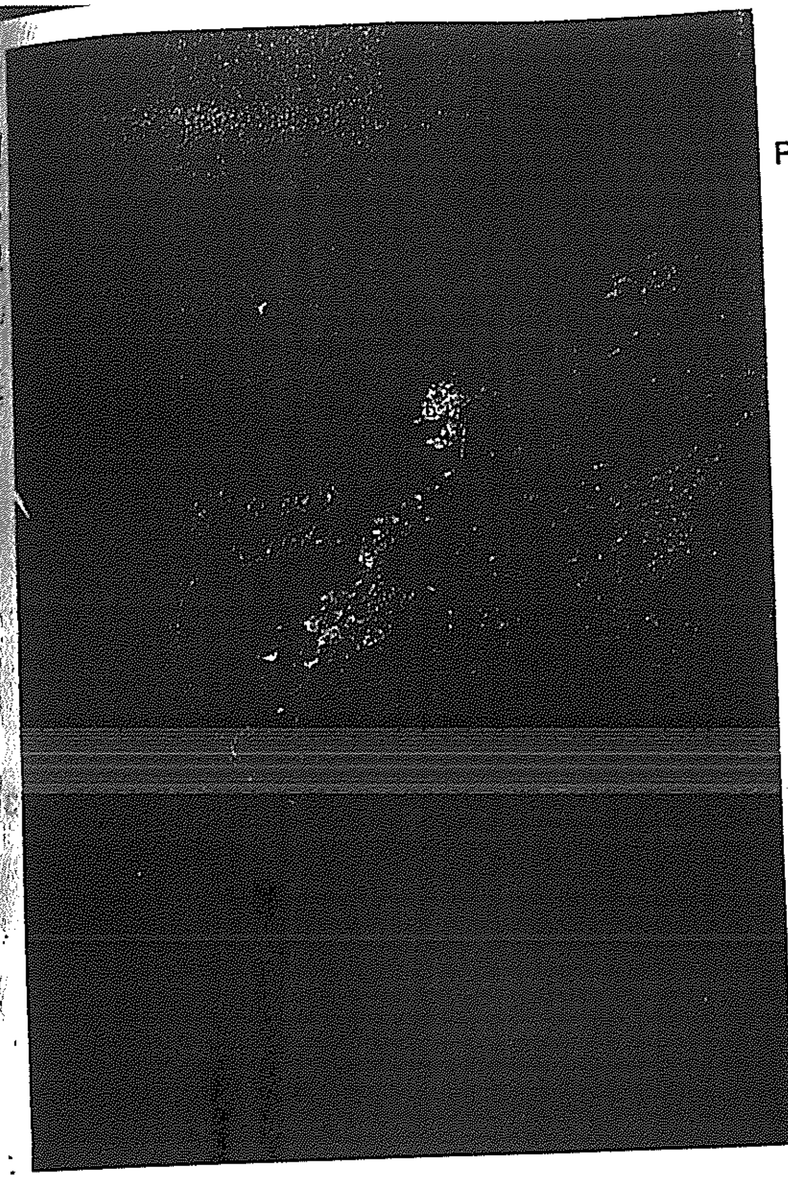

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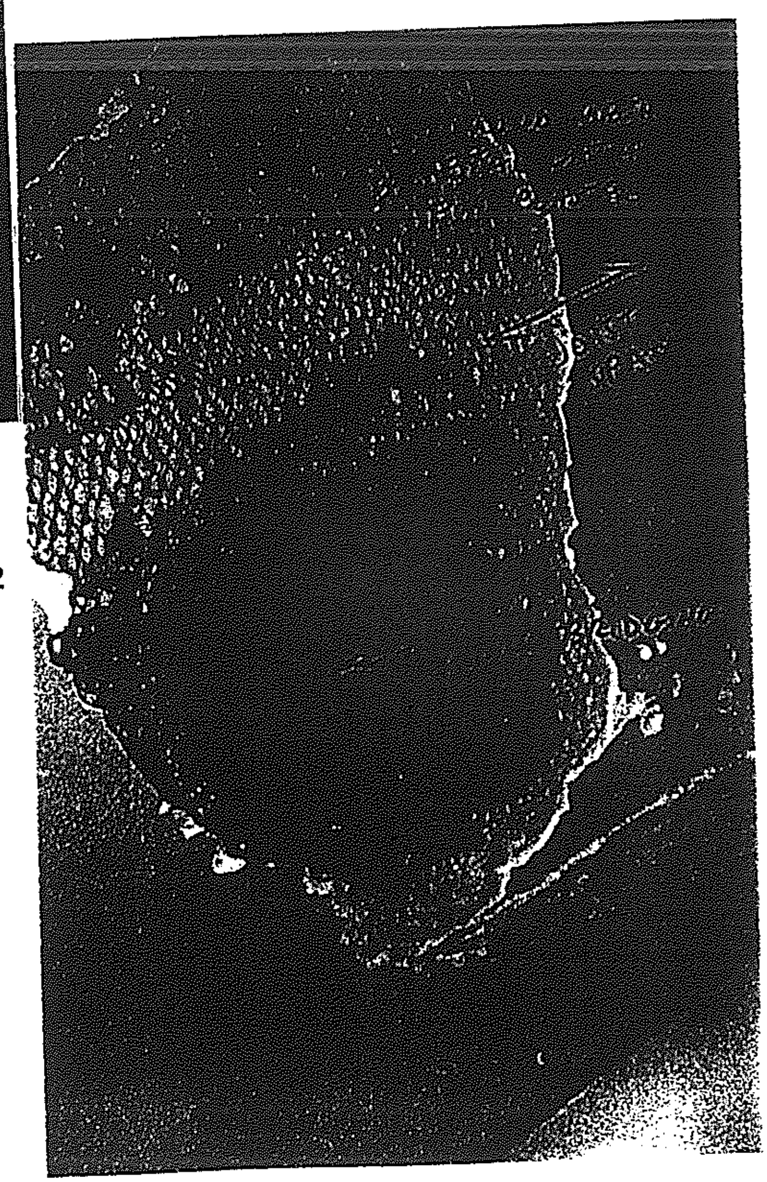

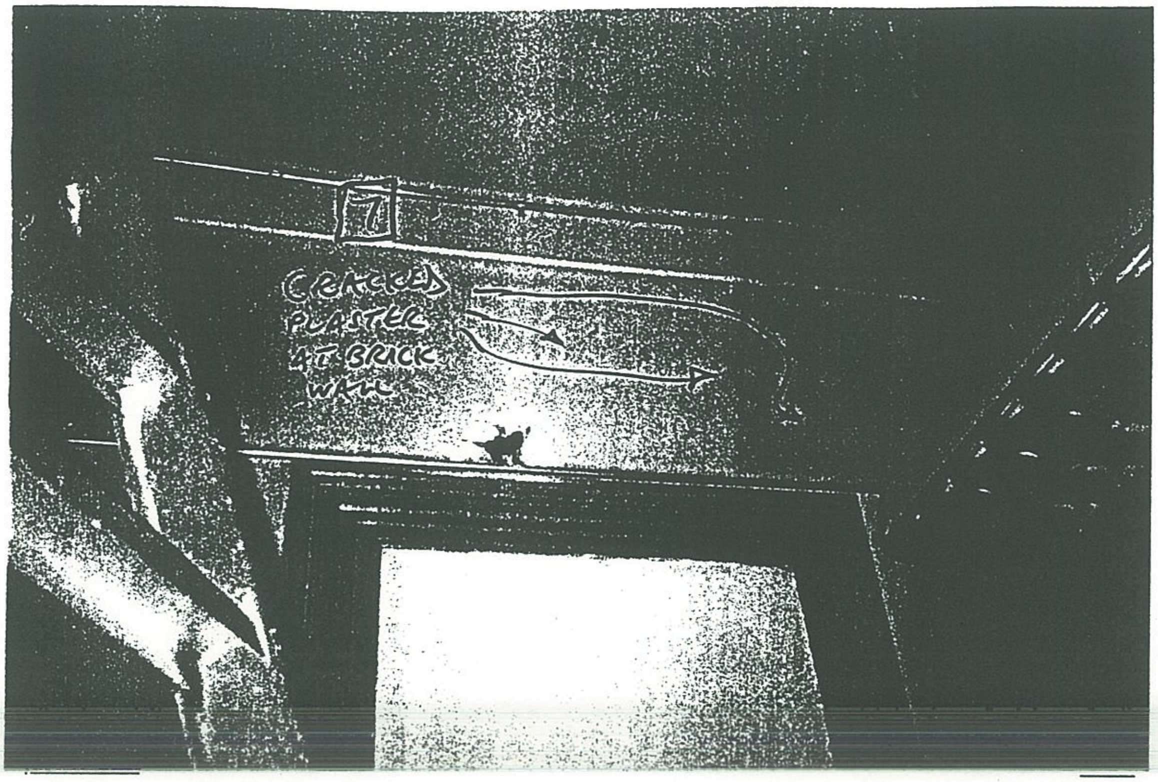

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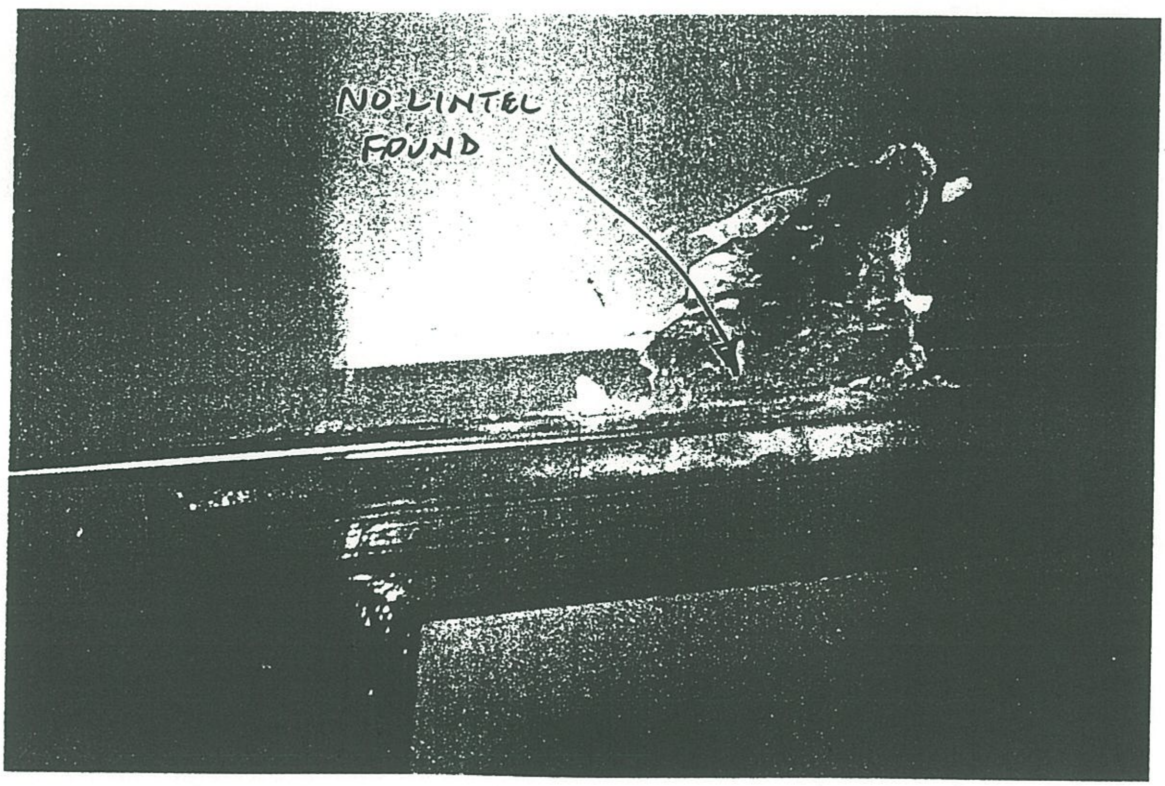

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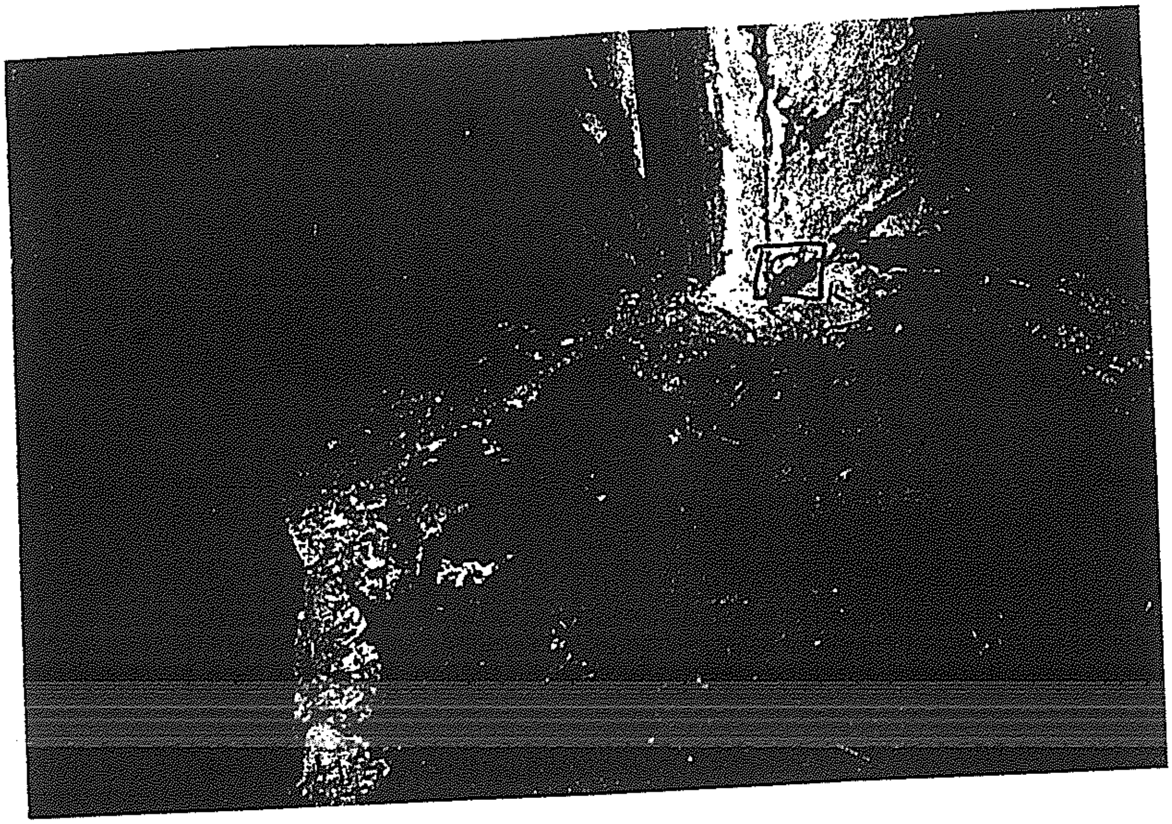

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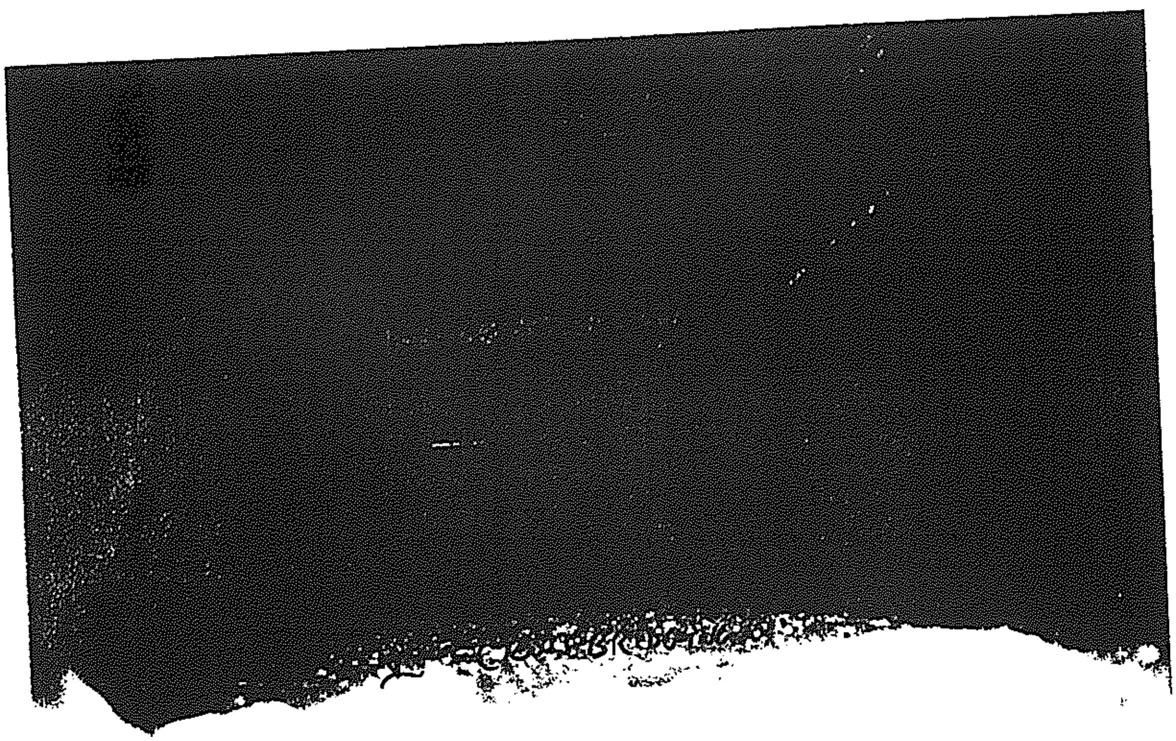

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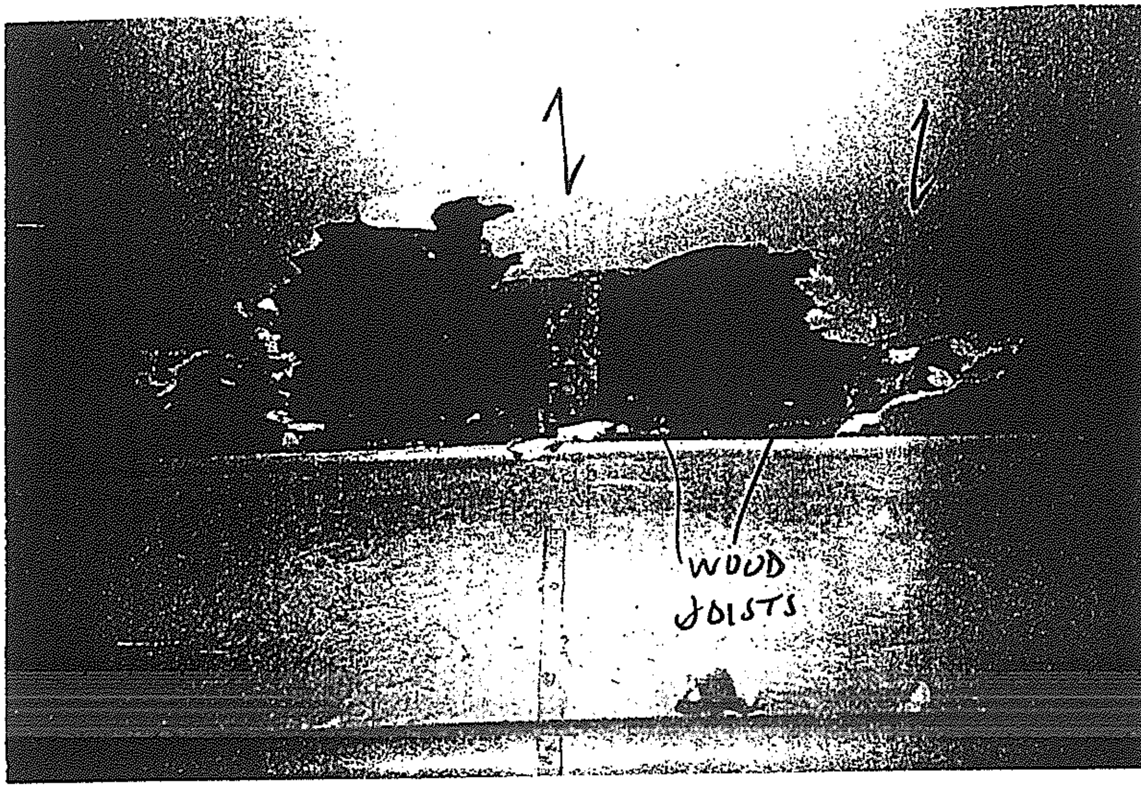

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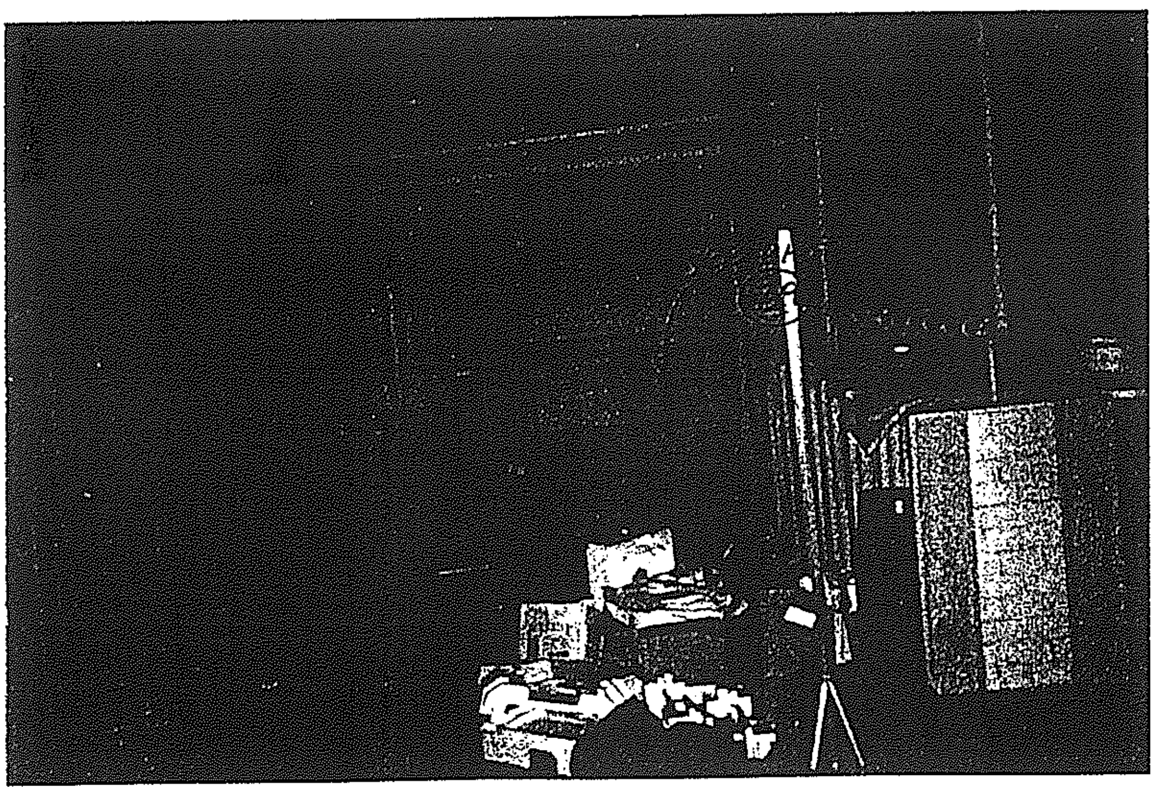

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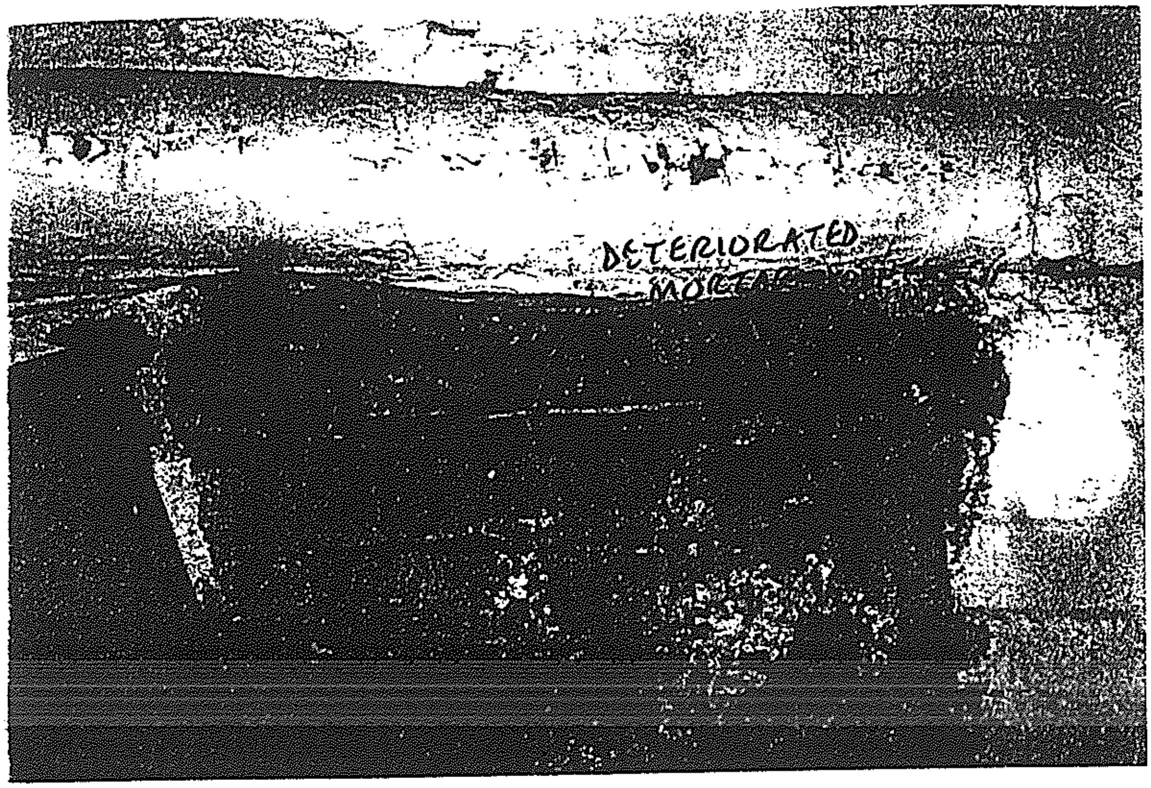

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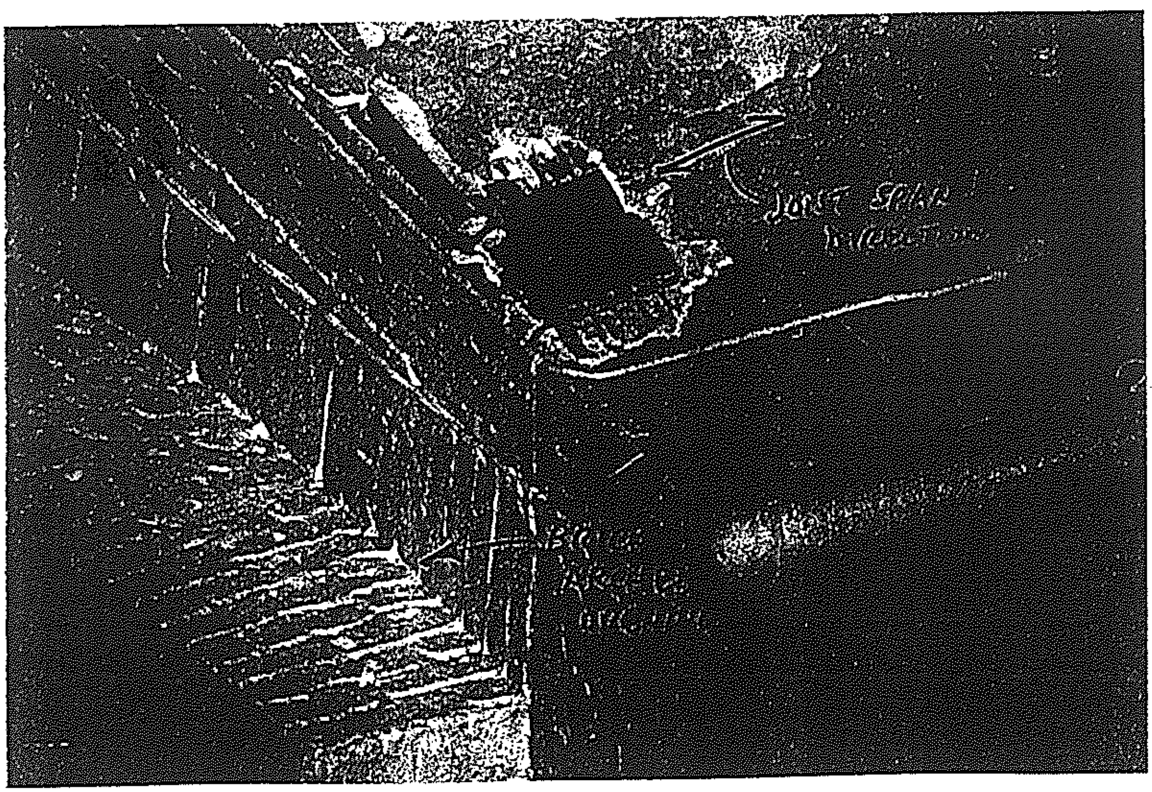

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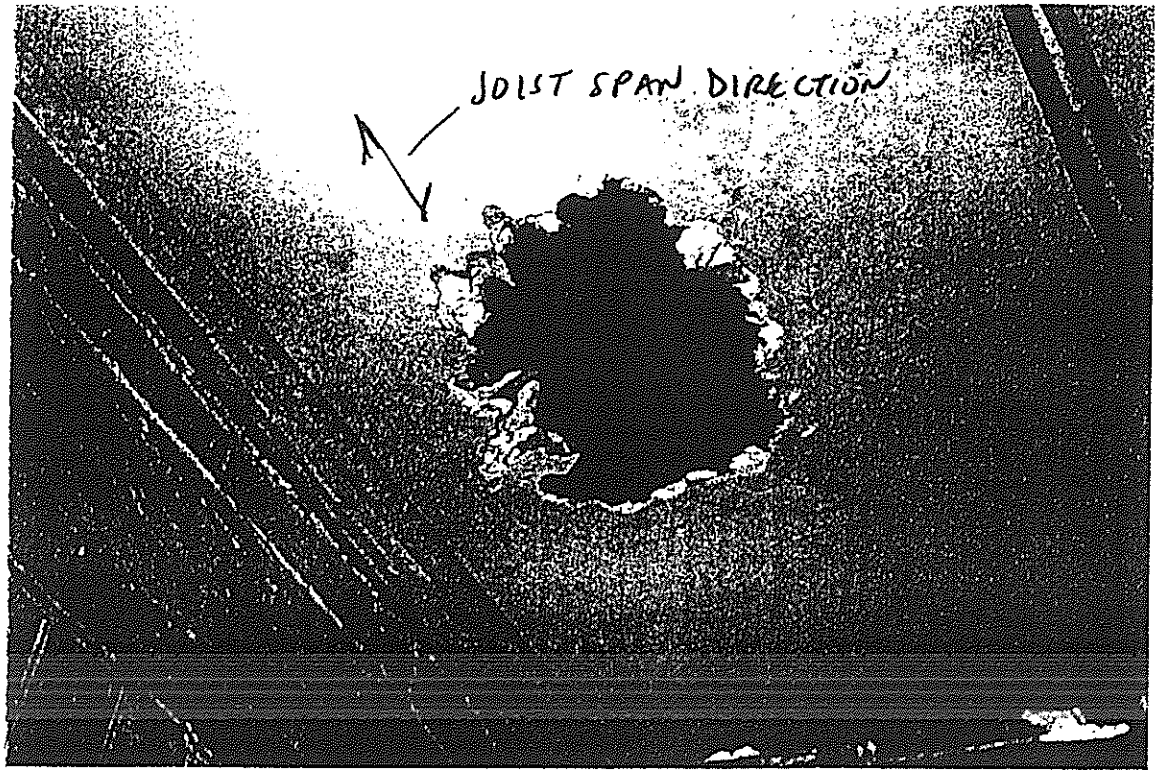

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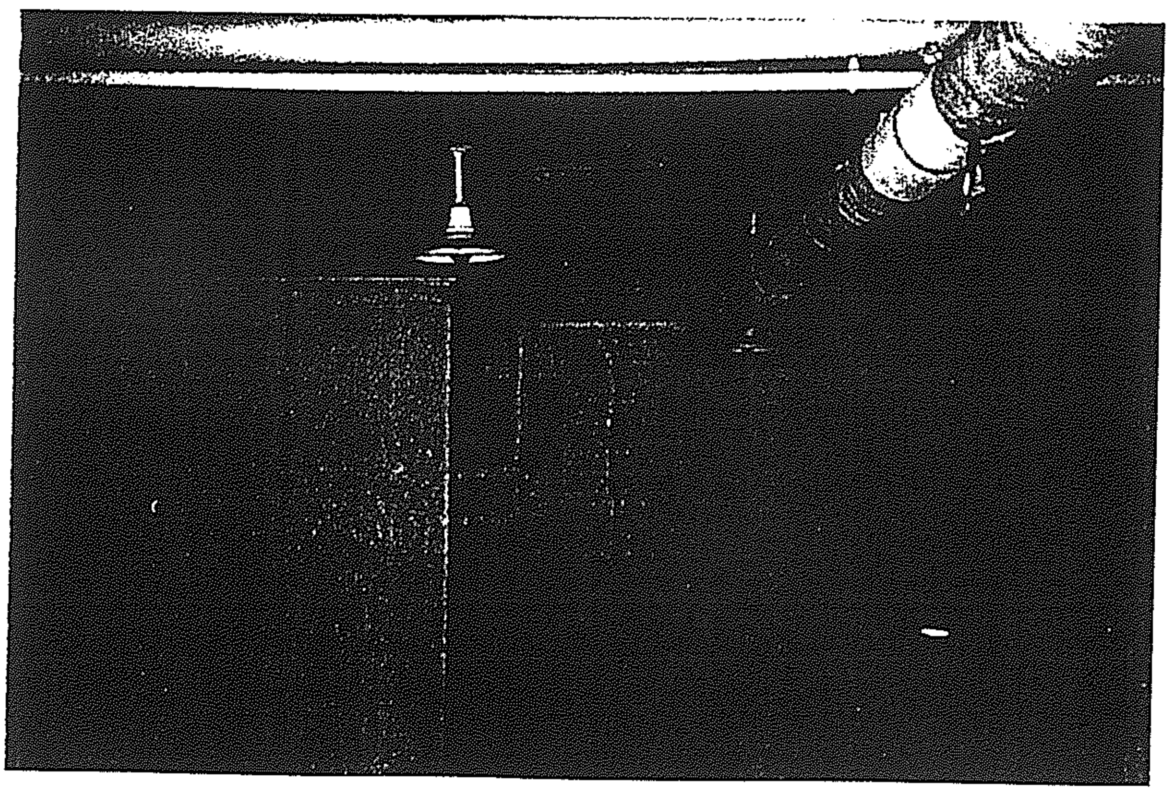

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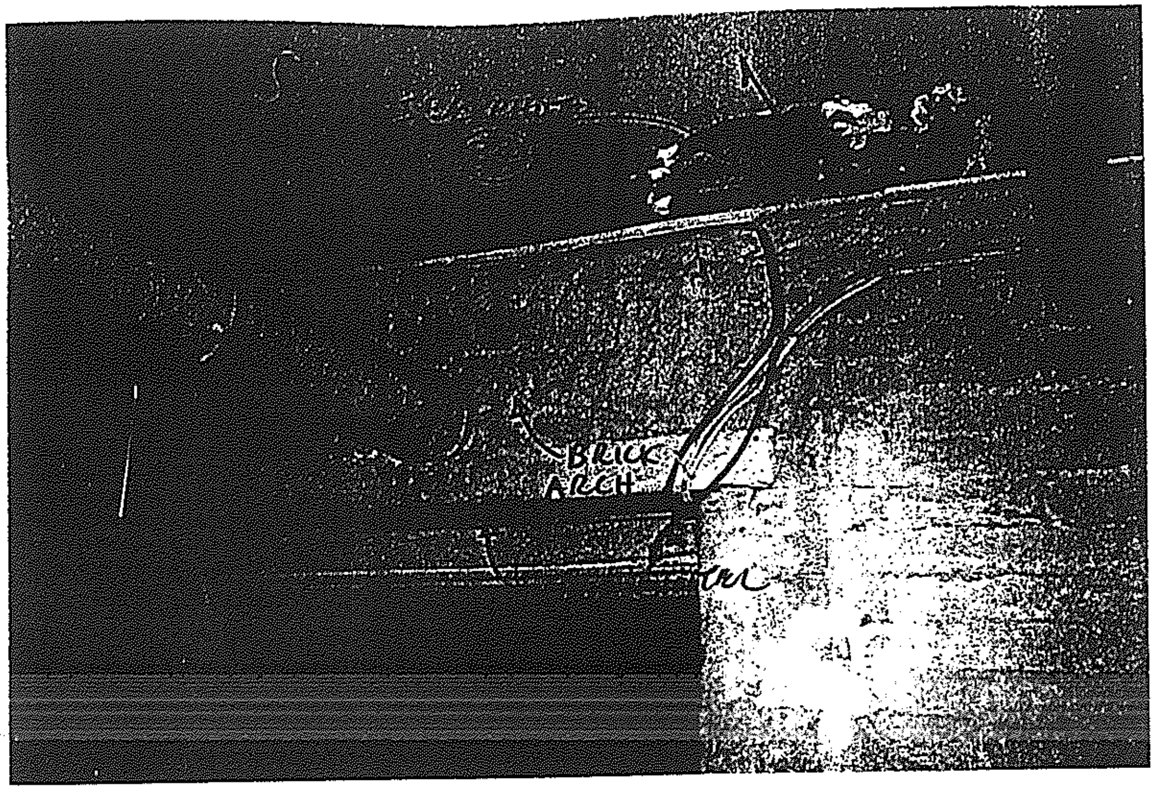

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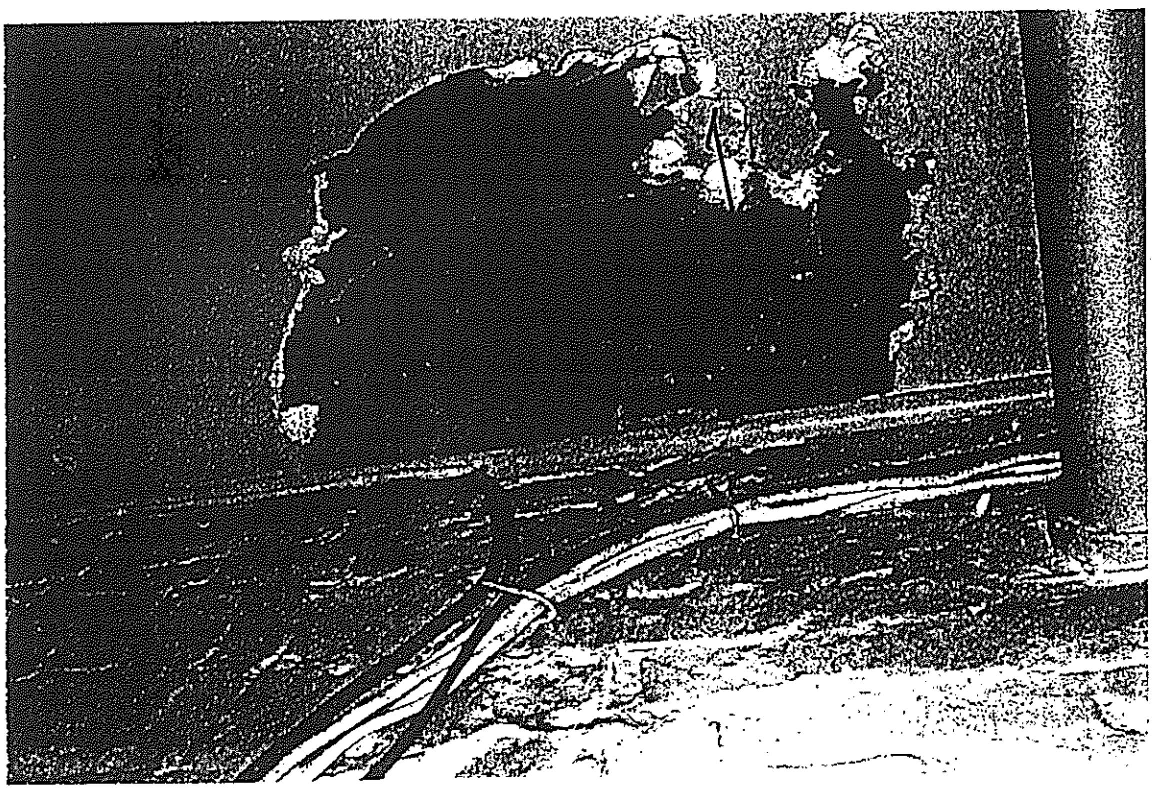

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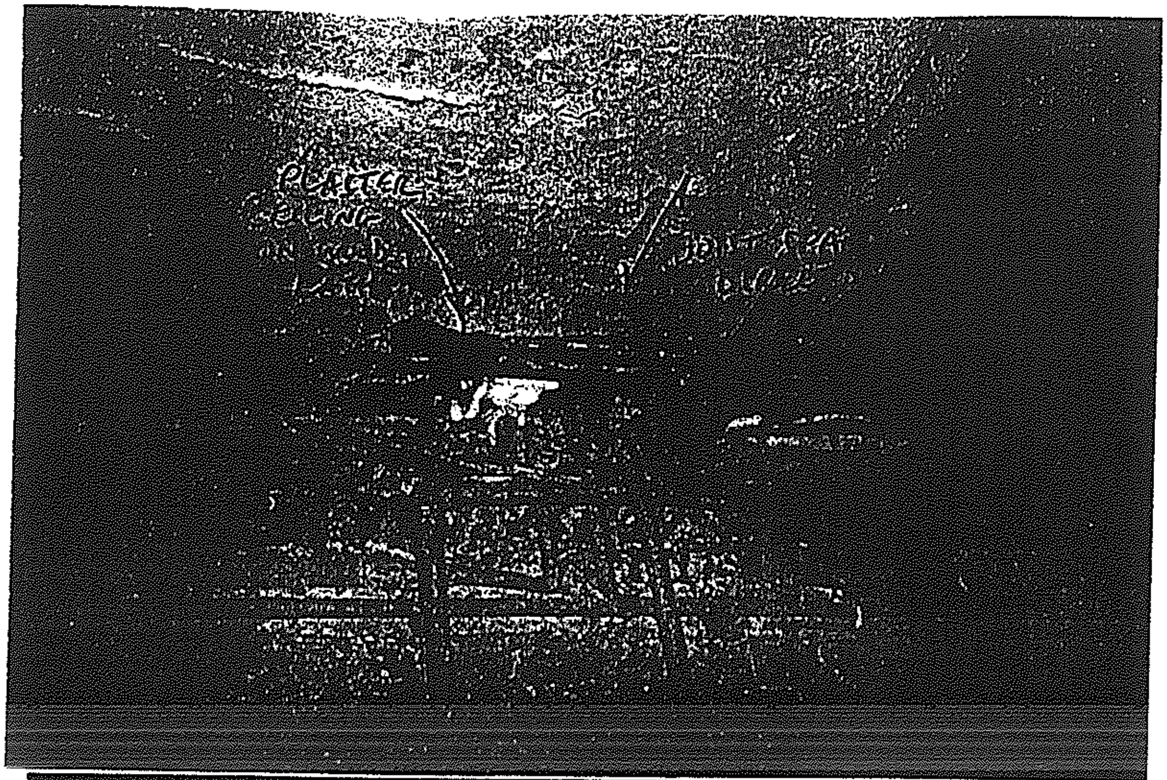

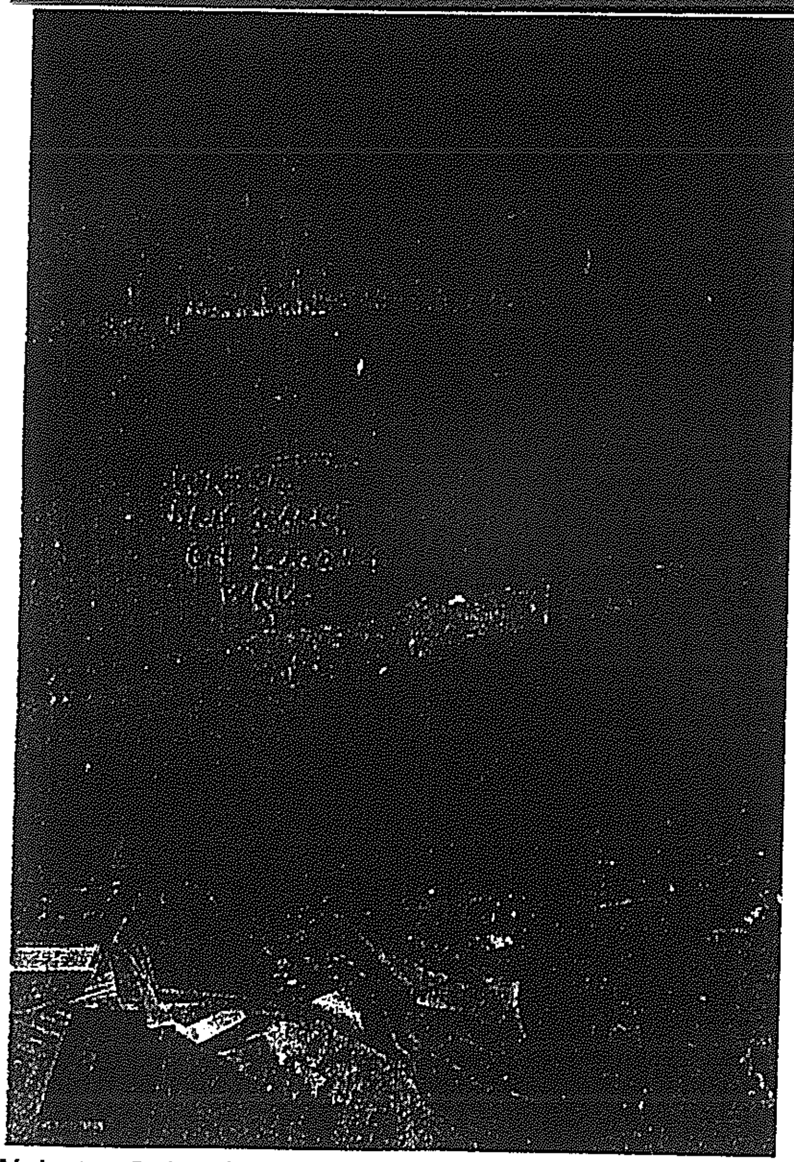

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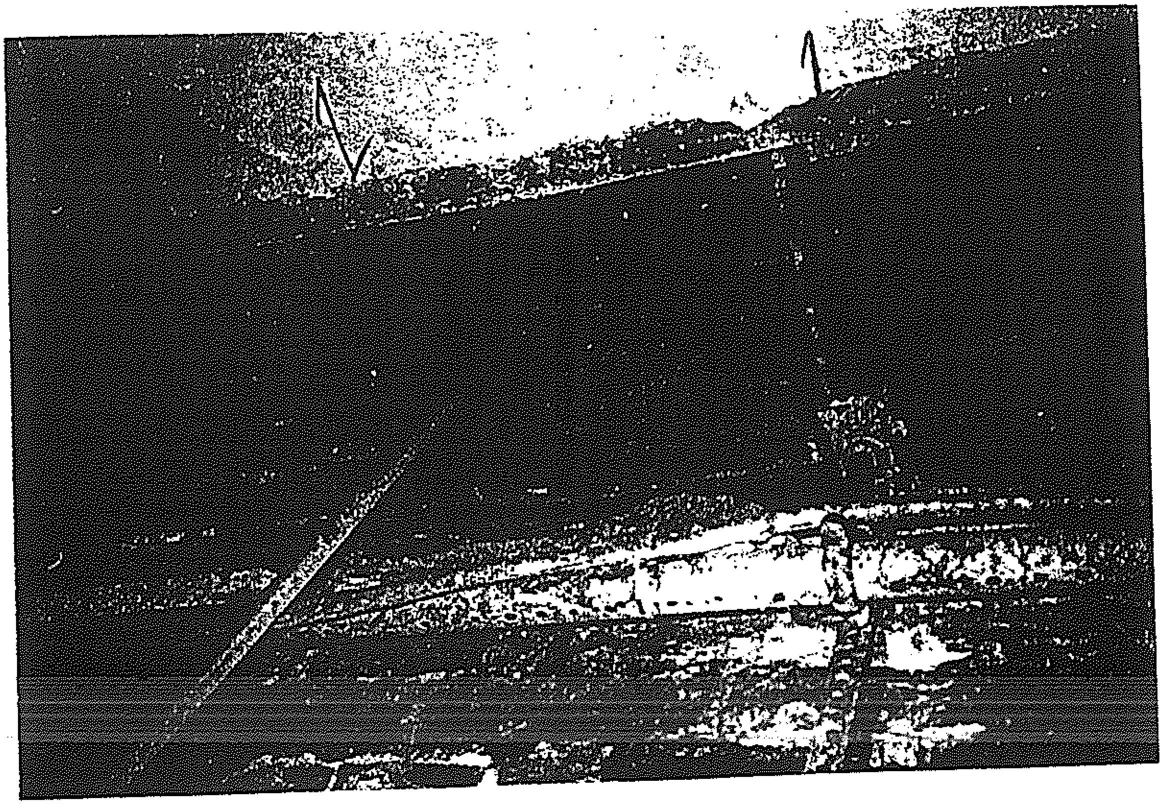

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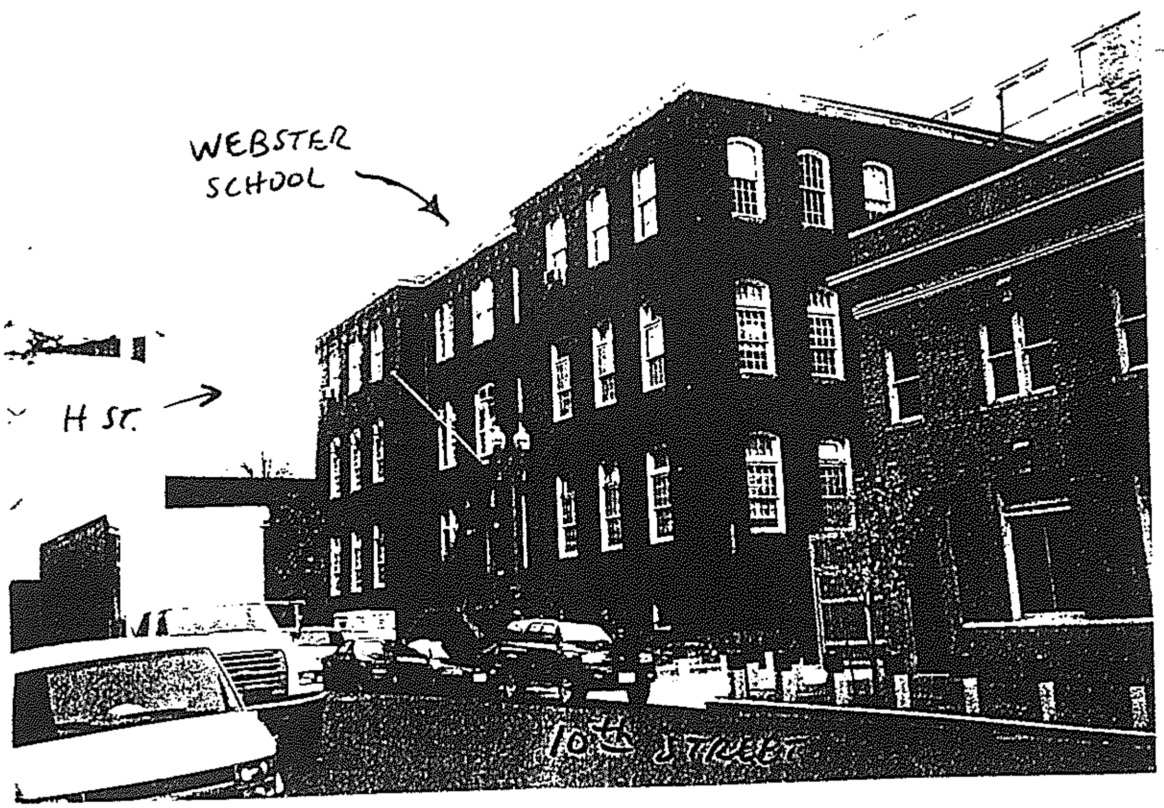

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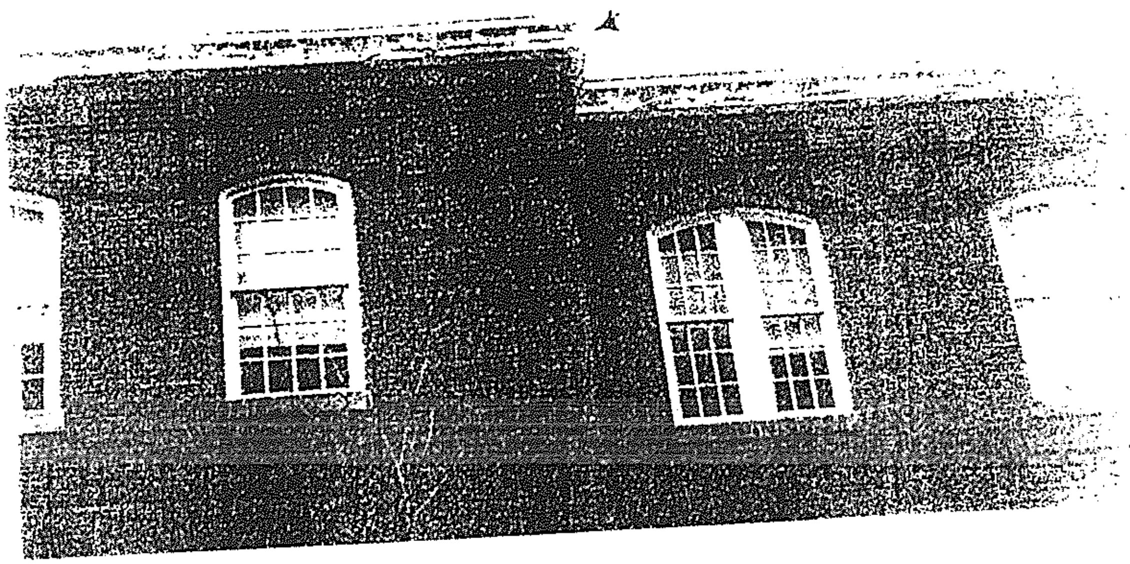

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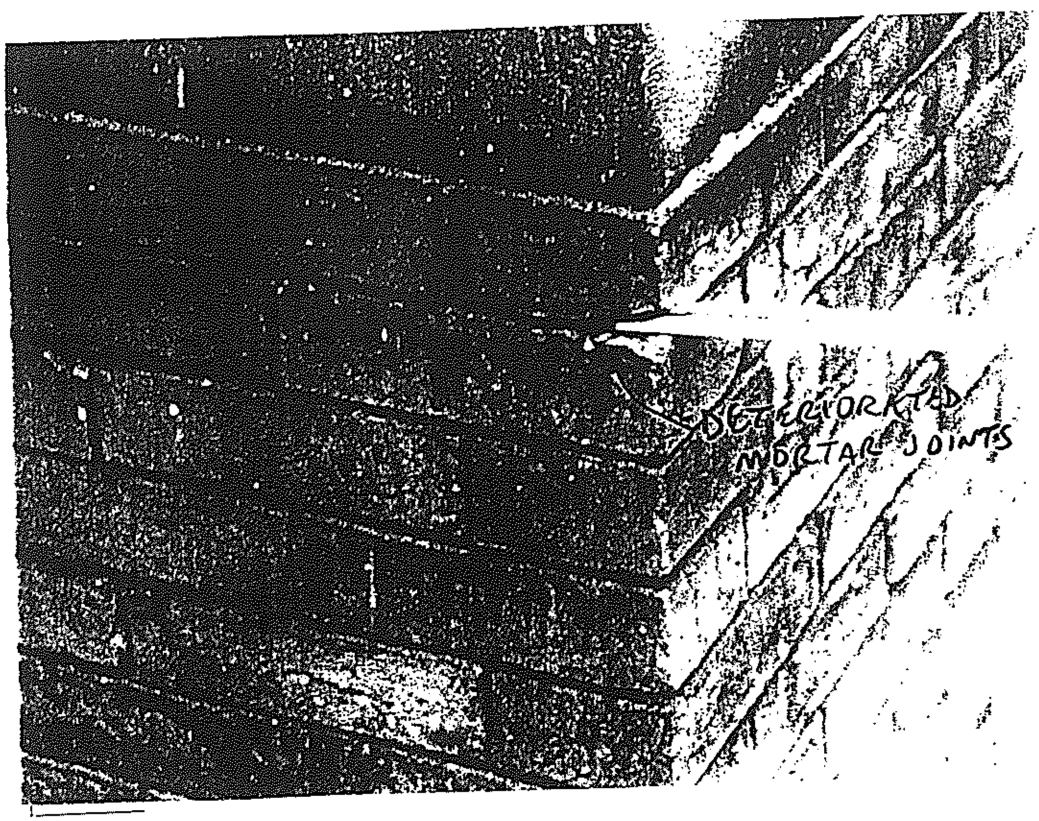

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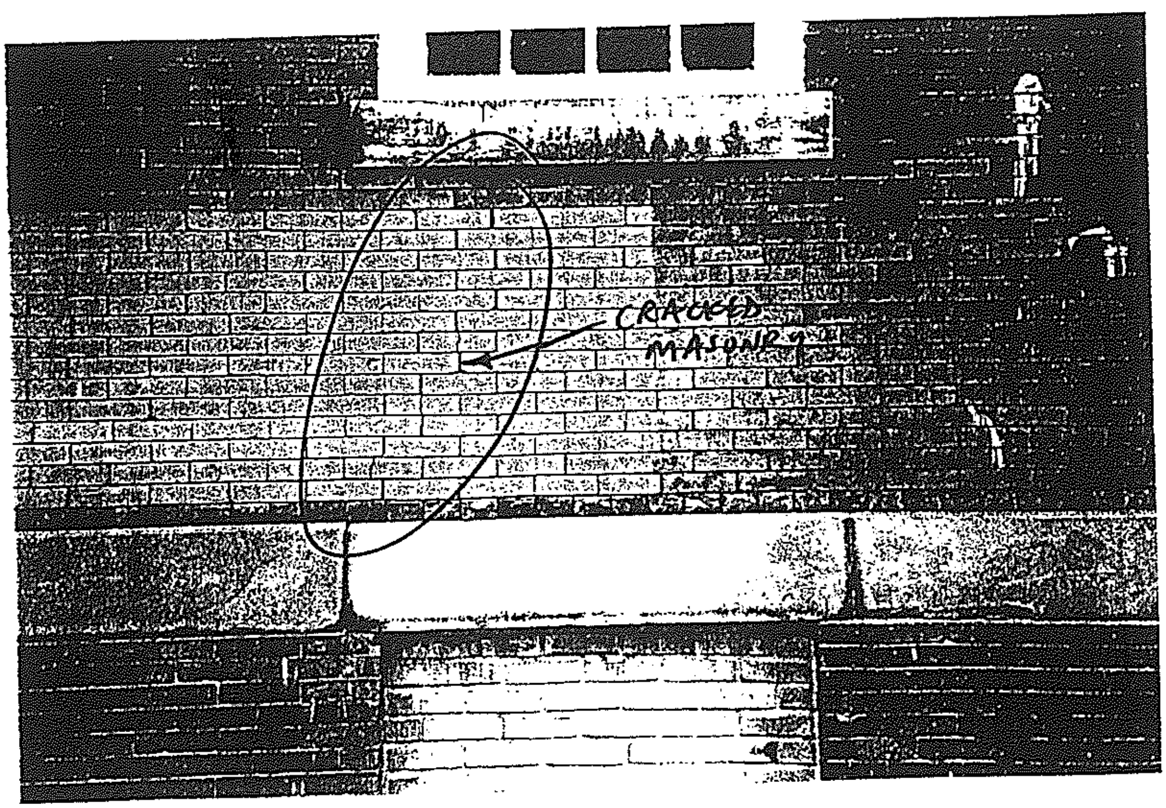

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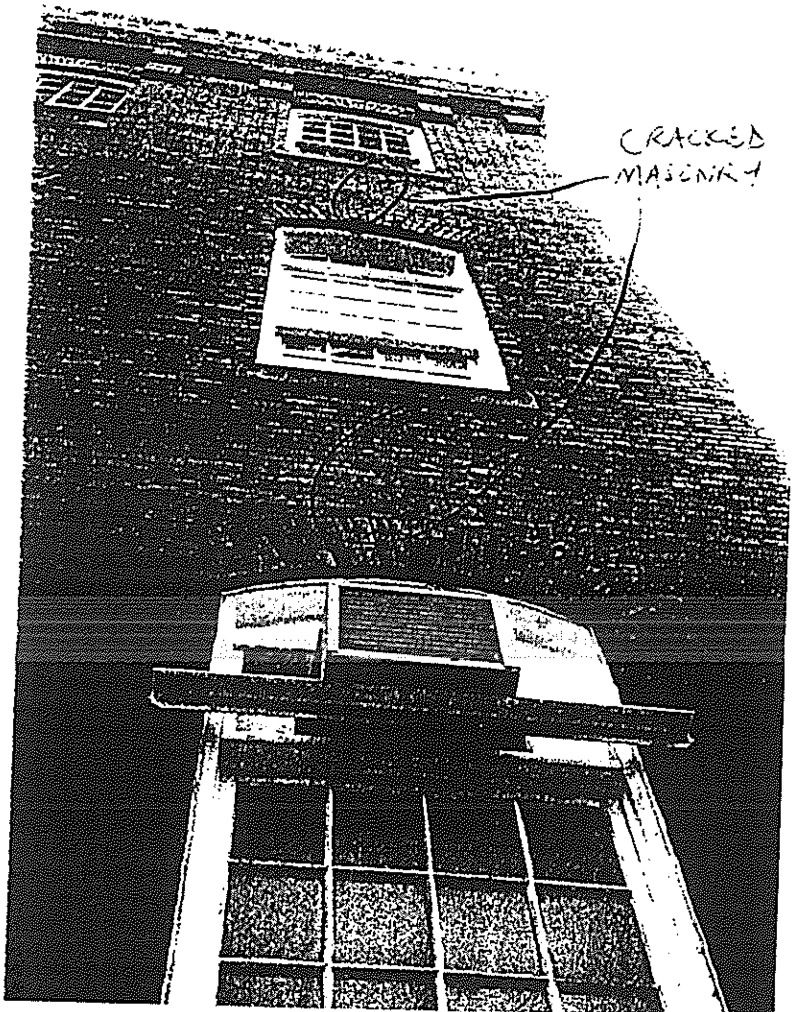

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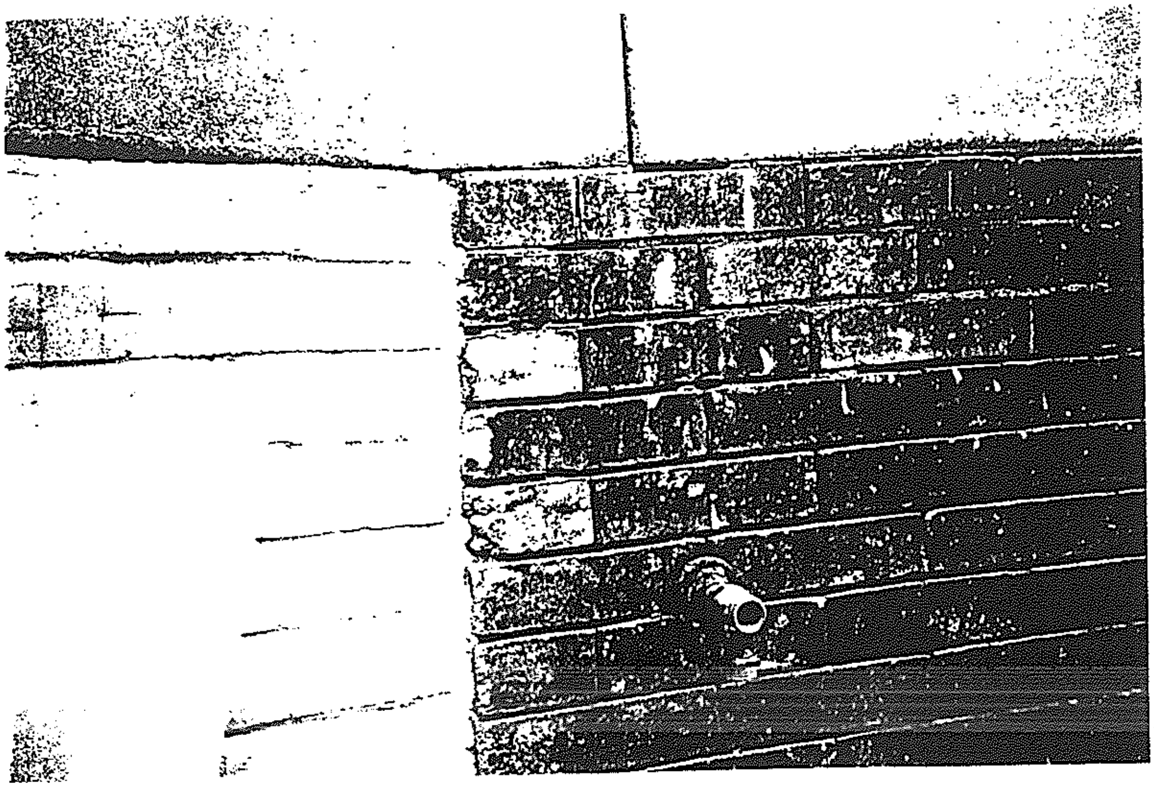

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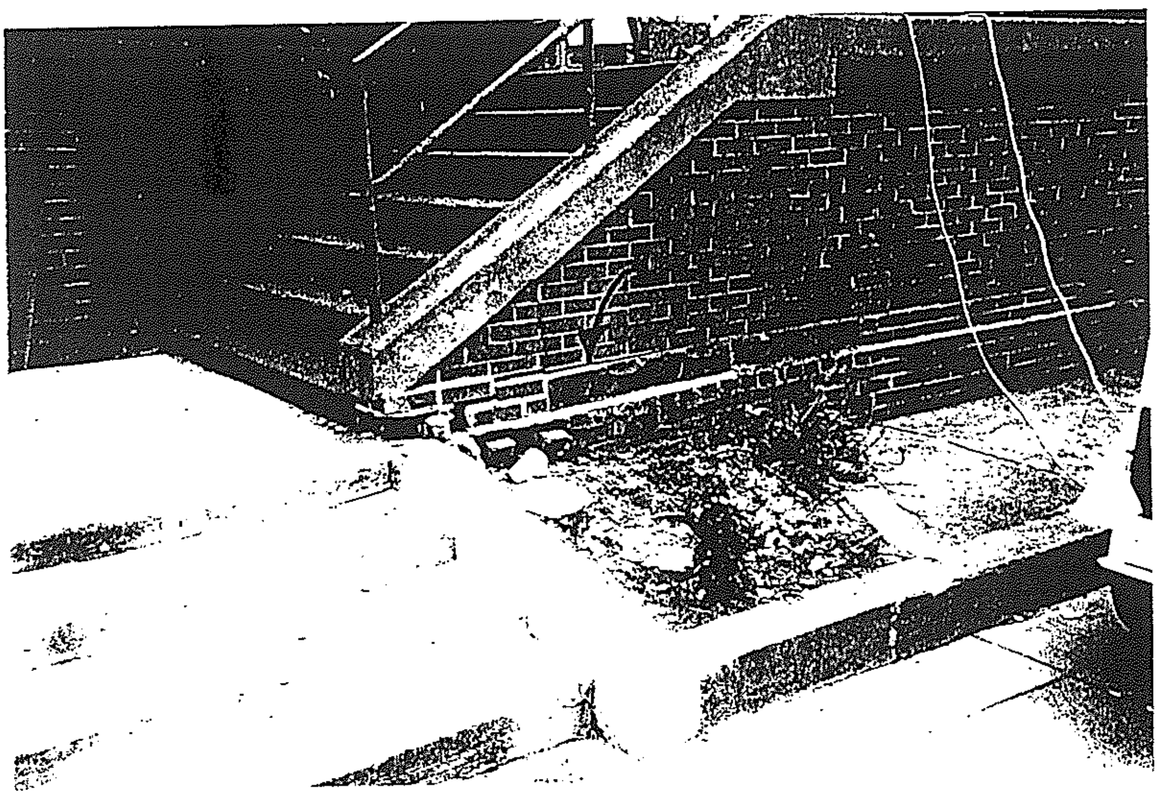

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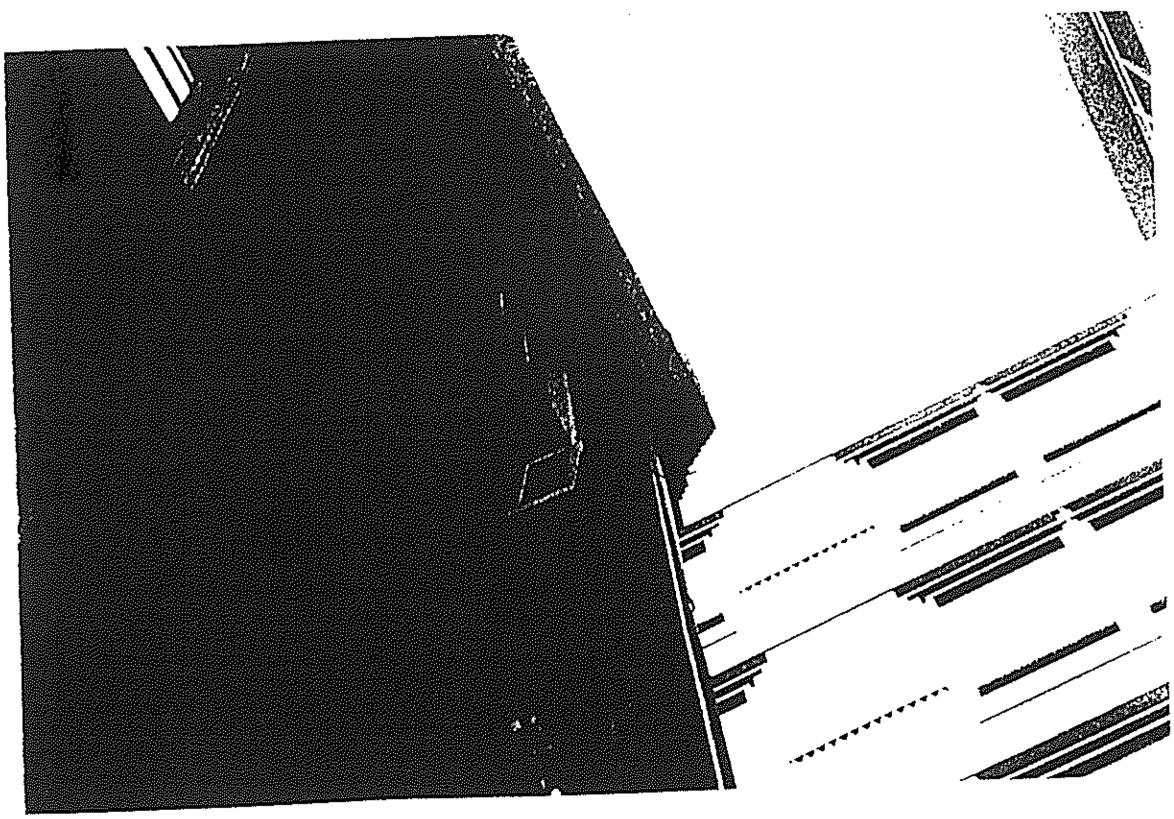

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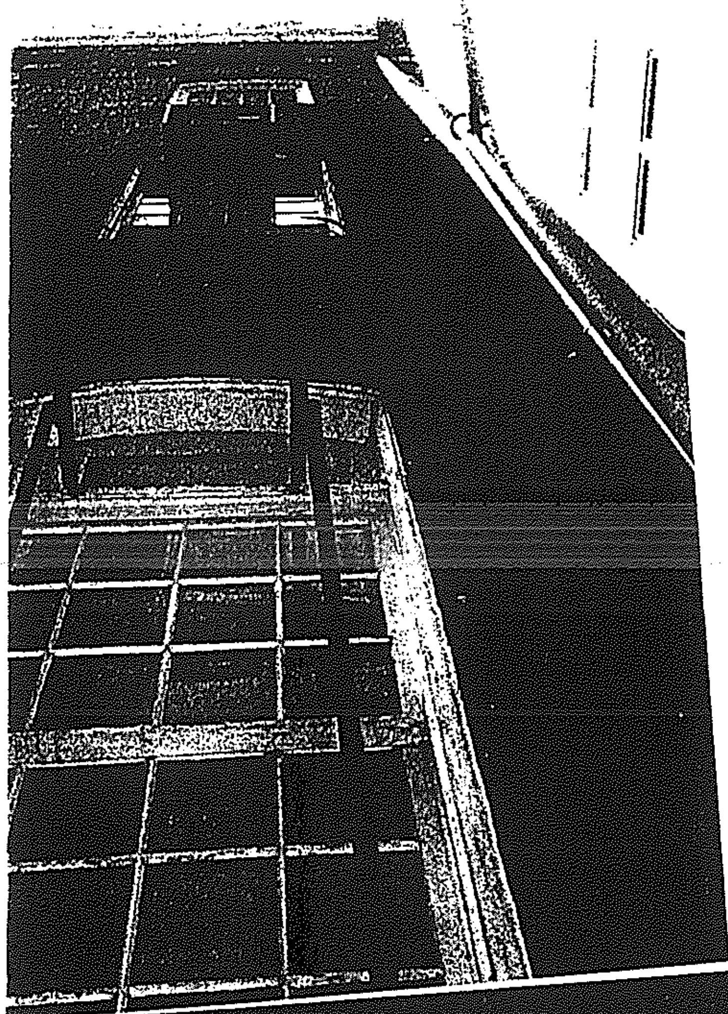

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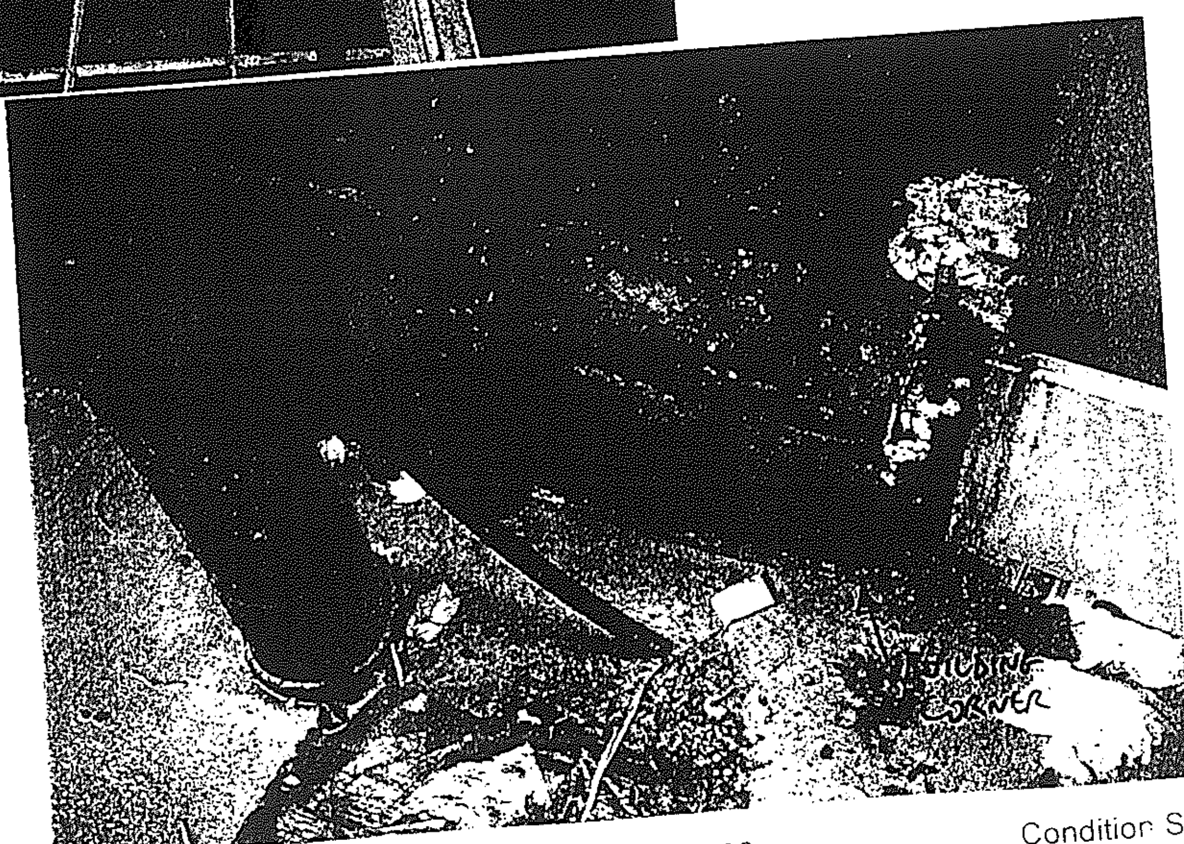

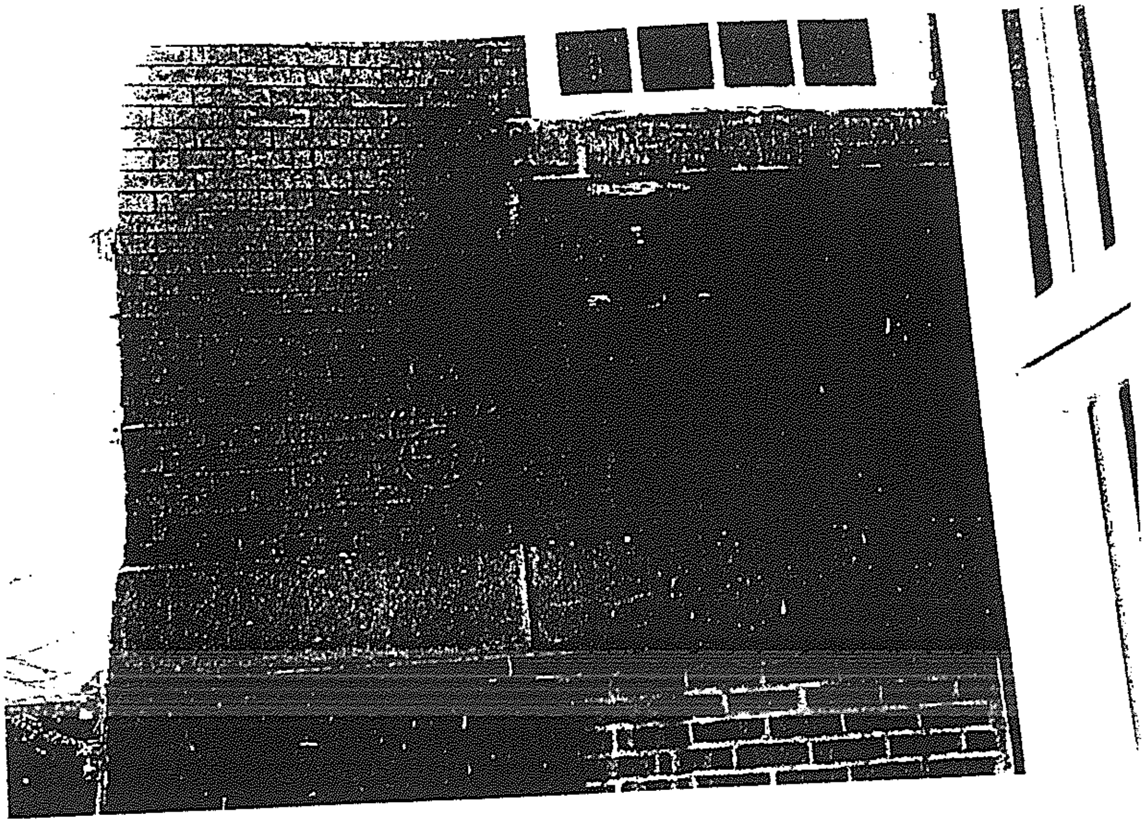

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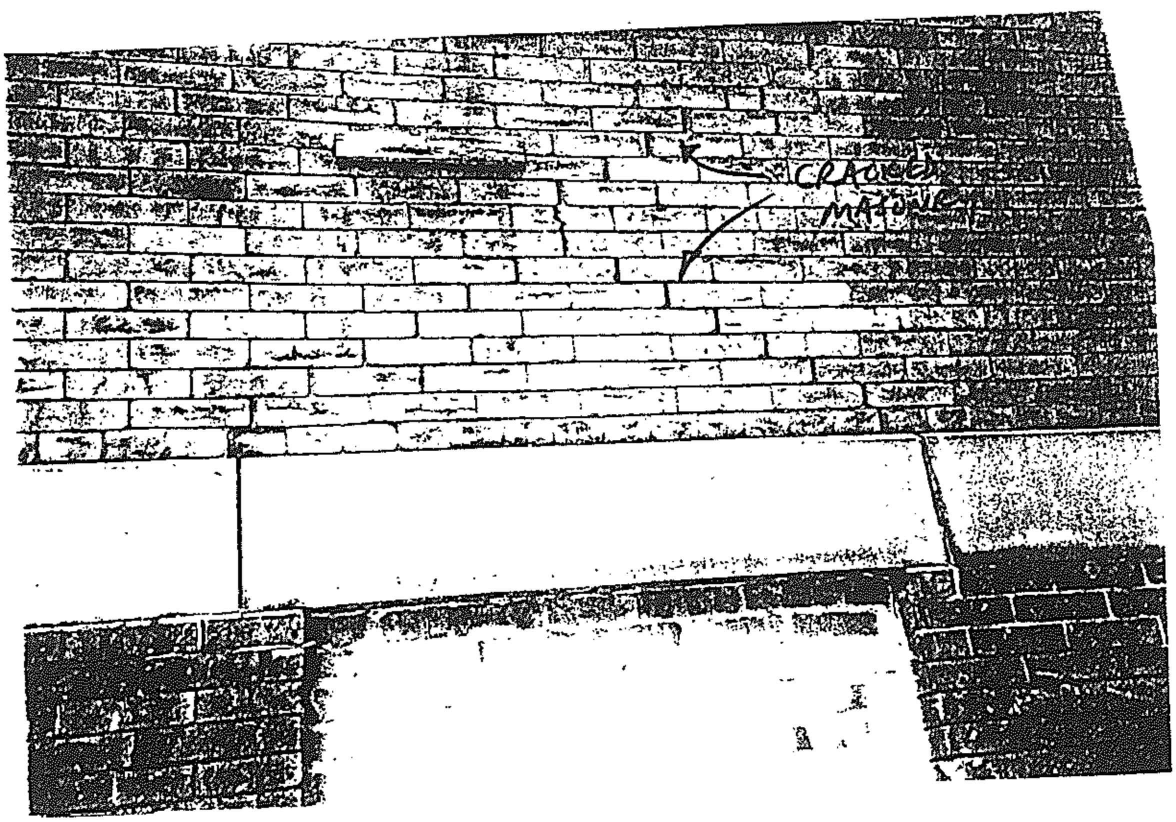

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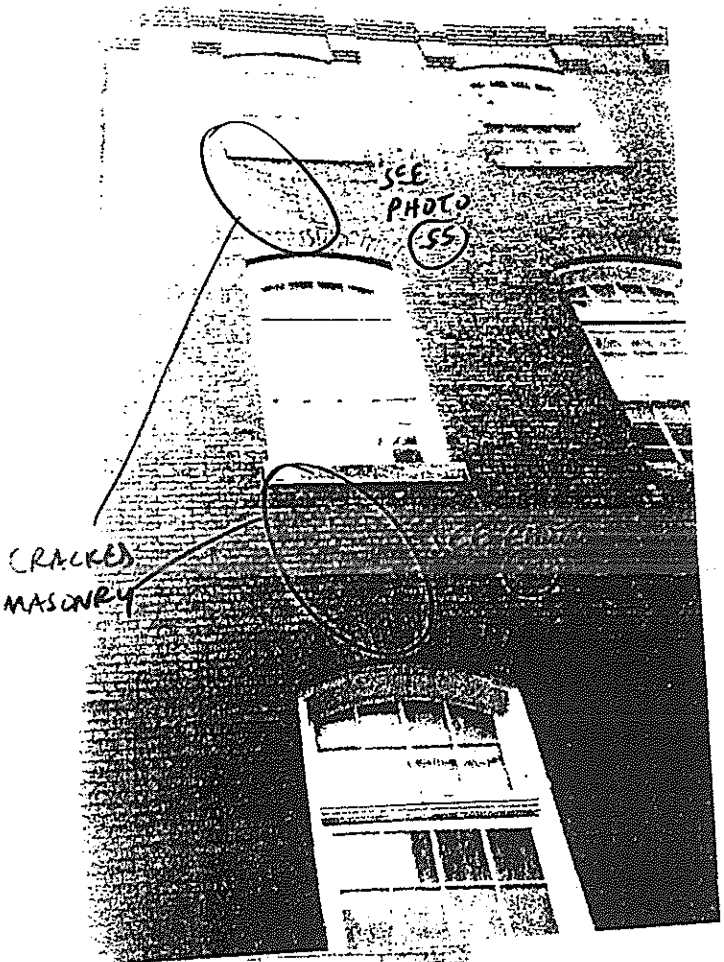

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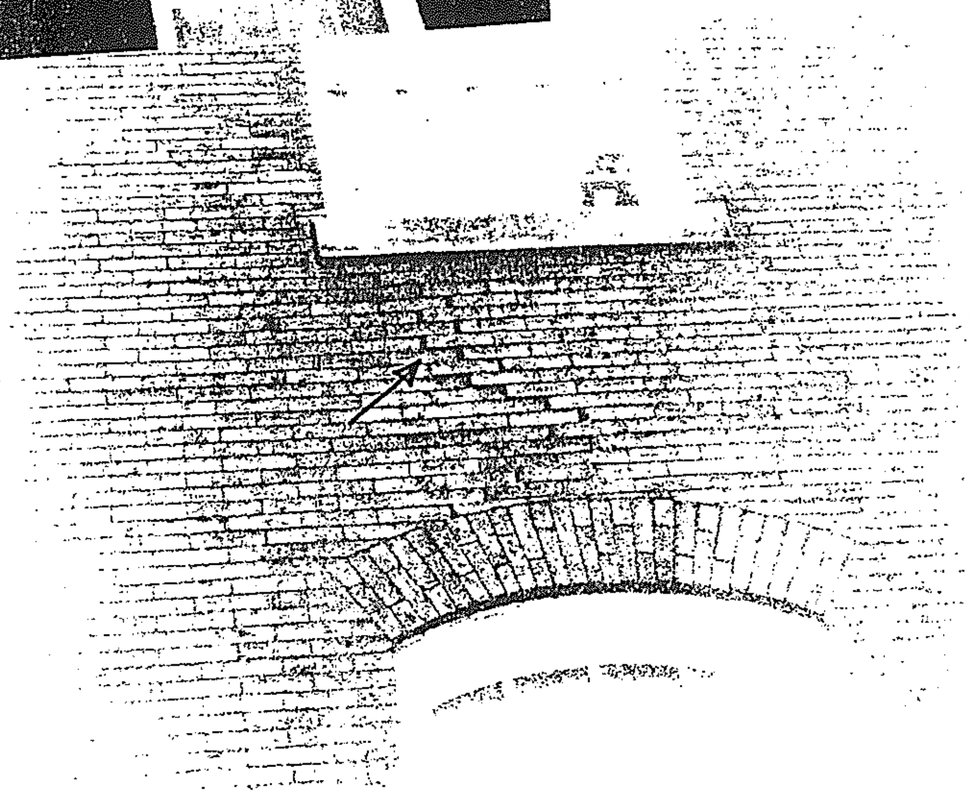

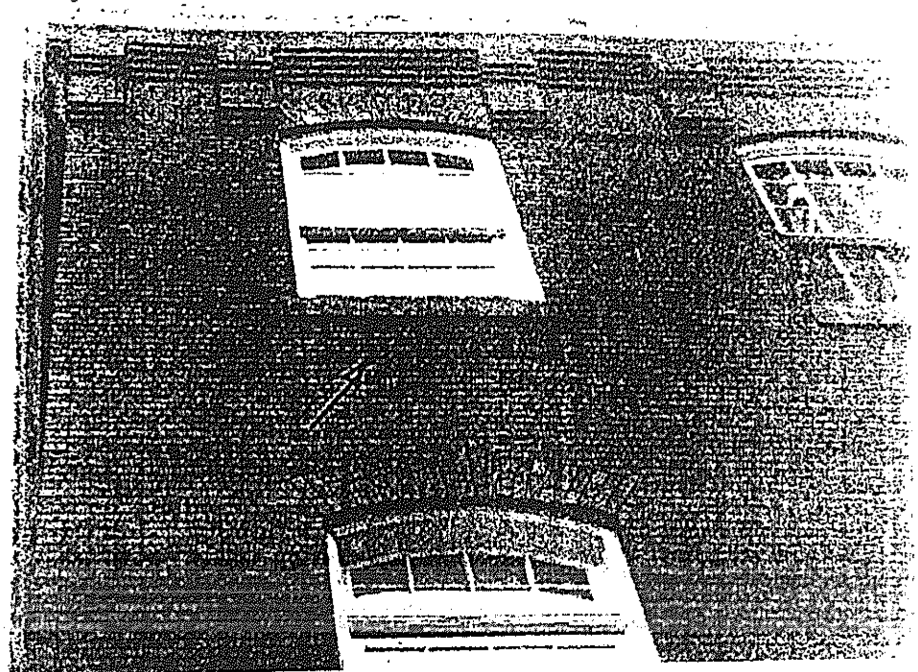

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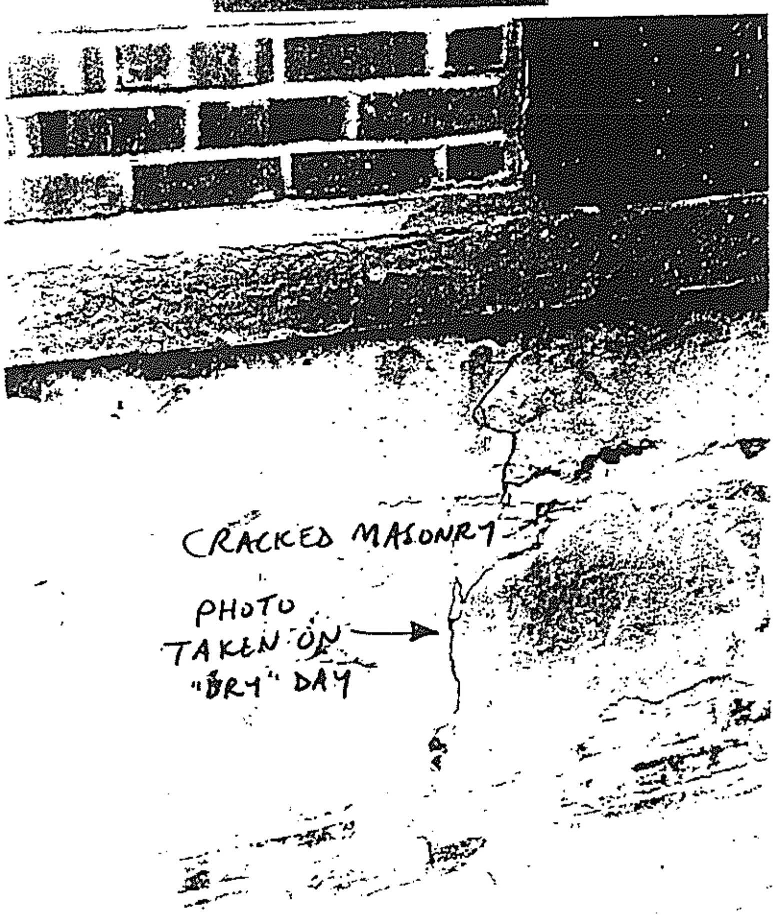

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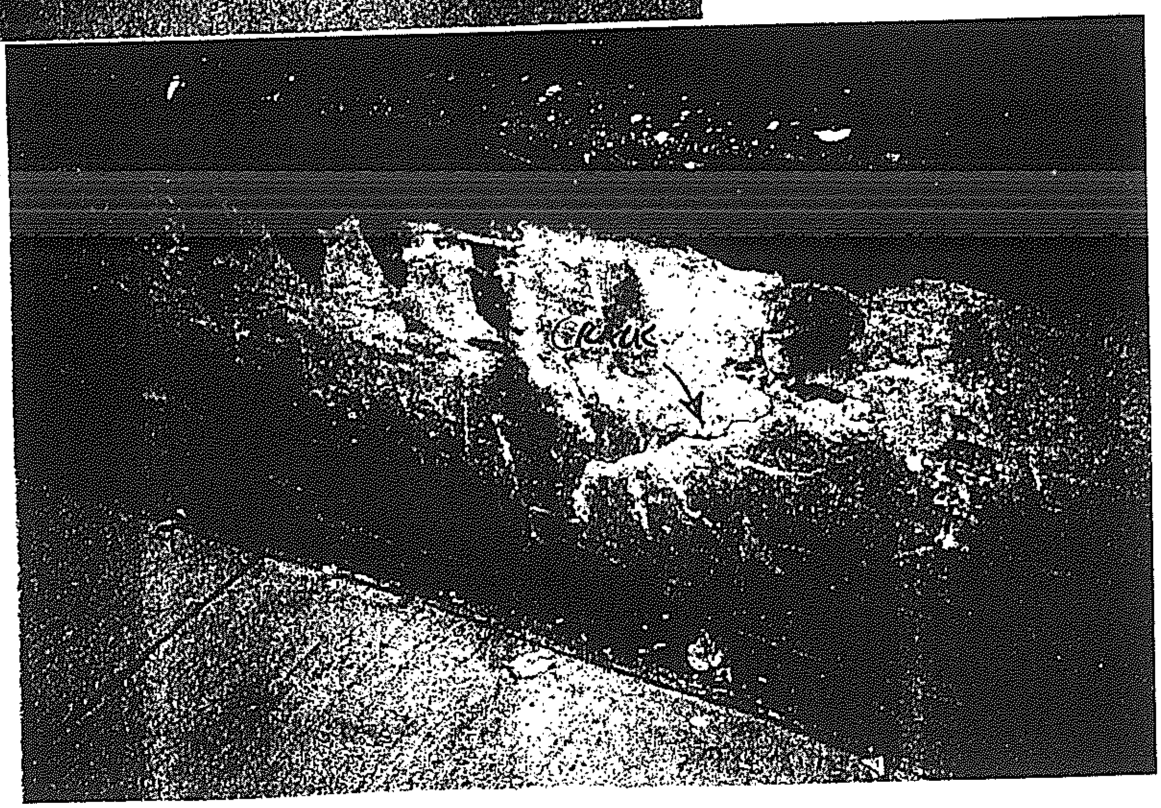

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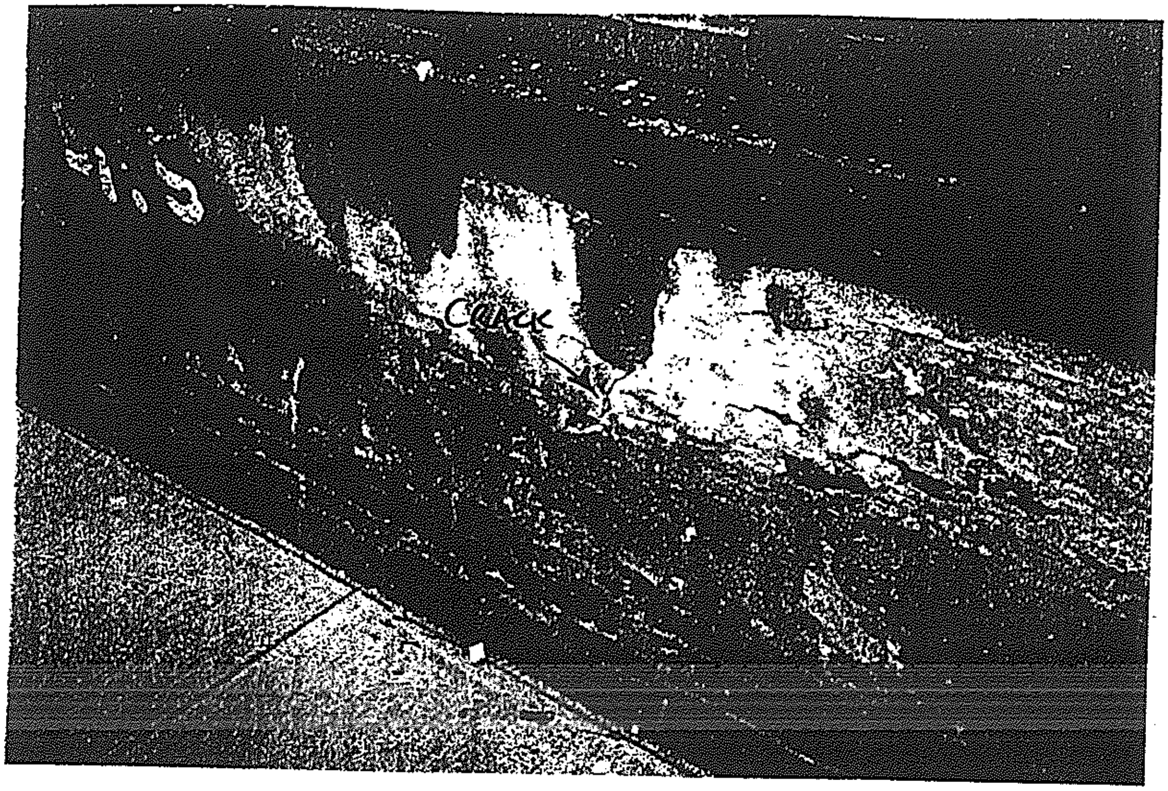

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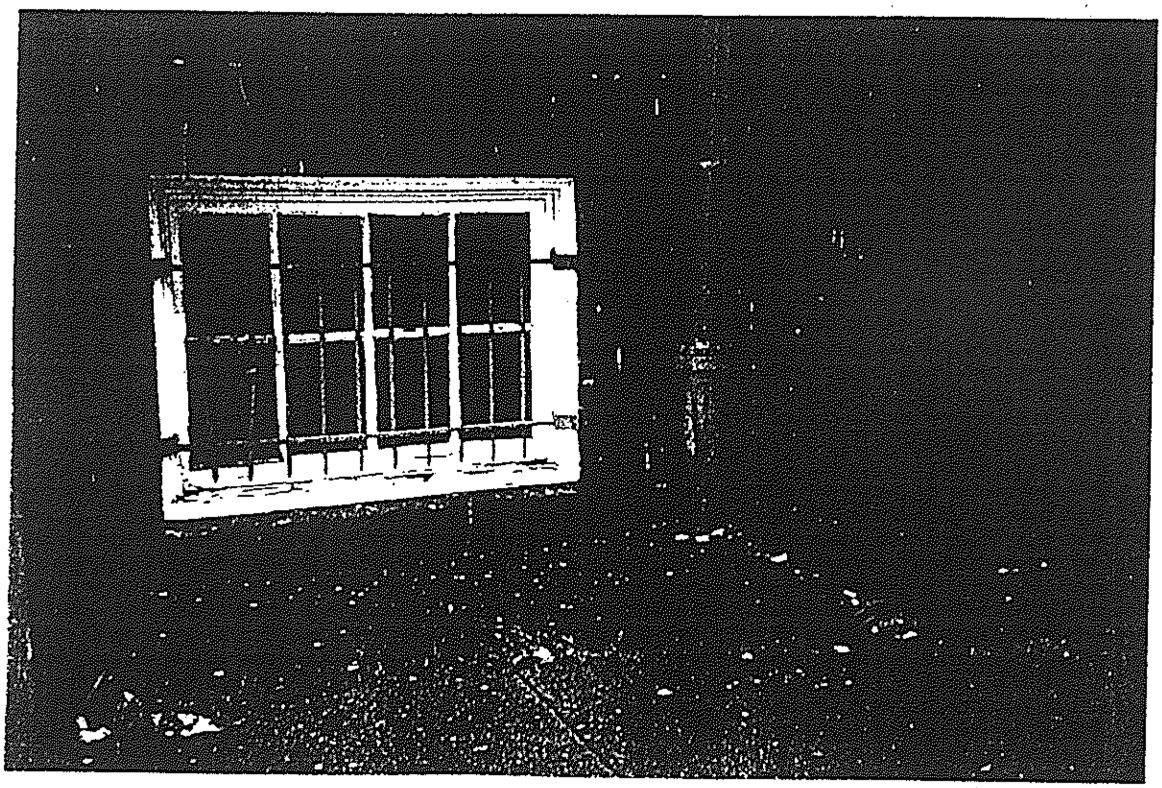

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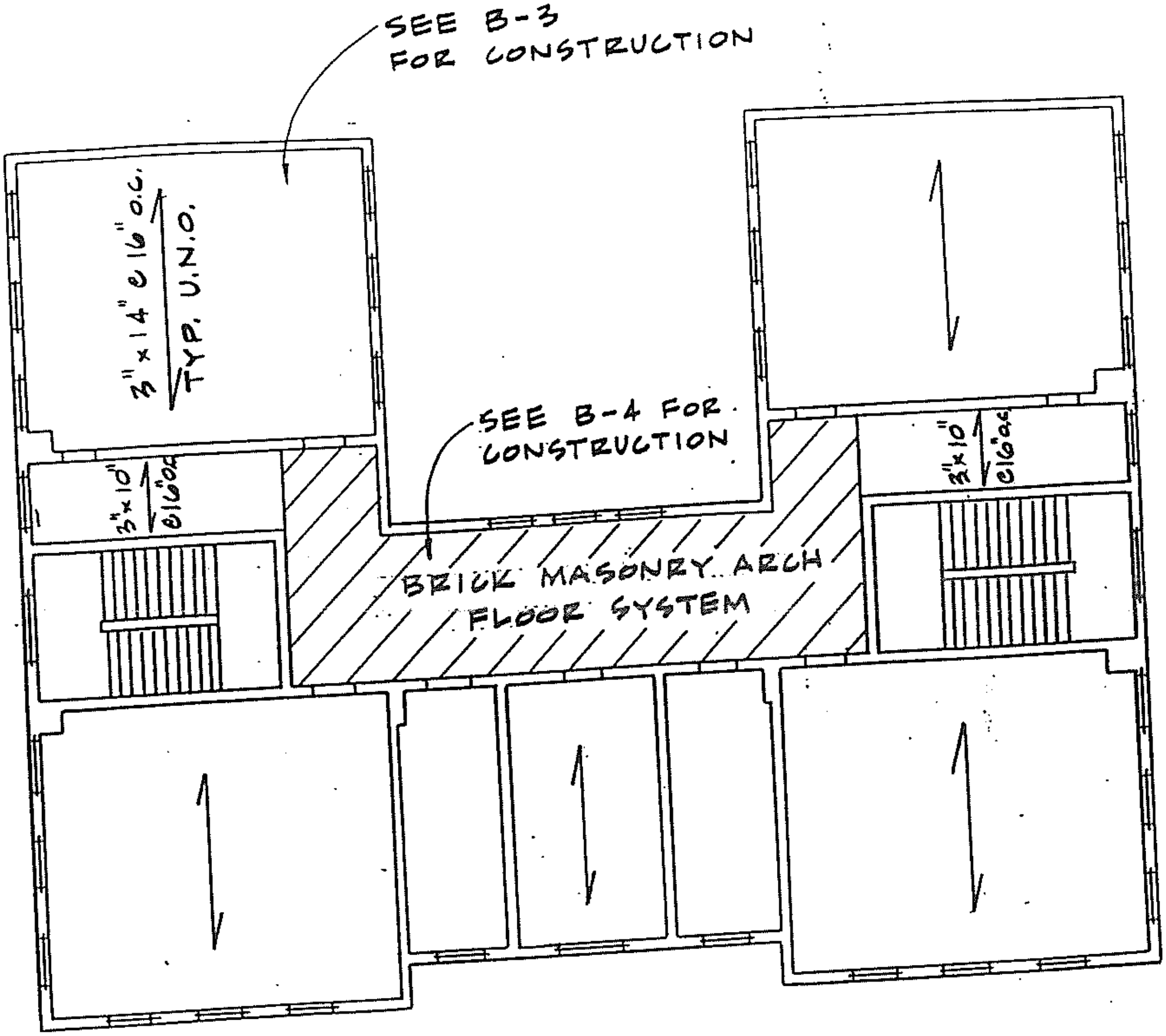
Appendix B
Existing Construction Features



EXISTING CONSTRUCTION

SECOND AND THIRD FLOOR FRAMING

1/16" = 1'-0" (±)

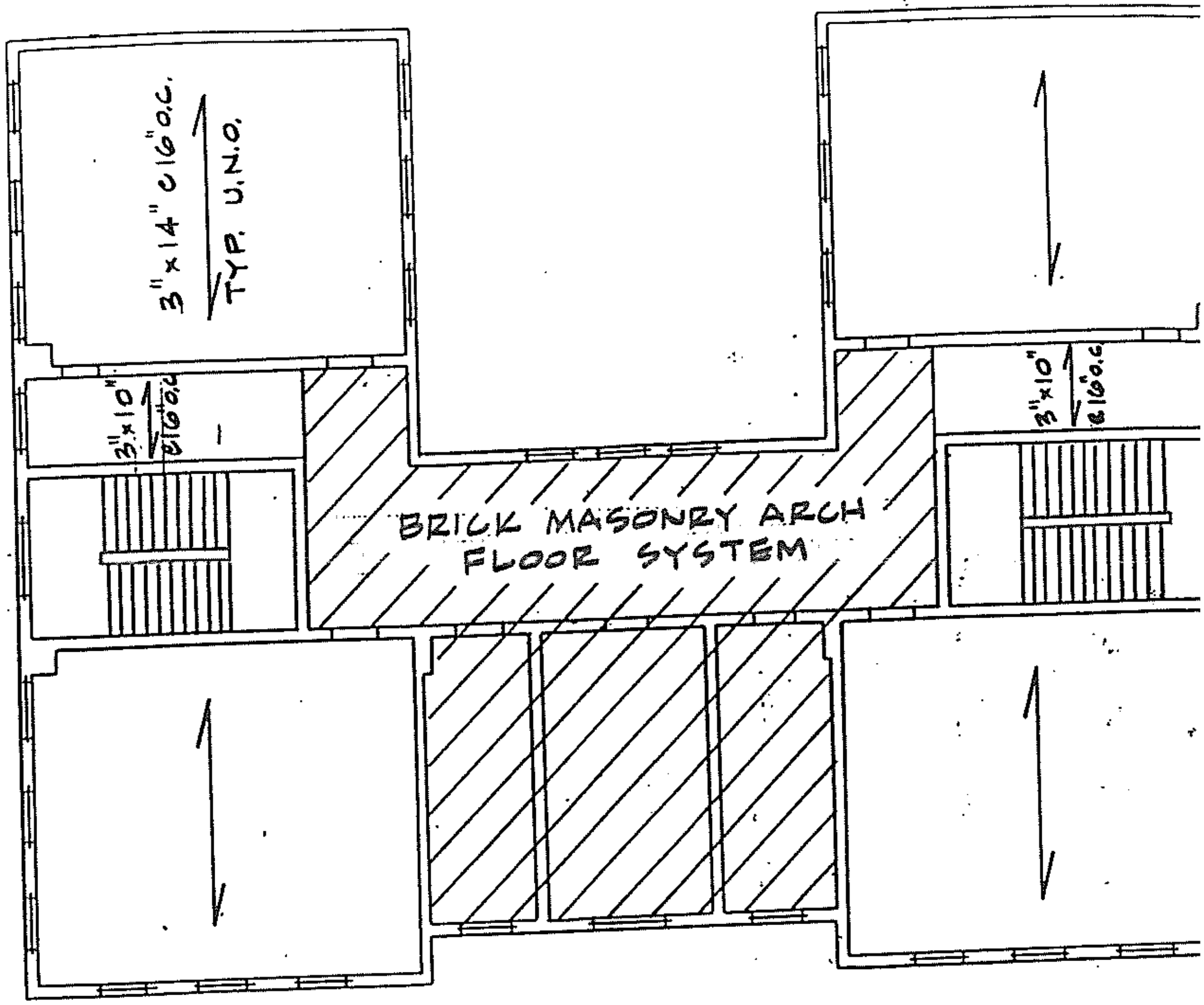
B-1

TADJER COHEN EDELSON ASSOC INC.
CONSULTING STRUCTURAL ENGINEERS
1109 SPRING ST.
(301) 587-1820
(301) 588-1966 FAX
SUITE #310
SILVER SPRING
MD. 20910

PROJECT: WEBSTER SCHOOL

DATE: NOVEMBER, 1999

PROJ. NO: 2992297.00



EXISTING CONSTRUCTION
FIRST FLOOR FRAMING

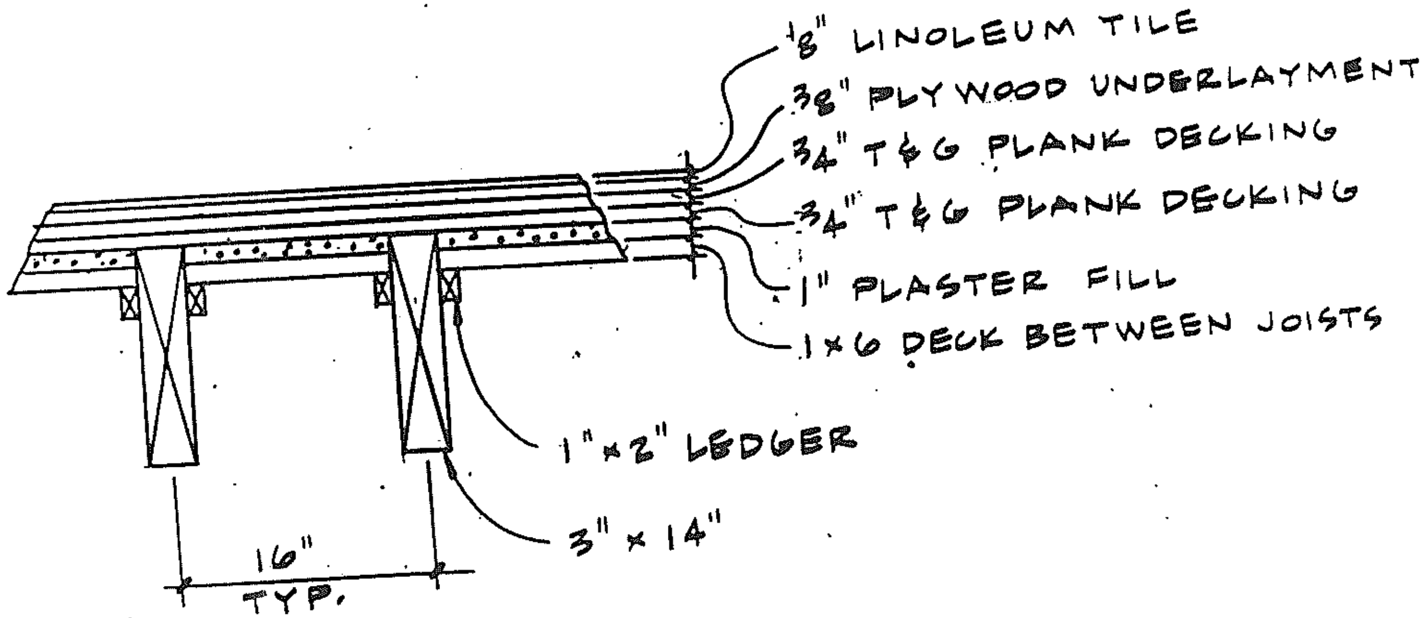
1/16" = 1'-0" (±)

B.

TADJER COHEN EDELSON ASSOC INC.
CONSULTING STRUCTURAL ENGINEERS
1109 SPRING ST.
(301) 587-1820
(301) 588-1966 FAX
SUITE #510
SILVER SPRING
MD. 20910

PROJECT: WEBSTER SCHOOL

DATE: NOVEMBER, 1999 | PROJ. NO: 299297.



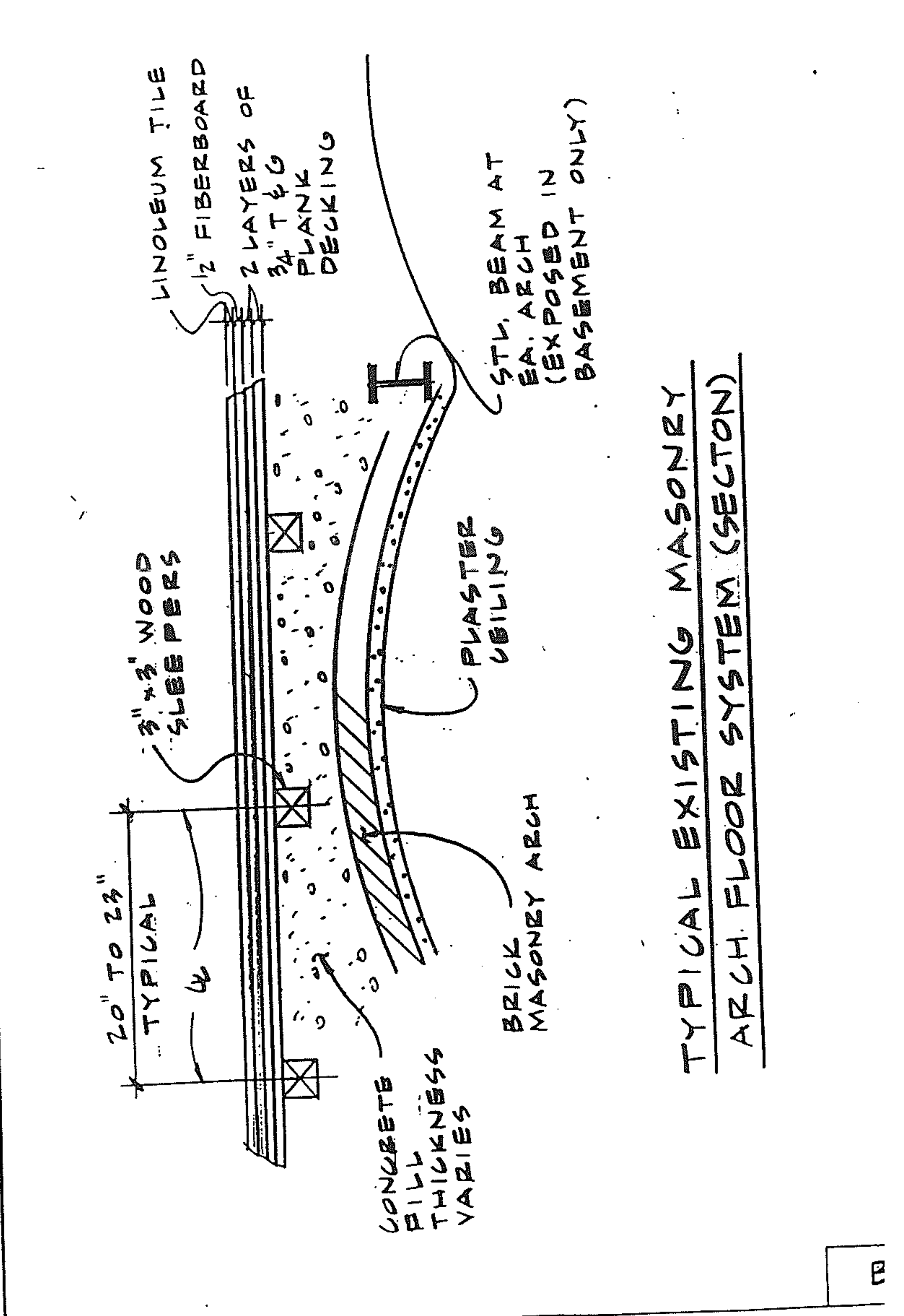
TYPICAL EXISTING WOOD JOIST FLOOR SYSTEM (SECTION)

TADJER COHEN EDELSON ASSOC INC.
CONSULTING STRUCTURAL ENGINEERS
1109 SPRING ST.
(301) 587-1820
(301) 588-1966 FAX
SUITE #510
SILVER SPRING
MD. 20910

PROJECT: WEBSTER SCHOOL

DATE: NOVEMBER, 1999 | PROJ. NO: 299297.00

B-3



TADJER COHEN EDELSON ASSOC INC.
CONSULTING STRUCTURAL ENGINEERS
1109 SPRING ST.
(301) 587-1820
(301) 588-1966 FAX
SUITE #510
SILVER SPRING
MD. 20910

PROJECT: WEBSTER SCHOOL

DATE: NOVEMBER, 1999 | PROJ. NO: 2992 9

Appendix C
Preliminary Repair Cost Estimates

PRELIMINARY
REPAIR COST ESTIMATE

Webster School
10th H Street, NW, Washington, DC
November, 1999

	REPAIR ITEM	UNIT MEASUREMENT	QUANTITIES	UNIT COST	ITEM COST	
	ROOF					
[1]	Remedial kneewall support at ends of all sloped roof joists	LF [entire perimeter]	500	$10.00	$5,000	
[2]	Reinforce/replace rotted wood roof joists and truss members	EA	100	$100.00	$10,000	
[3]	Replace rotted roof sill plates, rebuild wood cornices, wood gutters, and metal flashing	LF [entire perimeter]	500	$200.00	$100,000	÷ 2 = 50,000
[4]	Remove/reinstall all slate roofing—repair wood deck [10%], replace building felt [100%], replace broken slate [25%]	SF [entire roof surface]	8,400	$30	$252,000	÷ 2 = 126,000
	FLOORS					
[5]	Replace three (3) levels of collapsed wood floors in their entirety [including flooring]	SF [ALL]	3,000	$75	$225,000	
[6]	Sister existing rotted wood floor joists with 1-3/4"x14"x28'-0"+/-ML	EA	20	$100	$2,000	
[7]	Replace all layers of wood floor deck [at rotted deck&joists]	SF	450	$50	$22,500	
[8]	Replace all flooring and underlayment [leave existing subfloor]	SF [entire building]	21,000	$10.00	$210,000	
[9]	Replace deteriorated concrete fill at corridors	SF	850	$75.00	$63,750	
	WALLS					
[10]	Tuck point all mortar joints at interior face of exterior basement walls	SF [entire perimeter]	5,000	$30.00	$150,000	÷ 2 = 75,000

Tadjer Cohen Edelson, Associates, Inc.
Consulting Structural Engineers
1109 Spring Street, Silver Spring, MD 20910

PRELIMINARY
REPAIR COST ESTIMATE

Webster School
10th H Street, NW, Washington, DC
November, 1999

[11]	Replace all interior finish surface of basement walls at tuckpointed masonry [paint and drywall only]	SF [entire perimeter]	5,000	$5.00	$25,000
[12]	Repair cracked masonry at exterior façade	LF	300	$50.00	$15,000
[13]	Repair cracked masonry at interior, install steel angle lintels, replace wood door frame	EA	6	$2,000.00	$12,000
[14]	Tuck point mortar joints at entire exterior façade; includes scaffolding	SF [entire façade]	27,500	$60.00	$1,650,000
[15]	Excavate and install liquid applied membrane to foundation wall—entire perimeter below grade				
	Excavation and shoring	LF [entire perimeter]	500	$200.00	$100,000
	Liquid applied membrane	SF [below grade surface]	4,000	$5.00	$20,000
	Replace concrete sidewalk at excavated foundation	SF [8 ft. width at perimeter]	4,000	$5.00	$20,000
[16]	Replace isolated cracked brick units	EA	100	$25.00	$2,500

Subtotal	$2,884,750
General Conditions/ Protections (15% of Subtotal)	$432,713
Total Estimated Repair Costs	**$3,317,463**

Note: Repair cost estimates are for normal replacement in kind, or replacement with substitute materials in concealed areas (for example, MicroLam wood joists in lieu of sawn lumber). There has been no attempt to anticipate any special requirements for architectural or historical considerations. Repair costs may increase dramatically (even double or triple) after architectural and historical issues have been addressed.

Tadjer Cohen Edelson, Associates, Inc.
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1109 Spring Street, Silver Spring, MD 20910