

January 07, 2010

Mr. Leo Bradshaw
Loudon County Government
100 River Road
P.O. Box 110
Loudon, TN 37774

RE: Greenback School – Loudon County, TN
Structural Walkthrough – Visual Inspection of Facility
Report of Findings
HODGE Associates Job # 2564

Dear Mr. Bradshaw:

This report has been based solely on visual observations at the site. No destructive or material testing has been performed. The opinion provided herein is not intended as a comprehensive engineering assessment of the subject structure. In the event that any additional information becomes available, we reserve the right to revise the opinion contained within this report.

INTRODUCTION:

Per the request of Deputy State Fire Marshall Ron Jones as stated in the Annual School Inspection Report, Hodge Associates (HA) visited the site on Tuesday, December 1, 2009. Principal Joey Breedlove was on site along with custodians to assist with basement and roof access. The walkthrough focused on the primary structure, and does not include the portable “temporary” buildings, walk-in freezers, or the stadium bleachers. The purpose of the walkthrough was to perform a visual observation of the facility, and provide a report of findings noting structural deficiencies and needed repairs. This report does not include site civil, evaluations of mechanical, plumbing, electrical systems, or building finishes.

OBSERVATION:

The K-12 school is comprised of multiple adjoining buildings. Structural compositions vary and include wood and steel floor joists, wood and steel roof joists, concrete masonry unit (CMU) walls, wood stud walls and a brick façade throughout. Gymnasium roof systems utilize steel roof trusses bearing on CMU walls. Foundations range from

concrete slab on grade to crawl spaces to full basements. Room names in this report refer to the fire escape map currently posted outside of the front office #102.

During my walkthrough a number of issues were observed which are separated and classified in this report as “structurally significant” or “observed issues.” Structurally significant items should receive immediate attention.

Structurally Significant:

Brick Chimney:

The brick chimney in the center of the school has undergone severe freeze/thaw damage and is unsafe. The chimney appears to have a CMU core with a brick façade. As water penetrates the brick façade and freezes, it expands causing the brick to be pushed away from the CMU. The façade will continue to degrade, and may become unstable. See photo #1. Hodge Associates (HA) suggests the chimney be removed down to the roof elevation or down to a point where the façade is completely intact. A new cap should then be installed to seal the chimney from water infiltration.

Gymnasium:

A single steel roof joist of the gymnasium as part of the physical education building is showing signs of excessive shear stress at the bearing seats. Cracks exist where the joist bears on the wall. The cracks extend down the wall at a 45 degree angle and include both interior CMU and exterior brick. See photos #4 and #5 for location. HA suggests the existing fractured CMU and brick be removed, and the bearing conditioned repaired. All other joist seats should be closely observed for similar inadequacies.

Original Structure Circa 1939:

The oldest structure on site utilized as Middle School classrooms and offices has been repaired at the basement level using screw jacks and stacked CMU piers. The repairs appear to be adequate. However, HA suggests an additional screw jack at the beam joint showing signs of shear stress (see photo #6 for location). Furthermore, photo #7 suggests the need for adequate screw jack bearing to be installed. There appears to be possible delamination of an added repair beam as shown in photo #13. HA suggests bolting these laminations together to avoid further weakening of the built-up beam. Photo #15 suggests a possible roof truss anomaly needing further investigation. The truss should be repaired or replaced as necessary.

Band Room:

The standalone Band building is comprised of CMU walls with wood roof trusses. Missing gutters and down spouts have allowed water to infiltrate the CMU mortar joints and permitted freeze/thaw damage. HA suggests the CMU joints be cleaned and repointed. Gutters and downspouts should be installed in order to prevent water from being in contact with the wall, and to direct water away from the foundations. Also, the roof trusses appear to be sagging toward the north end of the building (see photo #8). Further investigation should be performed to determine the cause. The trusses should

be repaired or replaced as necessary.

Exterior Walkway Canopy:

The bearing of the walkway canopy at the west end of the High School is degrading and may become unstable. See photo #12 for location. Freeze/thaw damage may have contributed to the degradation of the bearing seat at the brick wall. HA suggests removing the damaged brick, and repairing the bearing condition as necessary. All other similar bearing conditions should be repaired as necessary.

Observed Issues:

A number of masonry cracks exist throughout the entire facility primarily due to an inadequate storm drainage system. Gutters and downspouts have not been maintained, and therefore allow water to accumulate at the foundations. Saturated soils become weak and precipitate localized settlement of the foundations. Walls bearing on settled foundations will incur stair-step cracks in the mortar joints. Horizontal displacement of the façade can occur in severe cases as shown in photo #16. The collapsed portion of the gutter along the north wall of the oldest building is contributing to the flooding of the basement (see photo #15). The mildew stained brick façade and rotting windowsills of the courtyard Middle School windows is attributed to leaking gutters. Gutters and downspouts must be repaired and replaced as necessary to direct water away from the structure. If left unattended, the poor storm water management may compromise the structural integrity of the foundations and could facilitate damage to other building components.

Storage Room "B" adjacent to the library has sustained a breach in the waterproofing of the partial retaining exterior wall as evident by the efflorescence on the wall.

Select exterior doors and windows throughout the facility do not have the proper weather stripping against the jambs. Broken windows were observed.

Concrete walkways and stoops contain severe cracks that could be tripping hazards, and should be patched and repaired.

The vertical cracks in the cafetorium spaced evenly along the south wall are due to expansion and contraction of the CMU wall. The cracks do not affect the structural integrity of the wall. The wall should have contained control joints to relieve these internal stresses.

The control joints in the brick façade should be further investigated. All joints that have dried-out and become brittle should be removed and replaced in order to seal the wall from infiltrating water.

Roof systems throughout the facility are in poor condition. The uneven ballast creates ponding, and does not properly channel the storm drainage to the downspout conductor

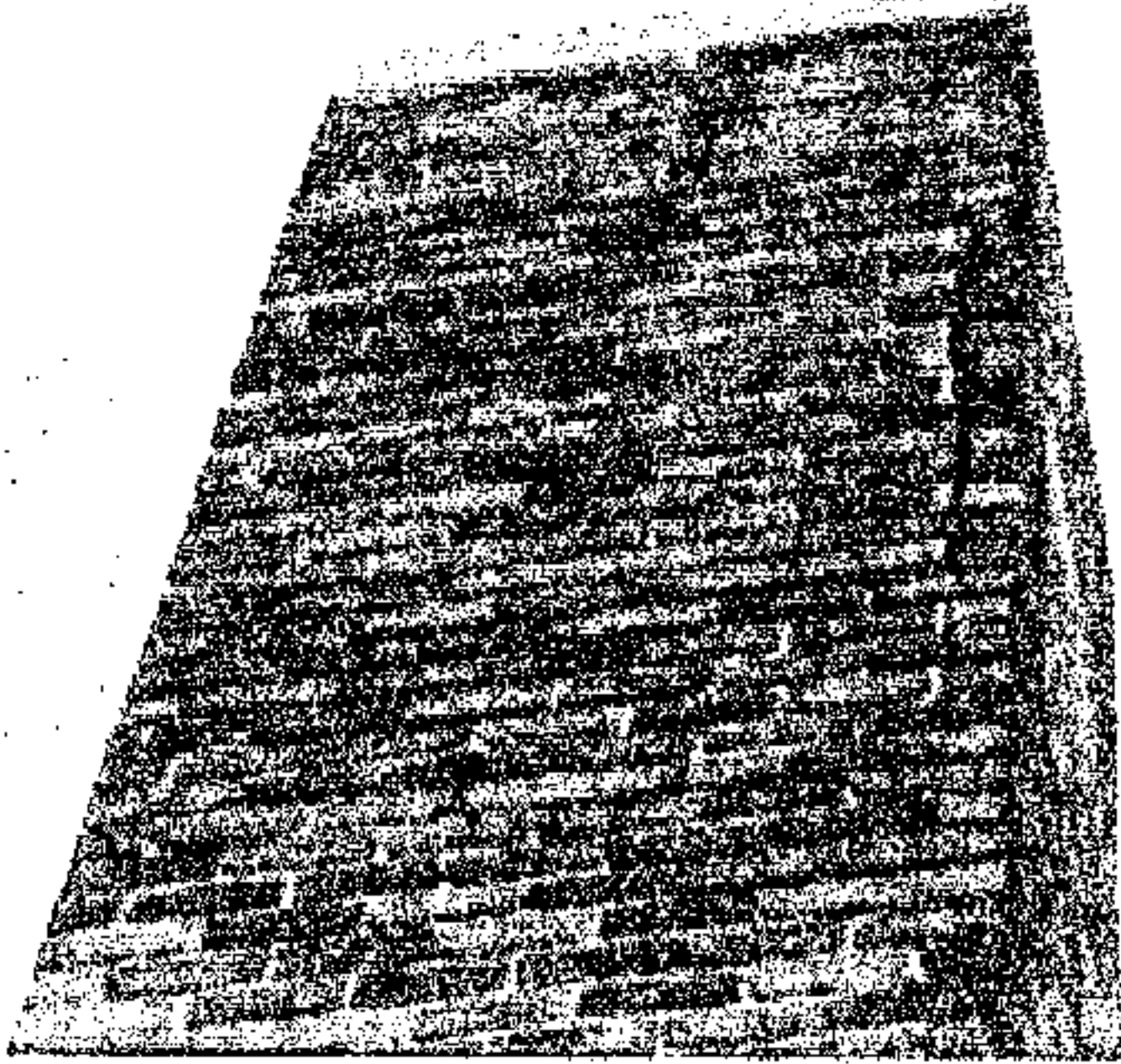
heads. Leaks in the spray foam material may cause the roof deck to rust and therefore compromise its structural integrity. HA suggests a thorough investigation of the roof deck to determine if leaks have occurred. The roof edge detail has allowed water to be in contact with the fascia boards and caused severe wood rot. The rotted fascia boards may allow water behind the brick façade and facilitate the freeze/thaw damage to the brick. The north wall of the High School gymnasium has suffered from freeze/thaw damage as evident from the popped brick faces. The asphalt shingles are nearing the end of their lifespan, and are mildewing which may be allowing leaks. HA highly suggests the consideration of installing a new roof throughout the facility as well as redesigning the edge detail.

CONCLUSION:

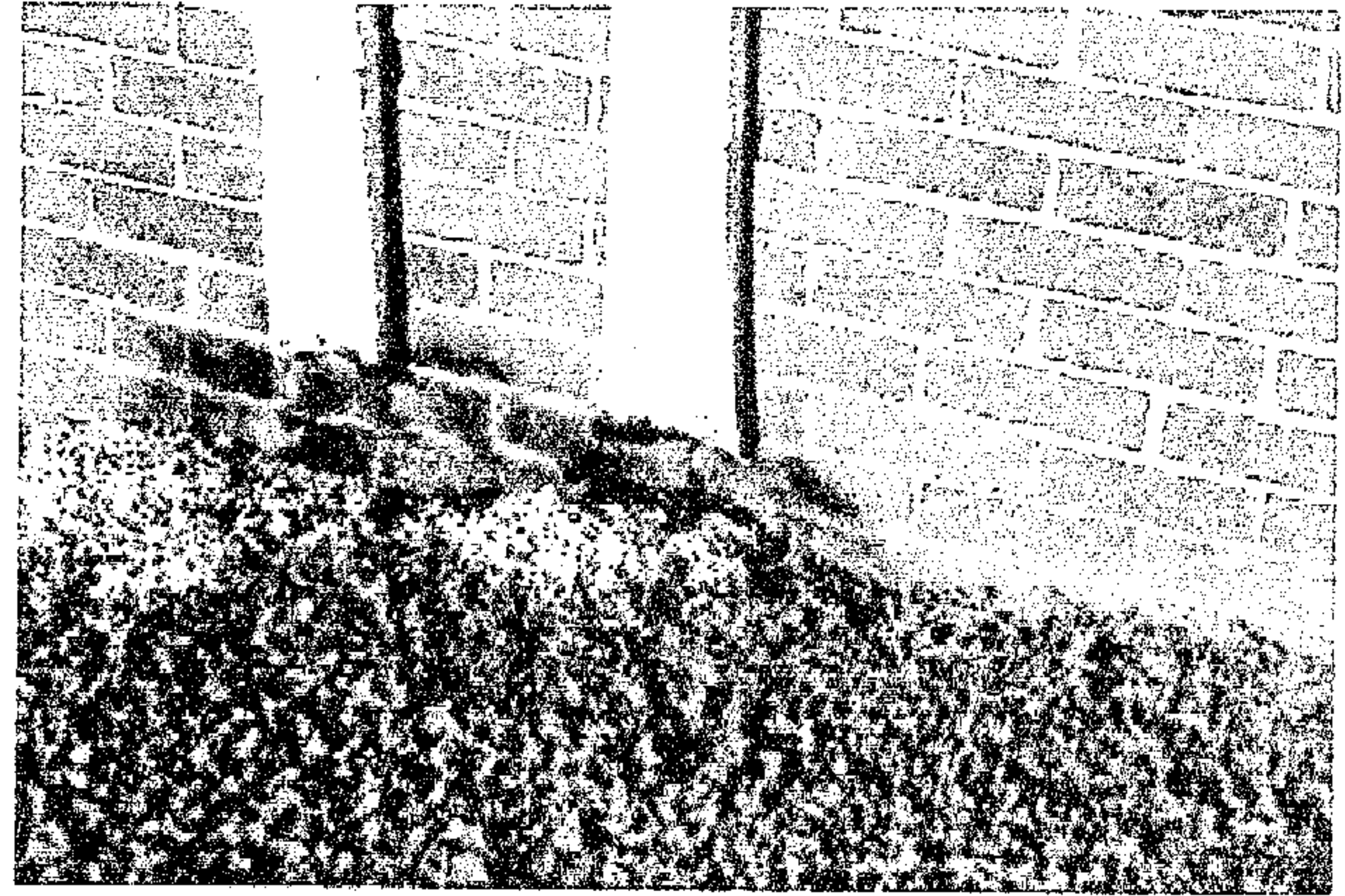
Based on the information compiled during my inspection it is my opinion that the structures are structurally safe for occupancy provided the suggested structurally significant repairs as outlined in this report take place. The overall condition of the facility appears poor due to ill maintained storm drainage systems. New gutters and downspouts should be installed to collect and direct water away from the buildings. Sufficient time should then be allowed for the grade surrounding the buildings to completely dry out. After the dry-out period, the brick façade throughout the facility should be cleaned and repointed as needed.

A potential exists for further analysis of architectural finishes, as well as mechanical electrical and plumbing systems.

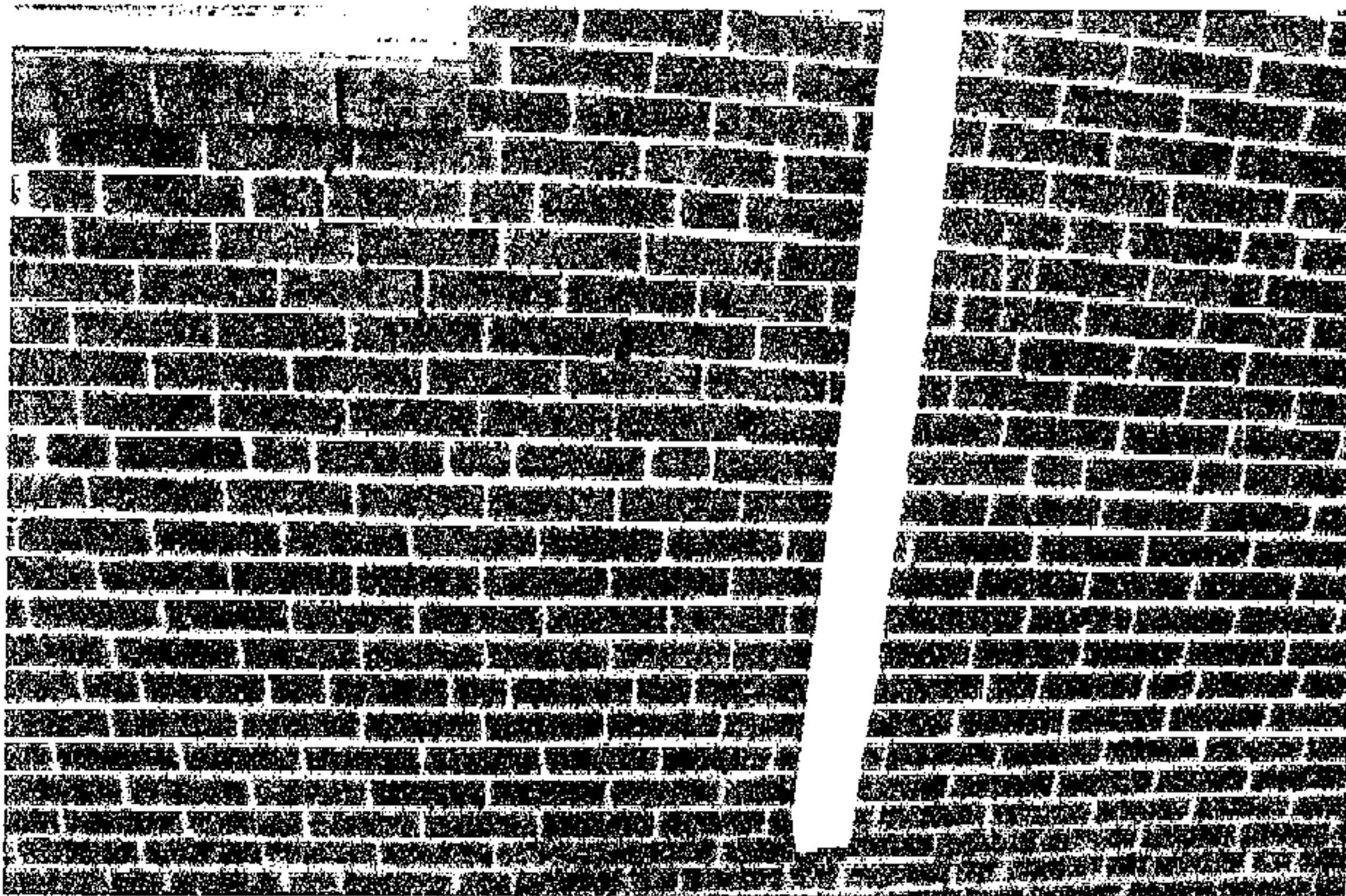
1. Chimney with failing façade.



2. Downspout saturating foundations.



3. Downspout with settlement crack.



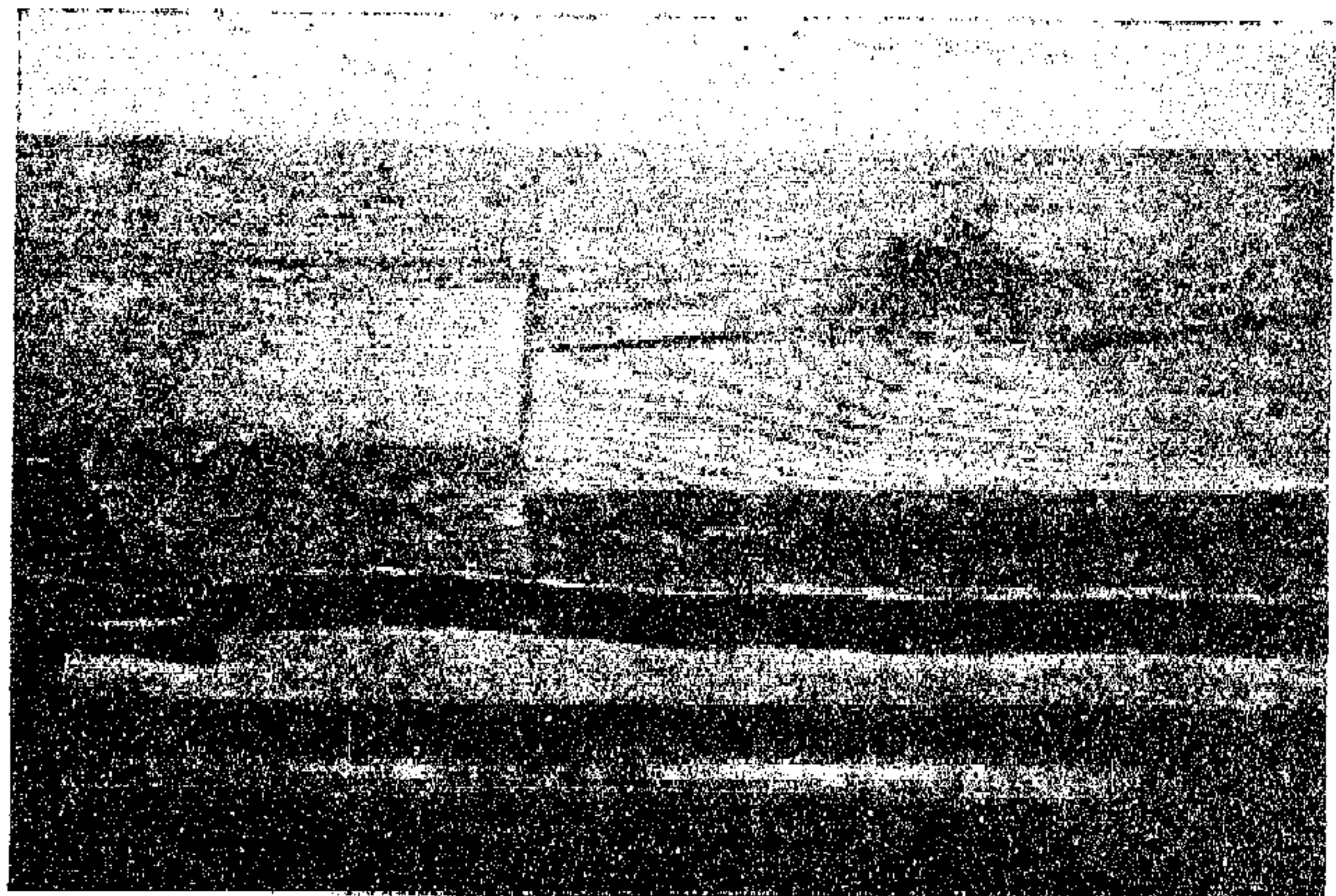
4. Gymnasium joist with bearing shear fracture.



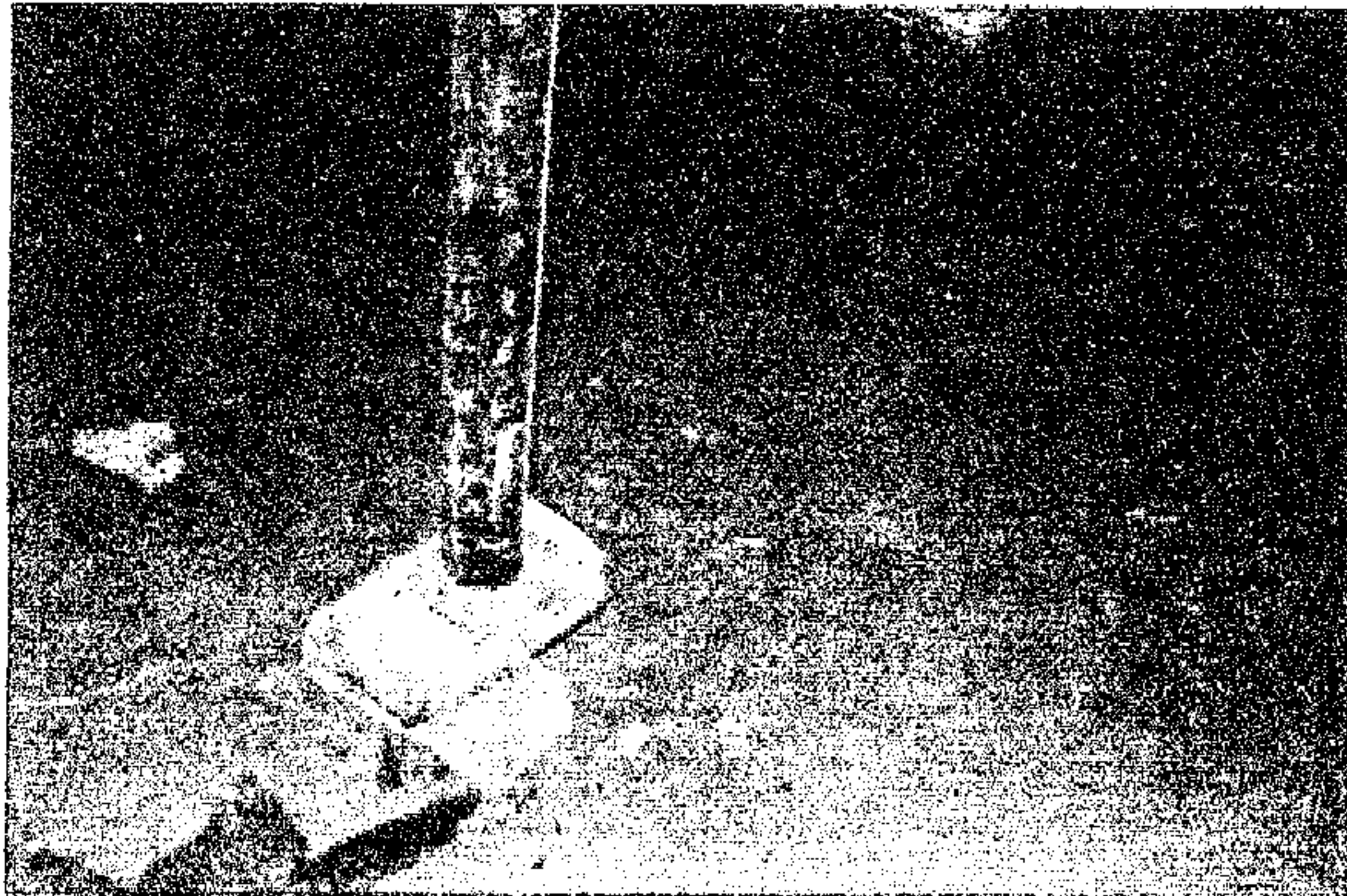
5. Gymnasium joist shear crack from exterior.



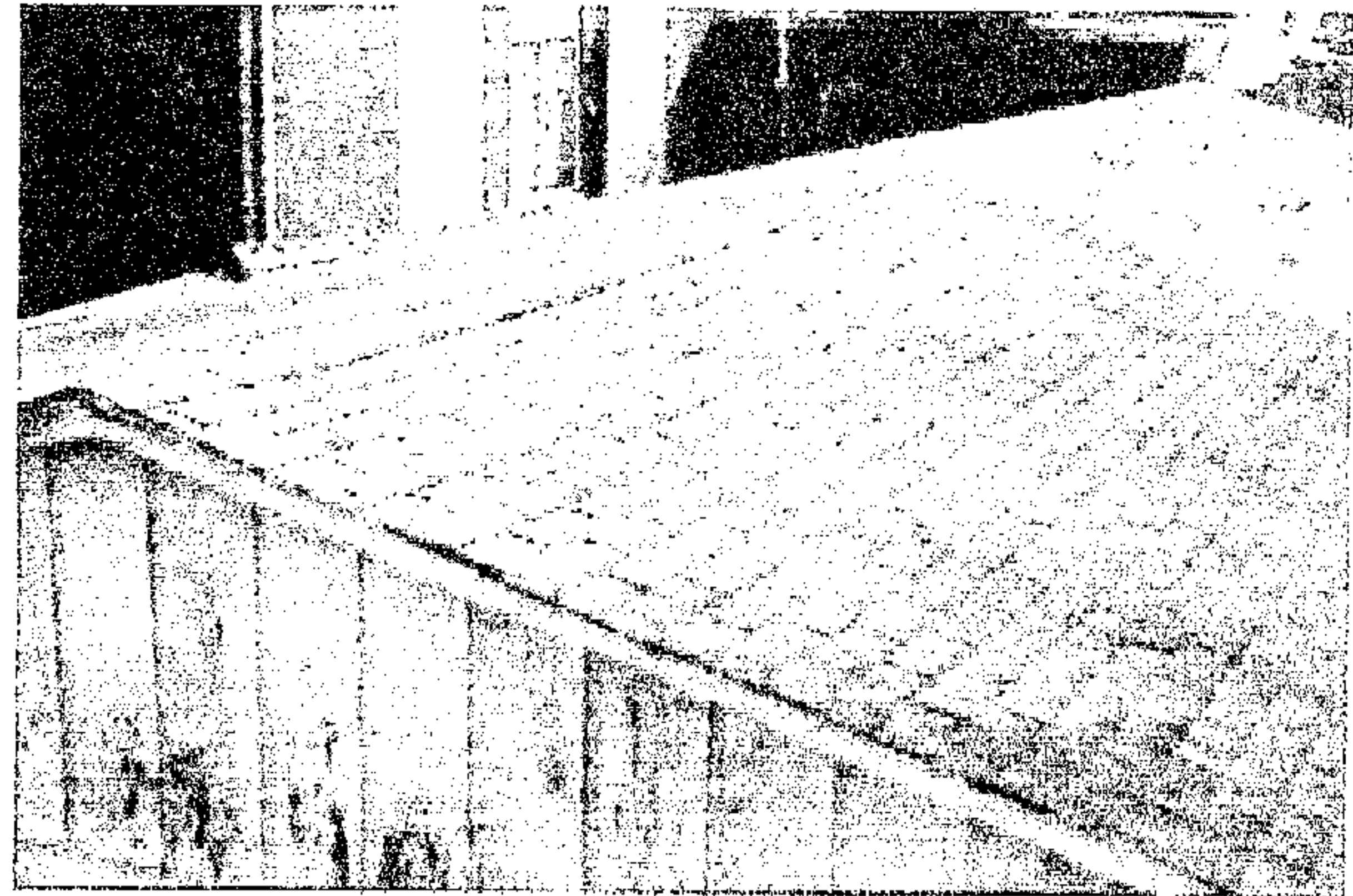
6. Add jack at fracturing joint.



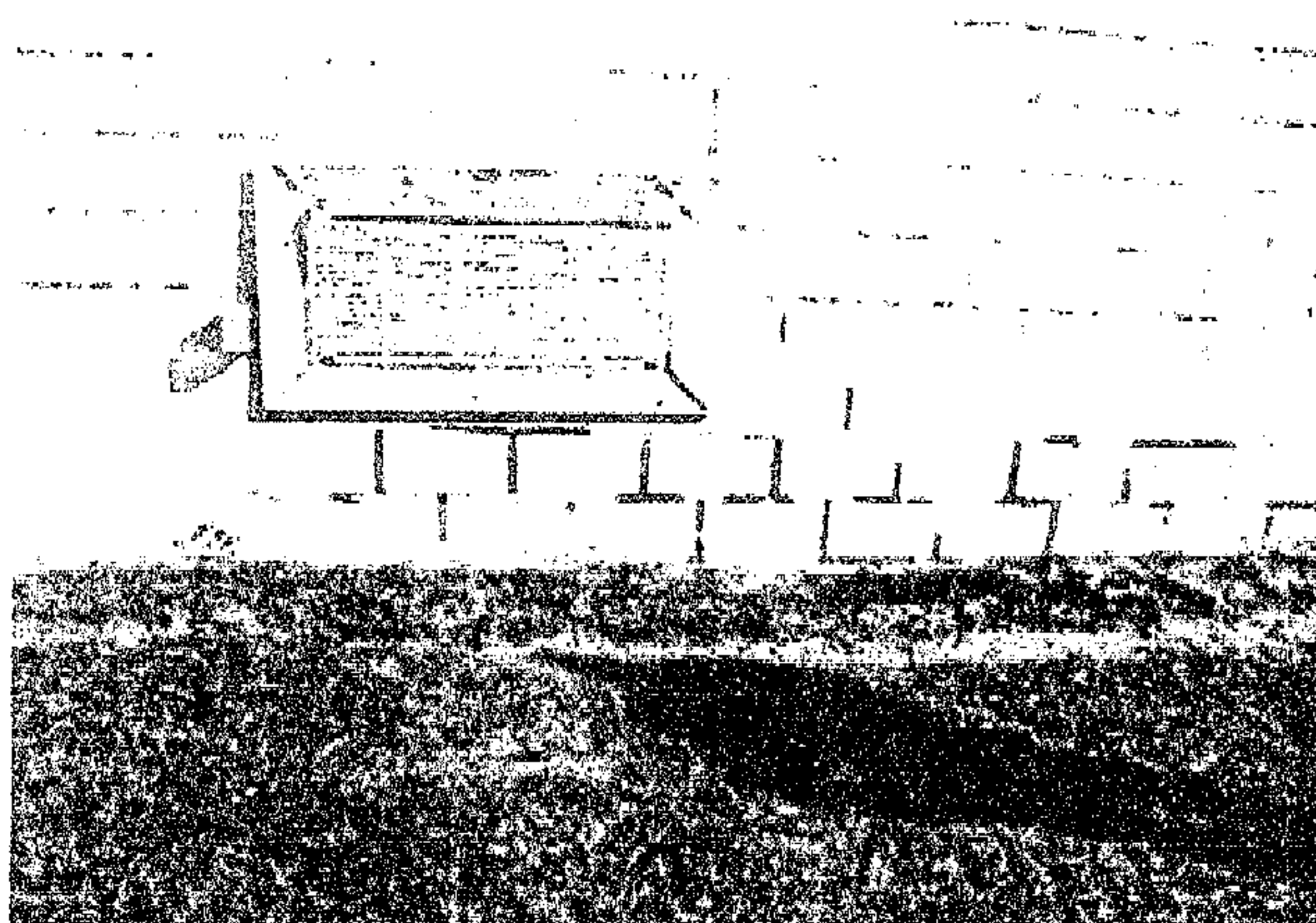
7. Repair jack bearing.



8. Band Room sagging roof truss.



9. Freeze/thaw damage to Band Room CMU walls.



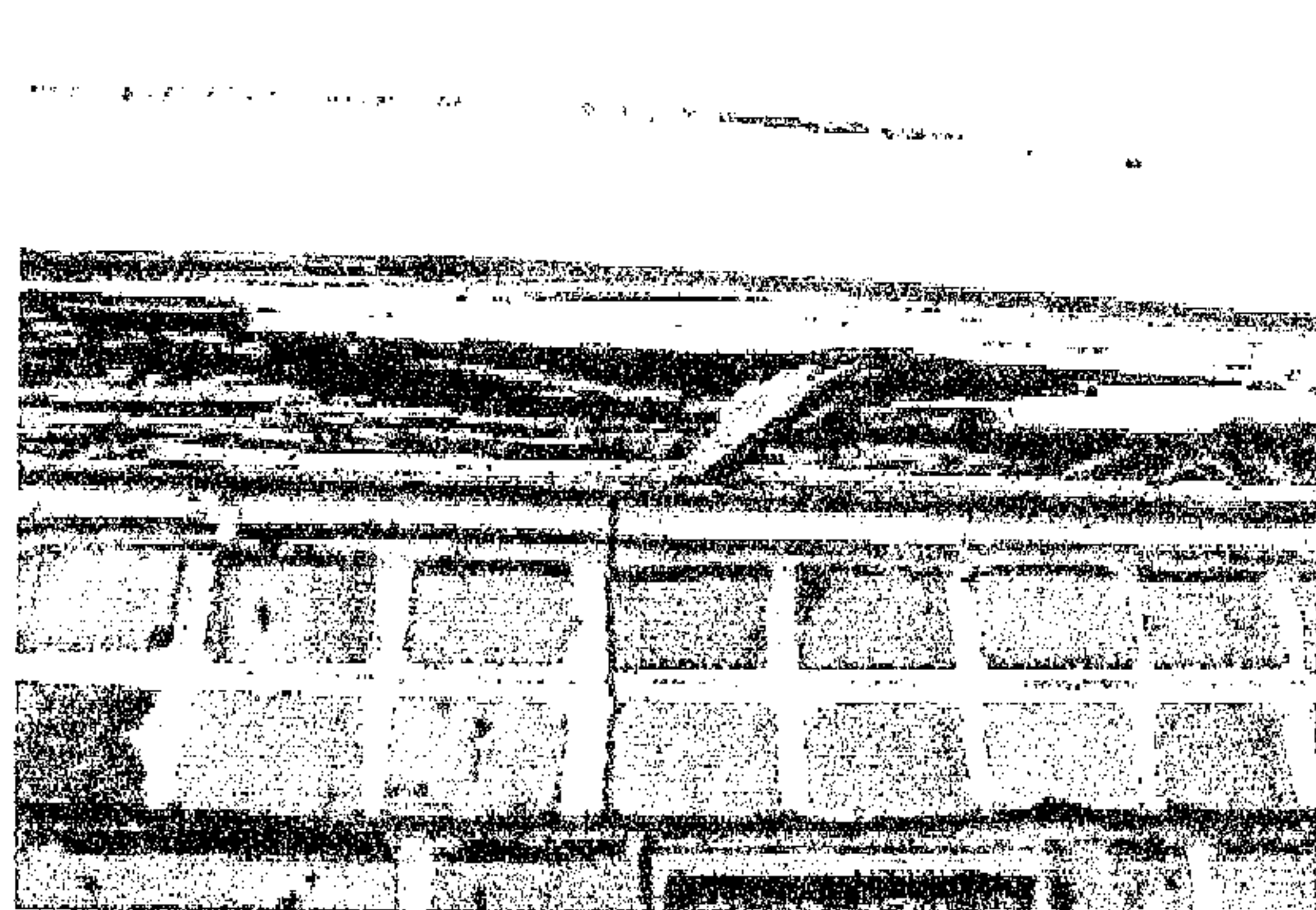
10. Exterior walkway canopy bearing condition.



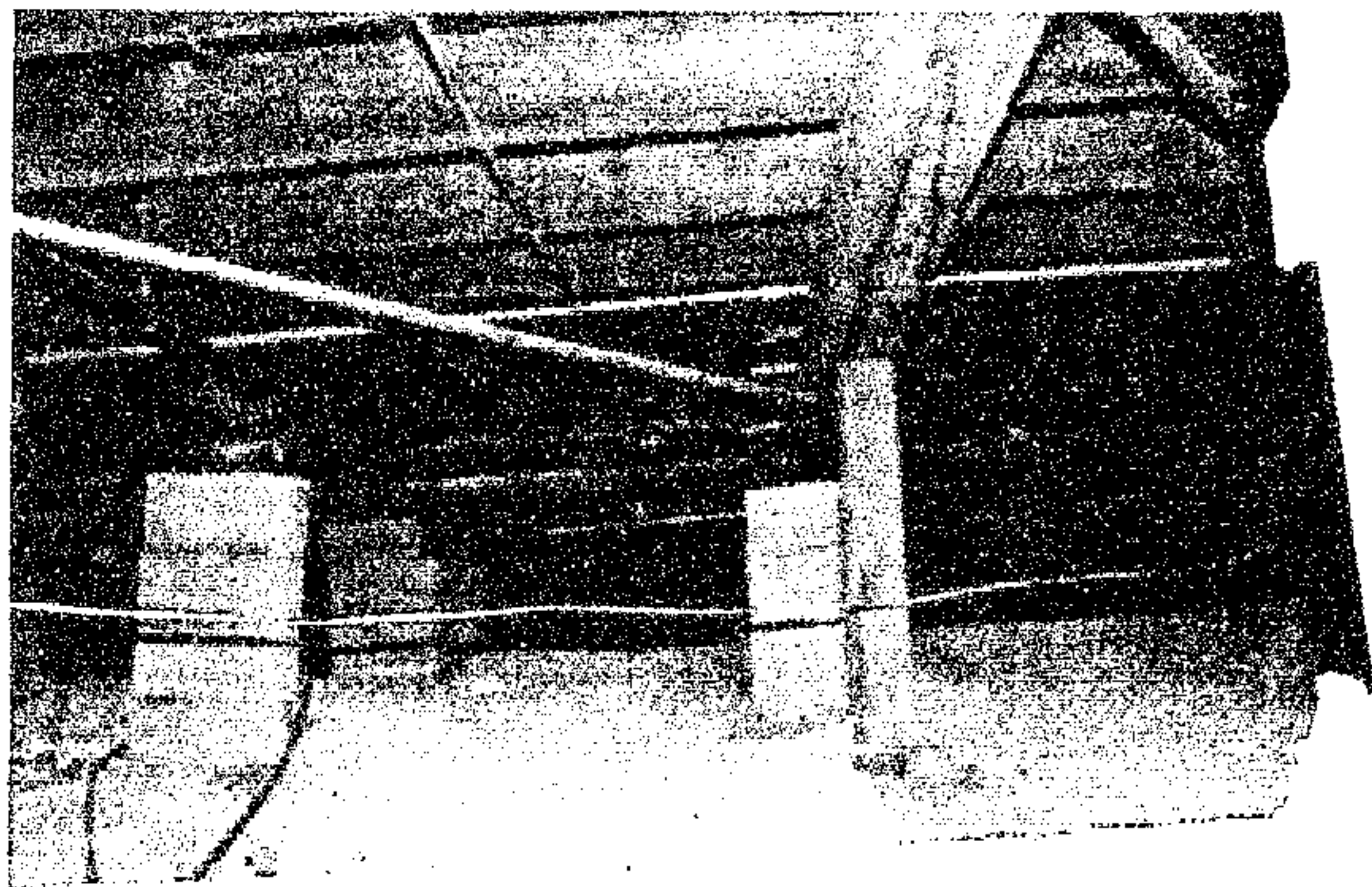
11. Rotting fascia boards



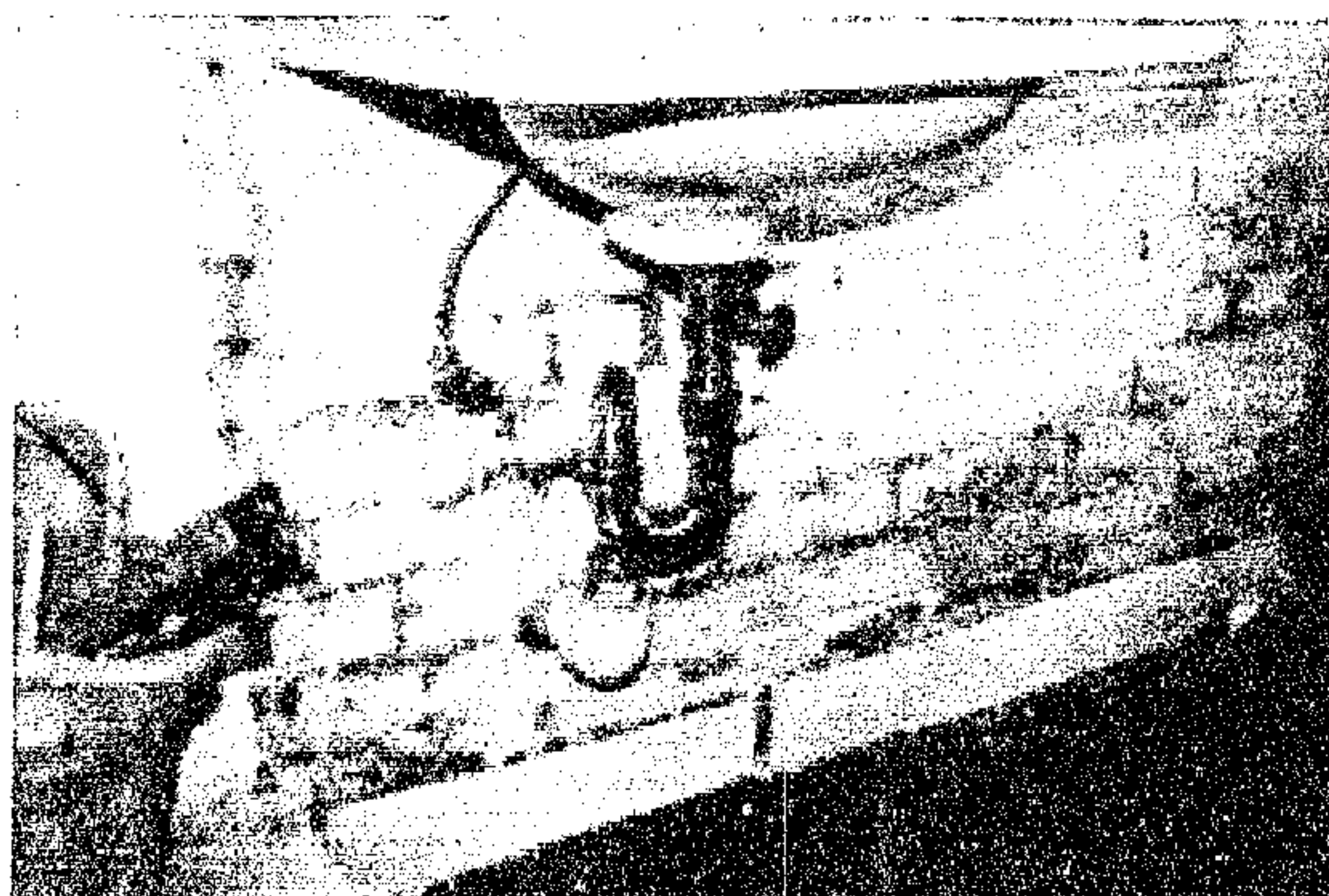
12. Rotting fascia boards.



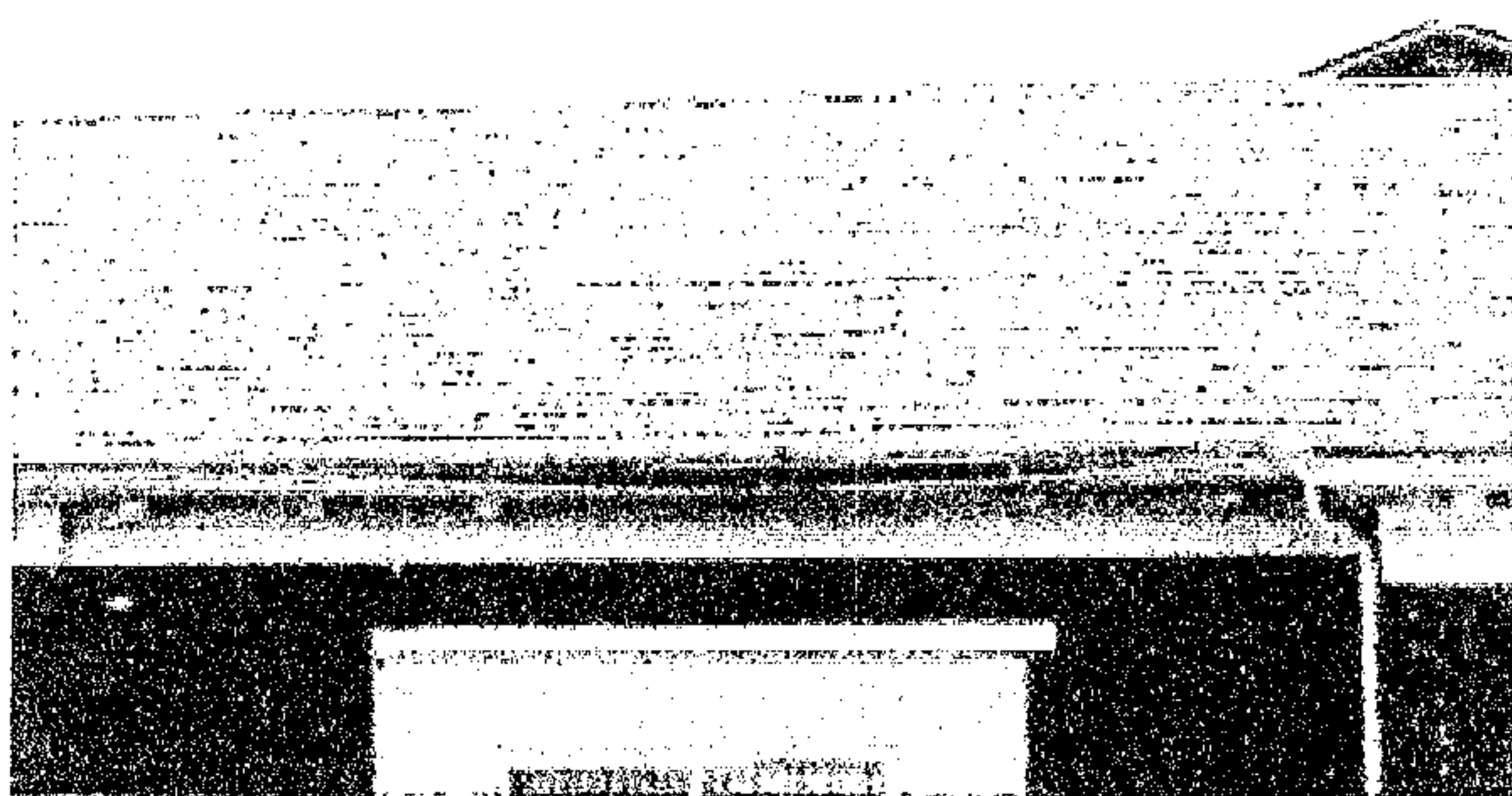
13. Delaminating support beam.



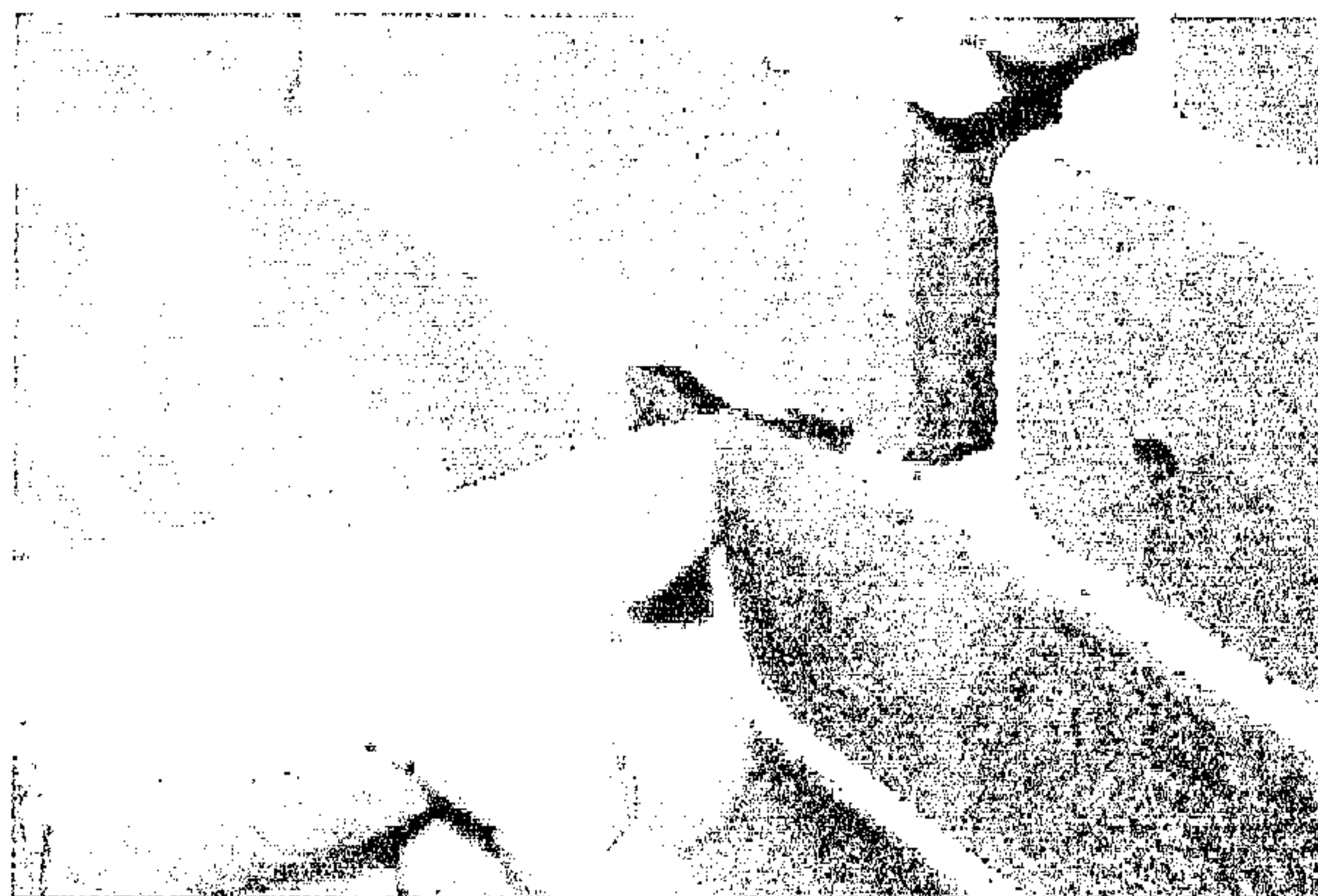
14. Efflorescence at Storage Room "B"



15. Failed gutter, and roof truss anomaly.



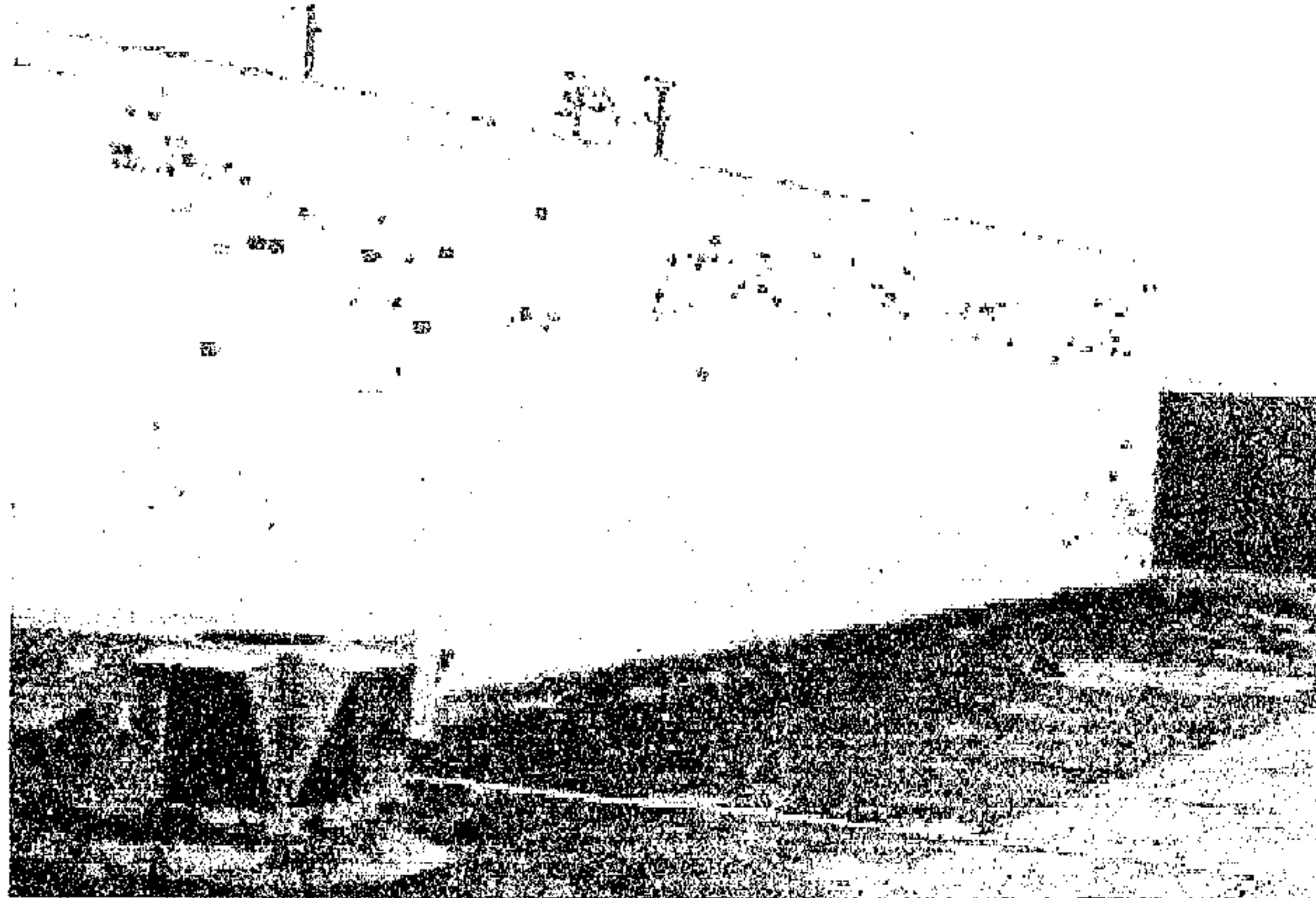
16. Horizontal displacement of brick façade.



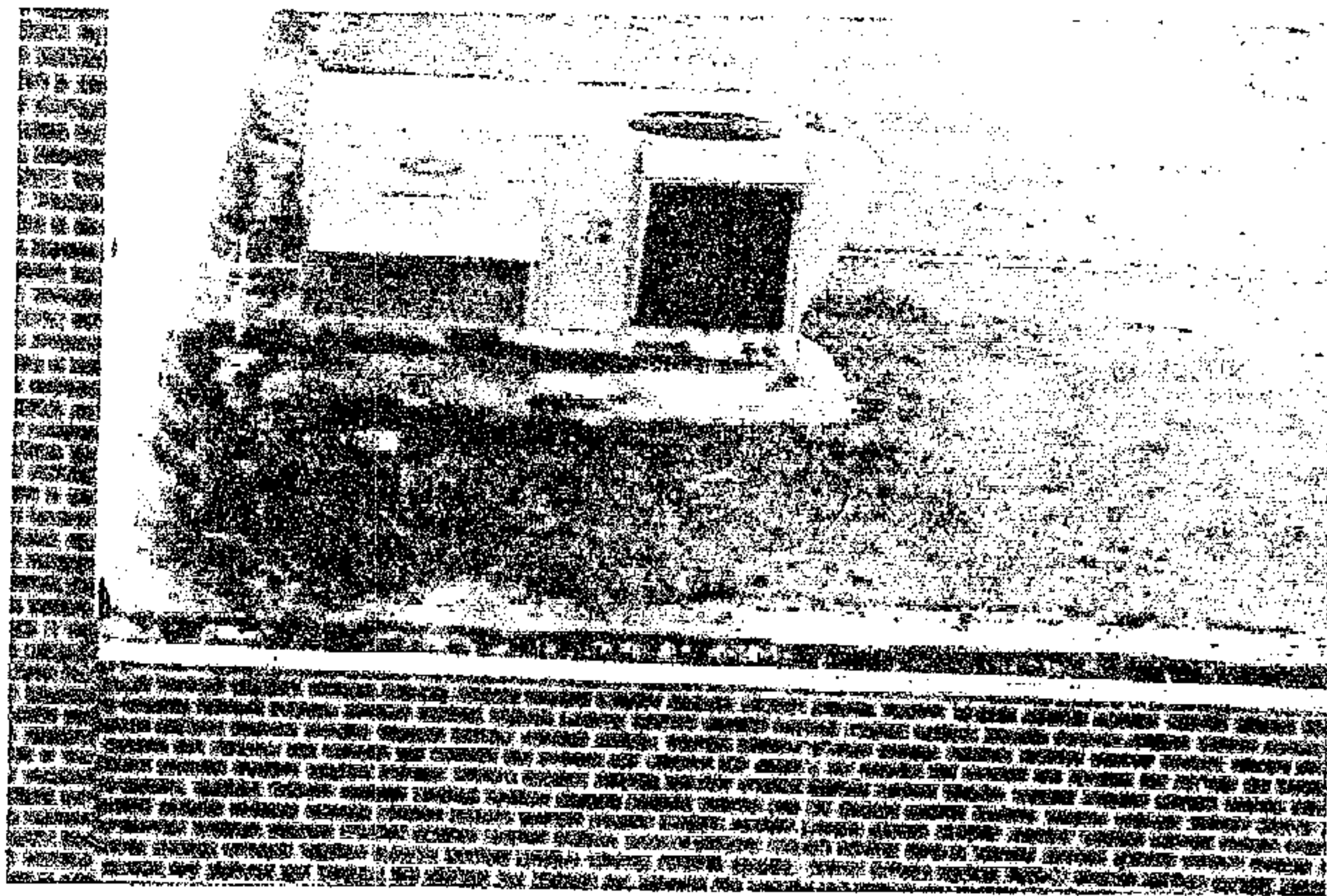
17. Leaking gutter in need of repair.



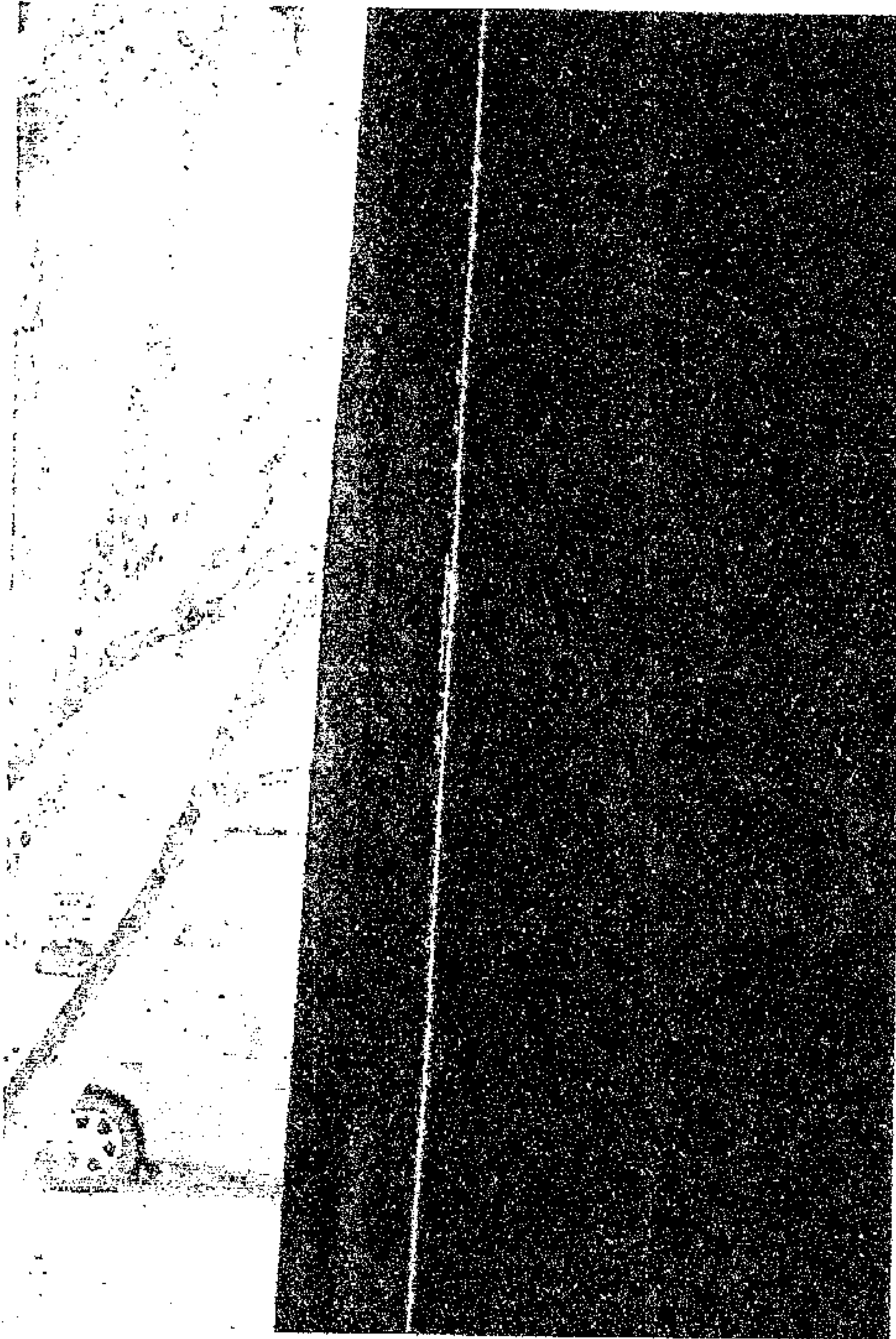
18. North face of gymnasium with popping brick faces.



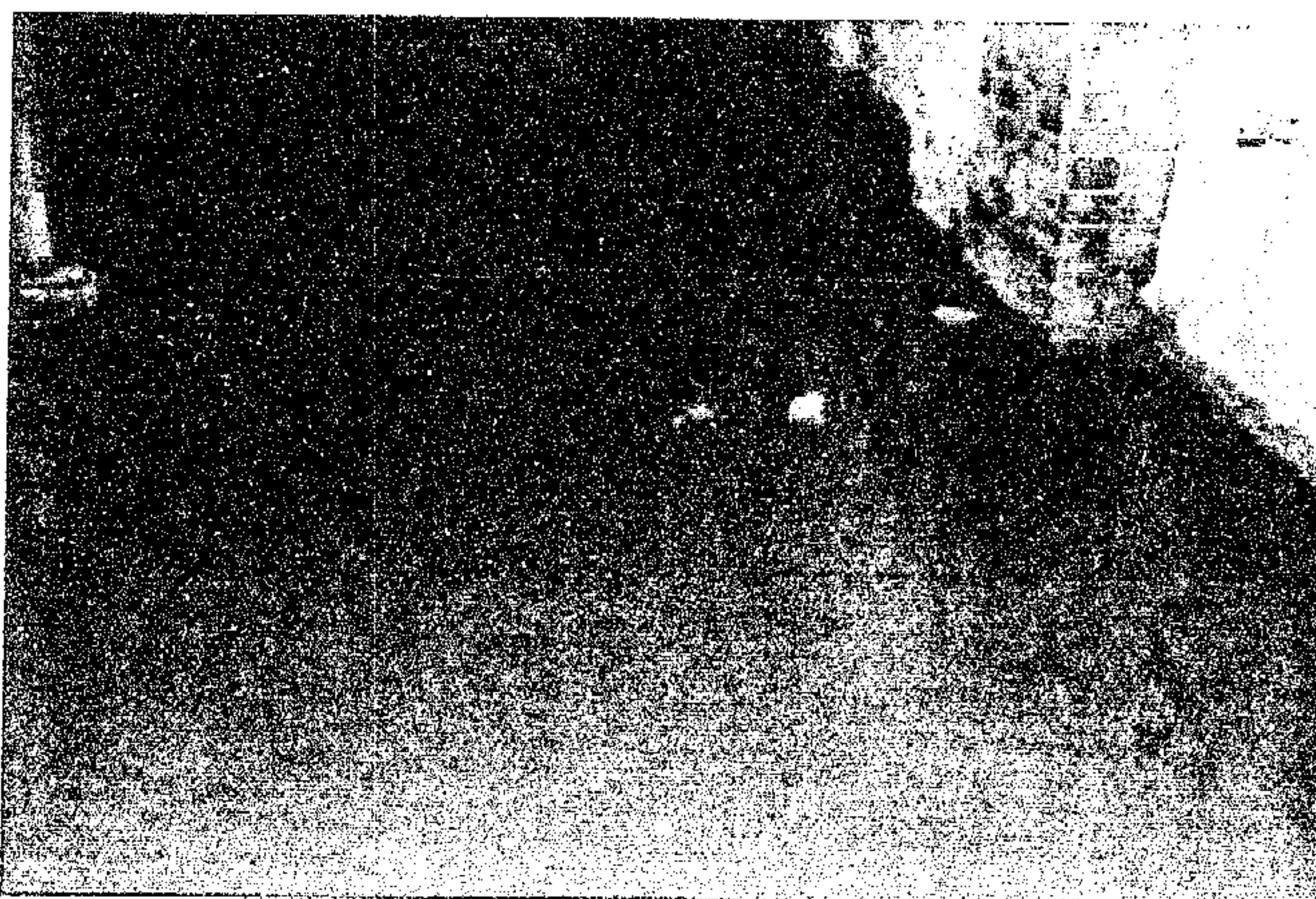
19. Poor drainage allowing roof vegetation.



20. Unsealed window jamb.



21. Standing water in the basement of the oldest structure.



22. Stair Step crack due to foundation settlement.

