

Everything You Wanted to Know About Slate Roofs

Fabrication, Installation,
Repair and Restoration

By Joe Jenkins

JosephJenkins.com

A stylized silhouette of a mountain range in shades of teal, located at the bottom right of the page.

SCHEDULE FOR THIS SLATE ROOFING PRESENTATION

10:30 am until 1:30 pm

- ◆ 10:30 until 11:15 – Fabrication and Installation...
- ◆ 11:15 until 11:30 – Short break (15 minutes)
- ◆ 11:30 until 12:30 – ...Repair and Restoration
- ◆ 12:30 until 1:00 – Longer break (lunch?) Q&A
- ◆ 1:00 until 1:30 – Hands-on demonstrations, etc.

FABRICATION

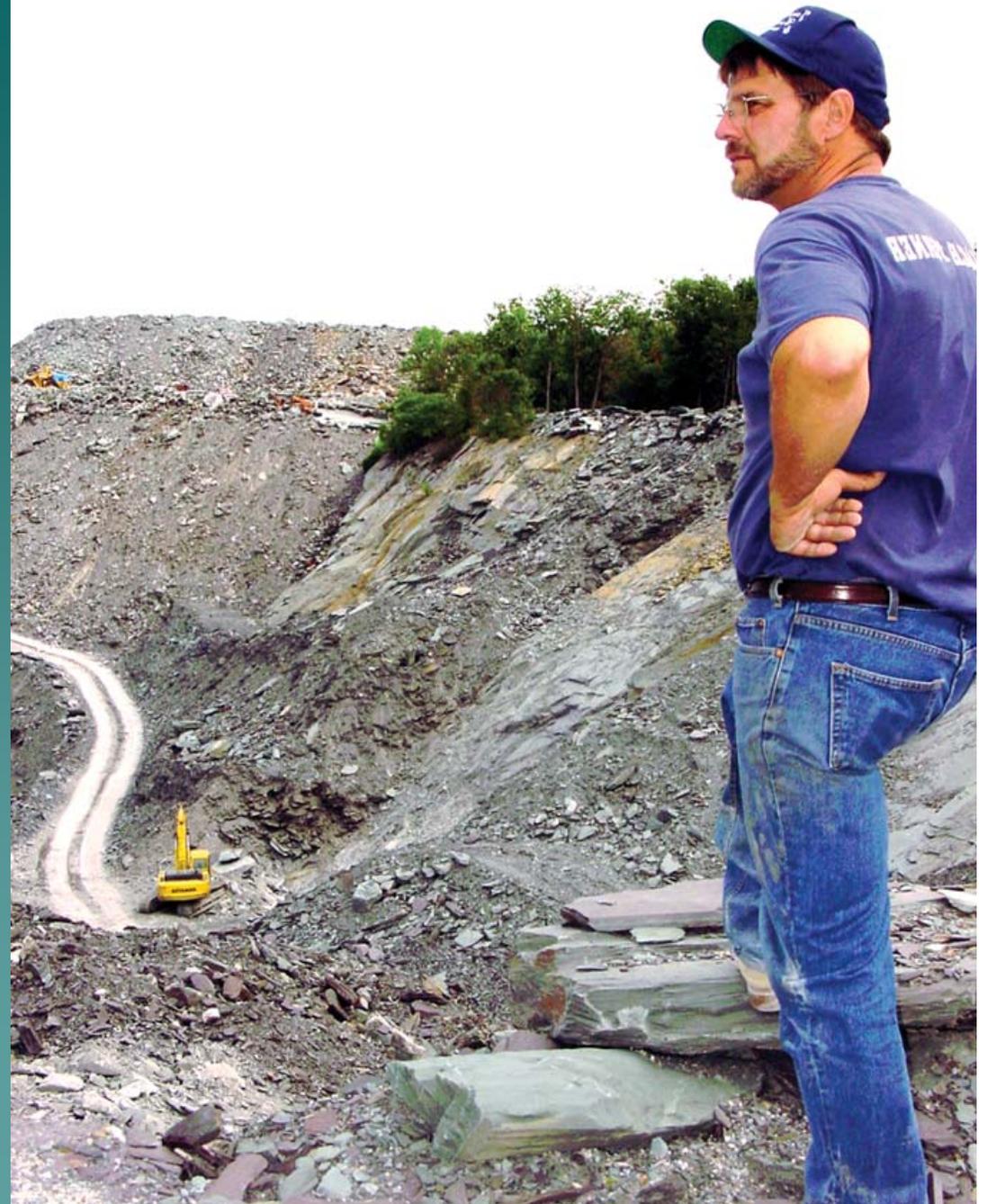
Slate roofs are made of rock. The rock is mined or quarried from the Earth. This is a quarry, or an open hole (at Camara Slate Co., VT).



This is a slate mine in Germany.
Mines are underground.



Here, slate is being extracted from a quarry by the U.S. Quarried Slate Company in Vermont.



A Chinese slate quarry.



A
Pennsylvania
quarry carved
into solid
slate rock.



Slate is still quarried in VT, PA, VA, NY

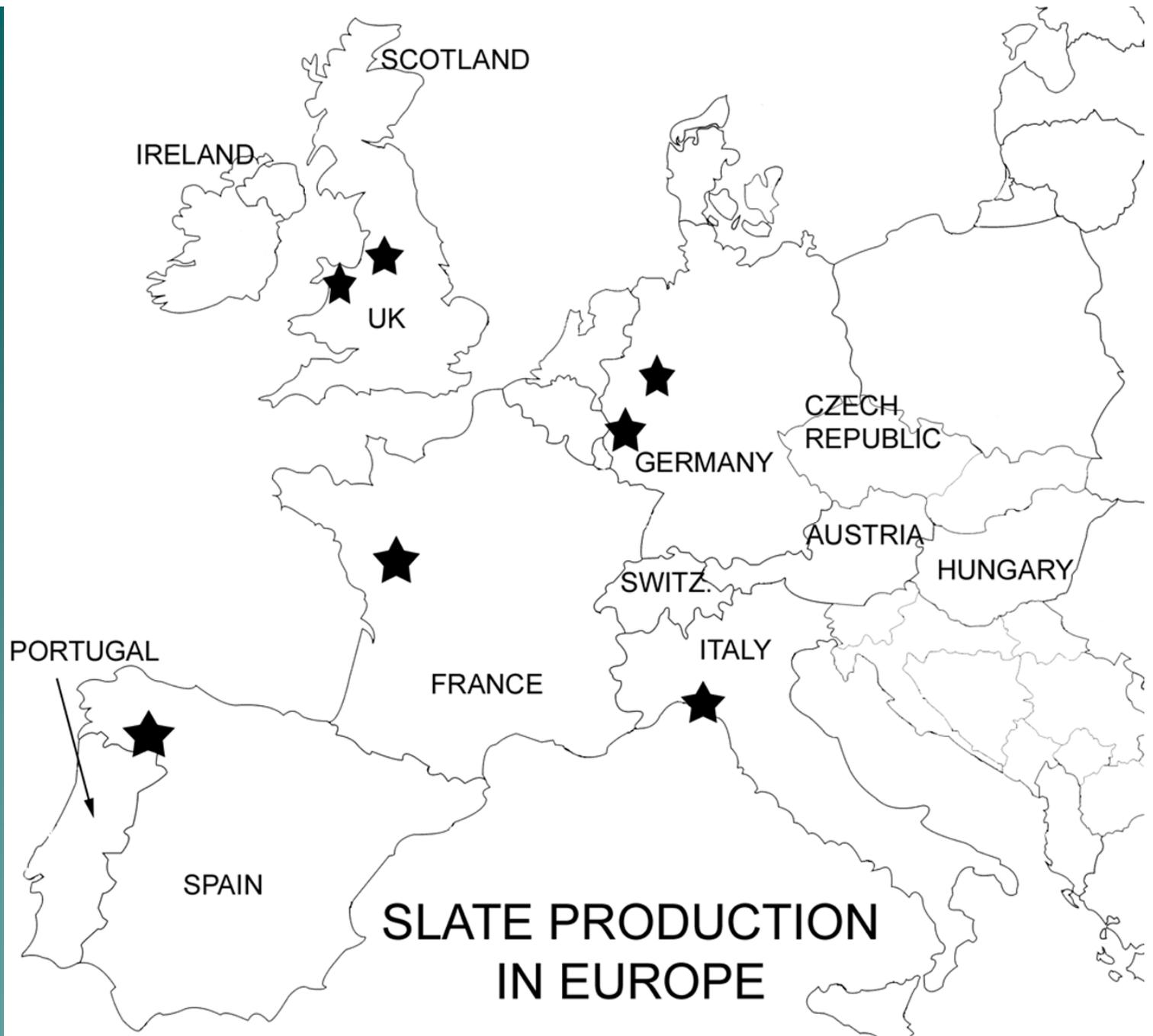


Figure 3.5

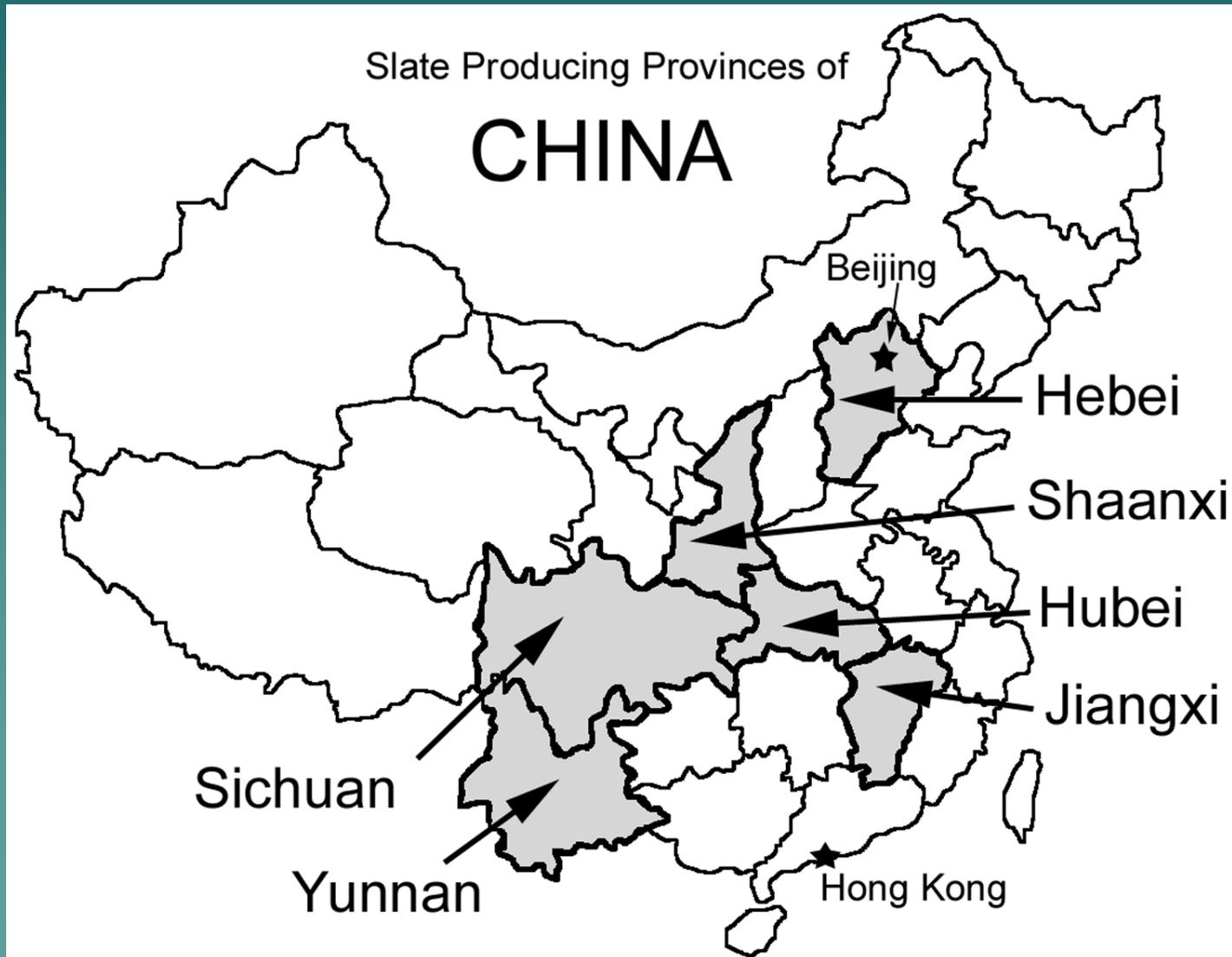
LOCATION OF KNOWN SLATE DEPOSITS IN THE UNITED STATES

Solid marks are (or were) productive districts, hollow marks are prospective districts. The five commercially important U.S. roofing slate districts are: 1) Monson District, Maine; 2) New York/Vermont border; 3) eastern Pennsylvania; 4) Peach Bottom (PA/MD border); 5) Buckingham District, Virginia, although only #2, #3, and #5 are still productive.

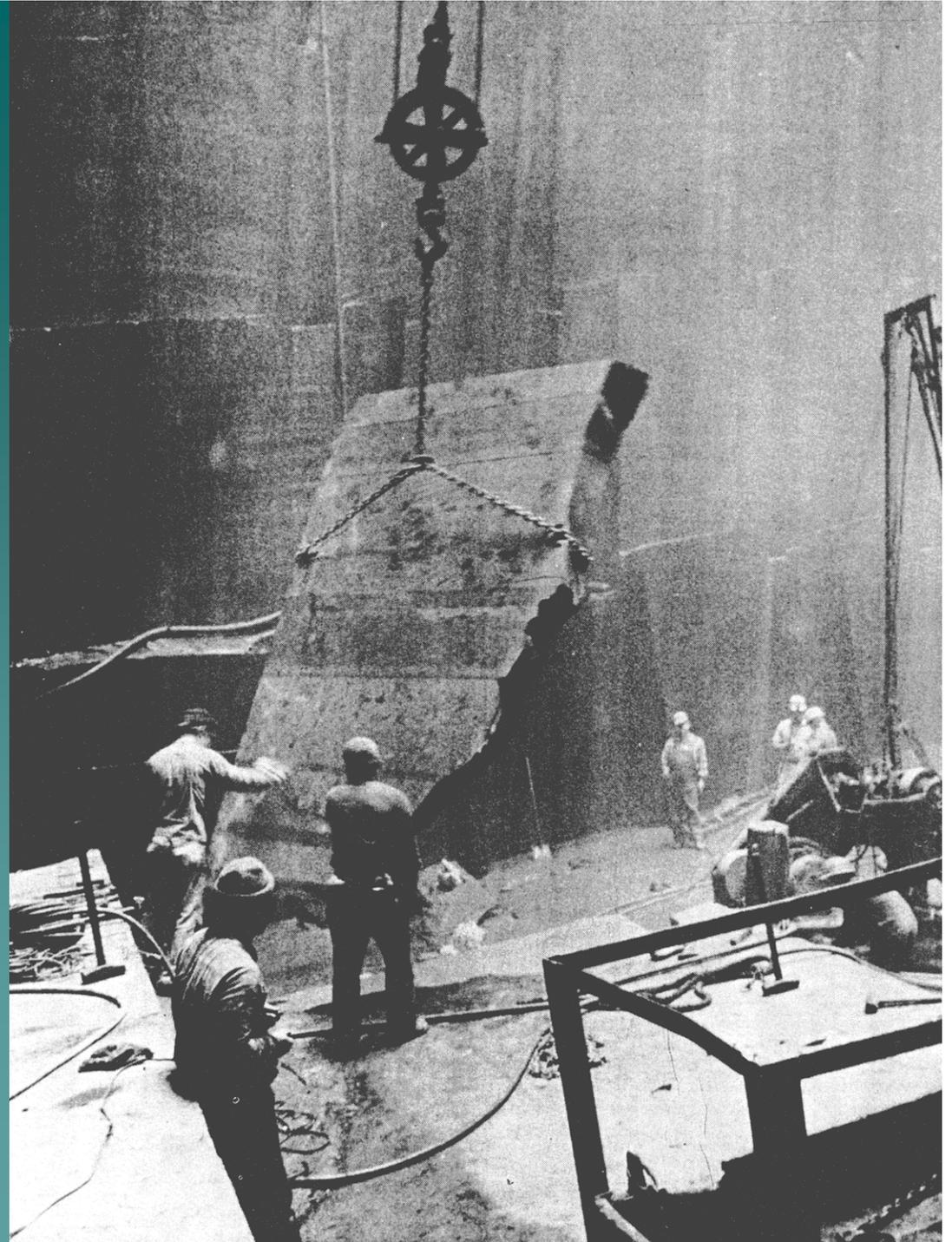
**Roof slate
is also
produced
in Italy,
Germany,
France,
Spain, the
UK, and
elsewhere
in Europe.**



Roof slate is now produced in China and throughout the world (South Africa, Brazil, Argentina, etc.)



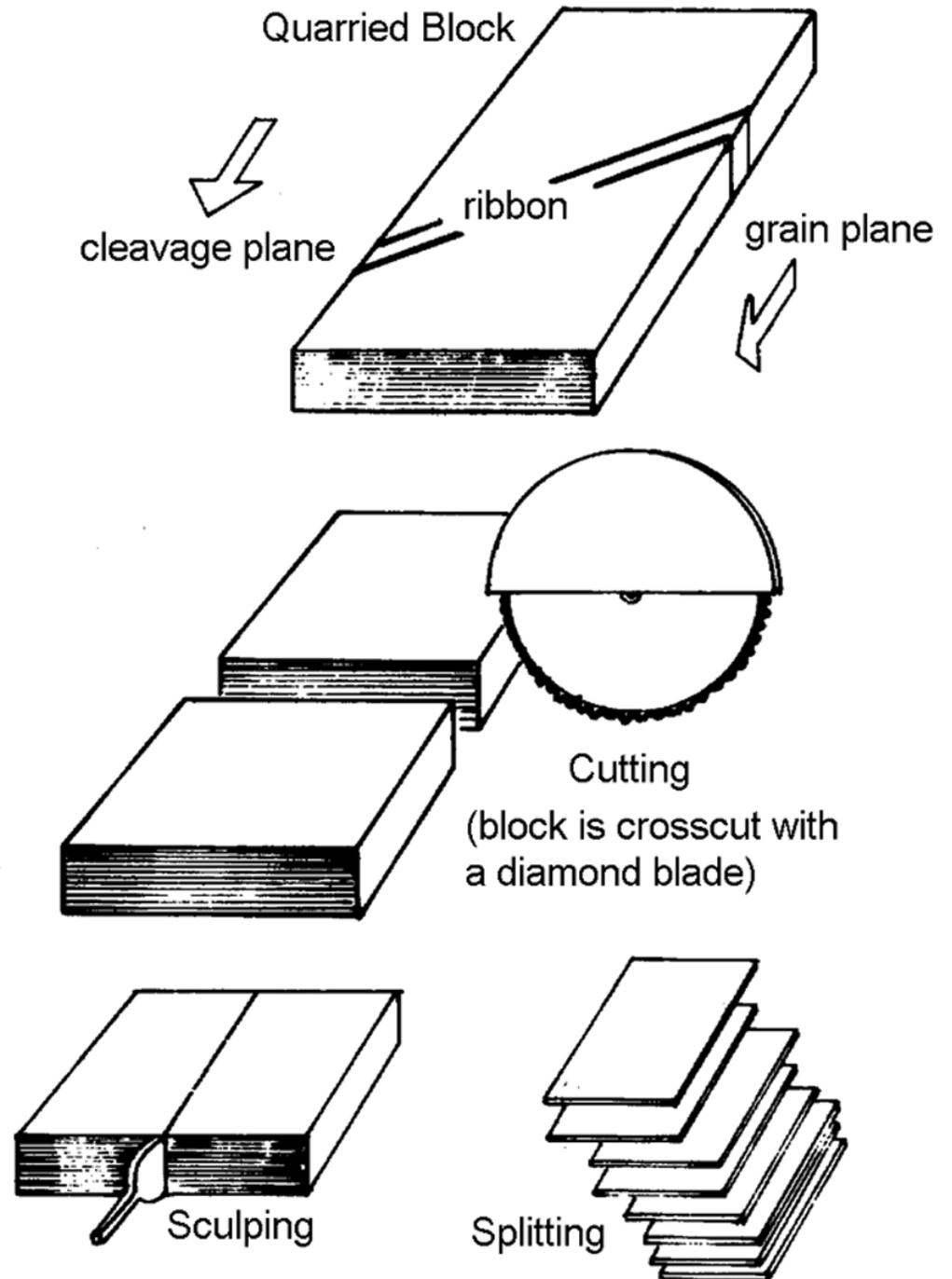
Large blocks of stone are removed from the quarry or mine.



The blocks
are split
according to
their grain
and
cleavage (VT
Structural
Slate).



Smaller blocks are cut using a diamond saw.



These blocks
are ready to
be split into
shingles
(Greenstone
Slate, VT).



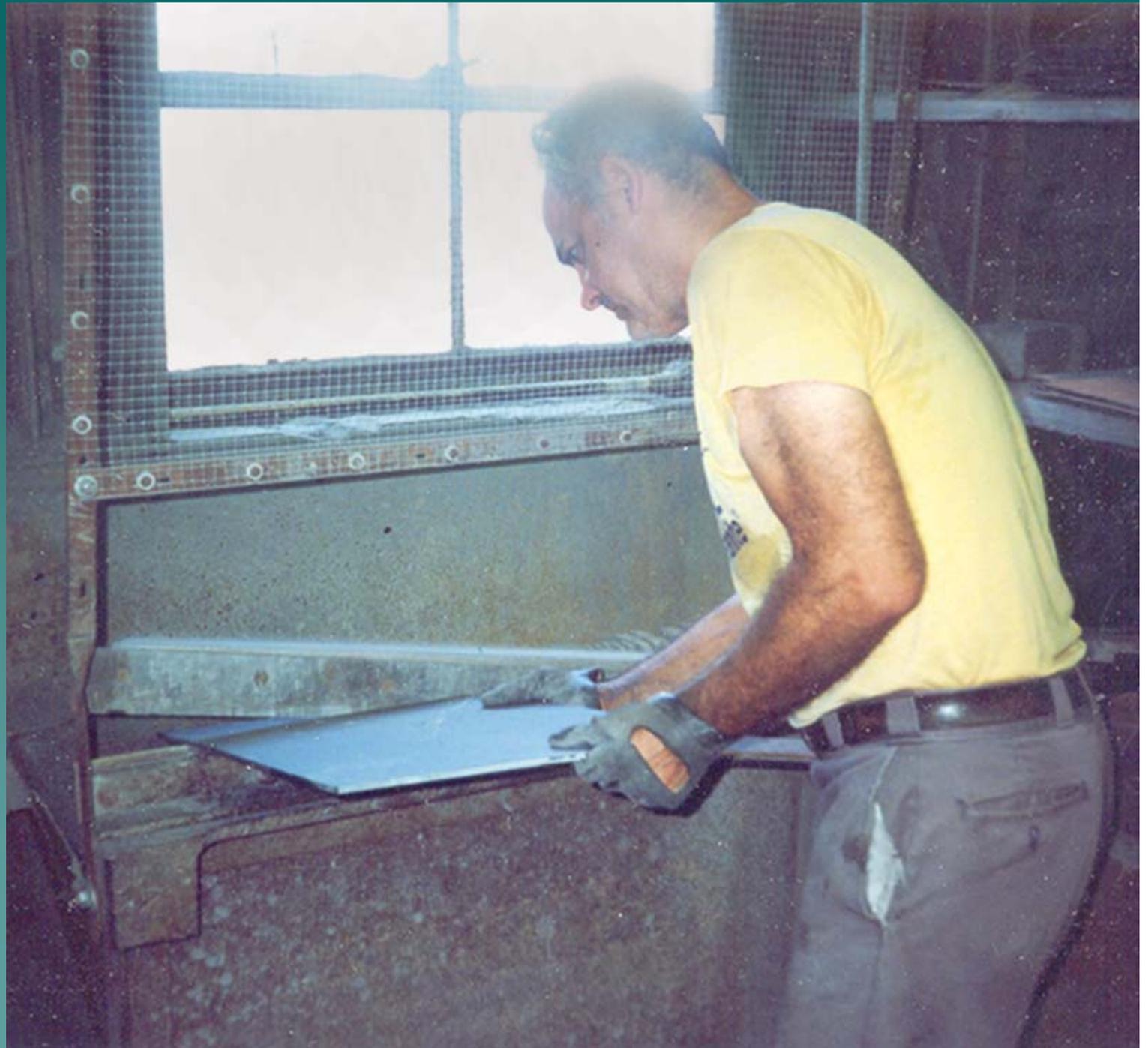
The slate is split into roofing shingles with hammers and chisels (here at Camara Slate, VT).



Another
splitter
(Hilltop
Slate, VT)



The
edges
are
trimmed
to size.



Nail holes
are then
punched
into the
slates
individually.



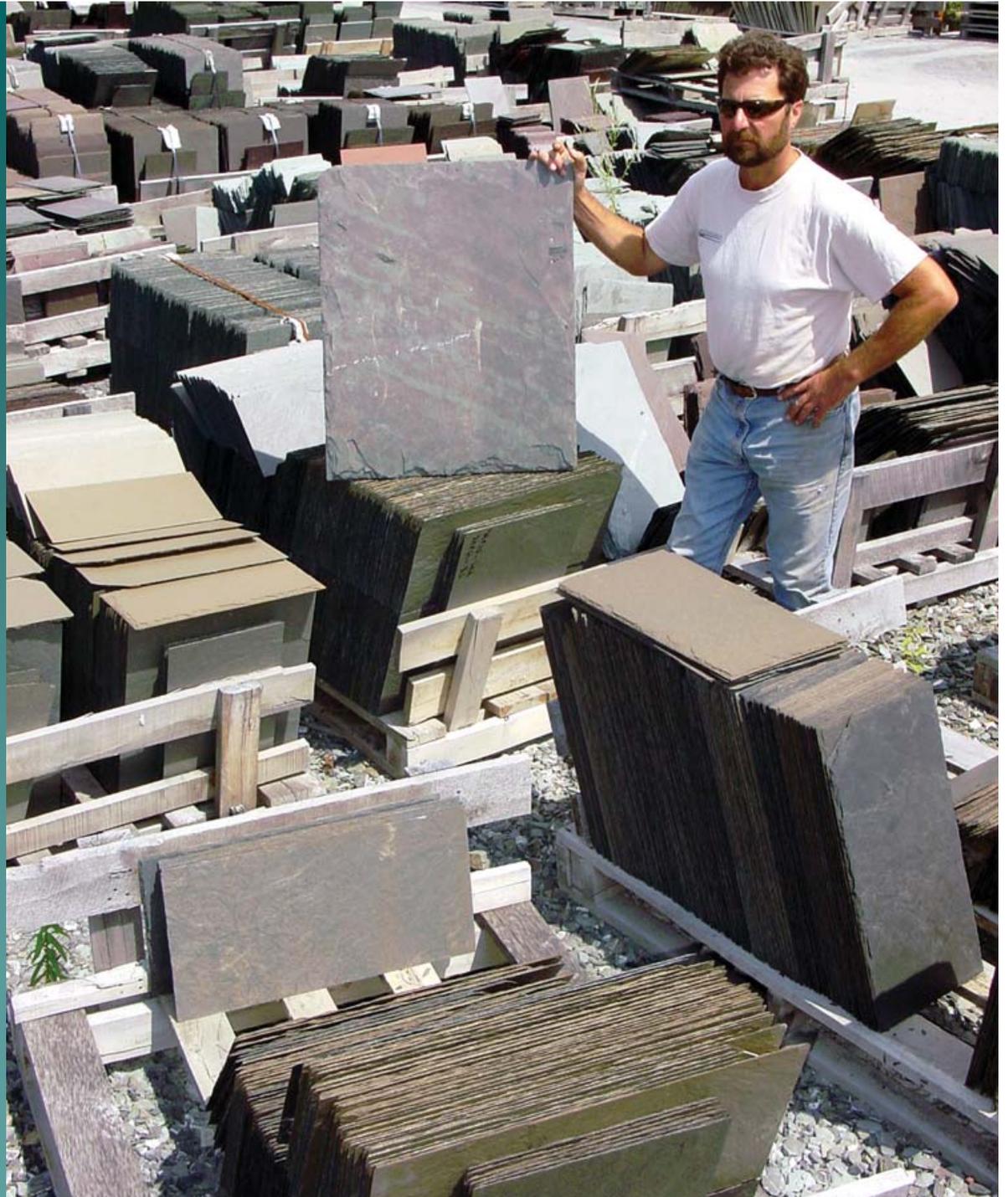
The finished shingles are then sorted, palletted and shipped.



These slates are being shipped to the US from China.



New roofing slates of all sizes, thicknesses and colors are produced in the USA today (here at Taran Slate, VT).



Sources of new (and used) roofing slates are listed on the web at jenkinsslates.com or in the back of the Slate Roof Bible, 2nd edition, which is available at this conference or by calling 866-641-7141.

The finished shingles are fastened to the roof deck with nails, preferably by experienced slaters.

**NEXT UP:
INSTALLATION
TECHNIQUES**



Installation techniques vary according to culture. This is traditional German slating.



A German valley installation



Altdeutsche: traditional German slating style.



UK: Old
stone roofs
were hung
with
wooden
pegs on
lath.



UK: Traditional UK slating now requires felt under battens (lath).



A fully battened UK roof ready for slating.



A very old UK pegged slate roof showing the lath system without underlayment (felt).



UK: Distances between battens must be carefully measured.



Note the diminishing spaces between slating battens.



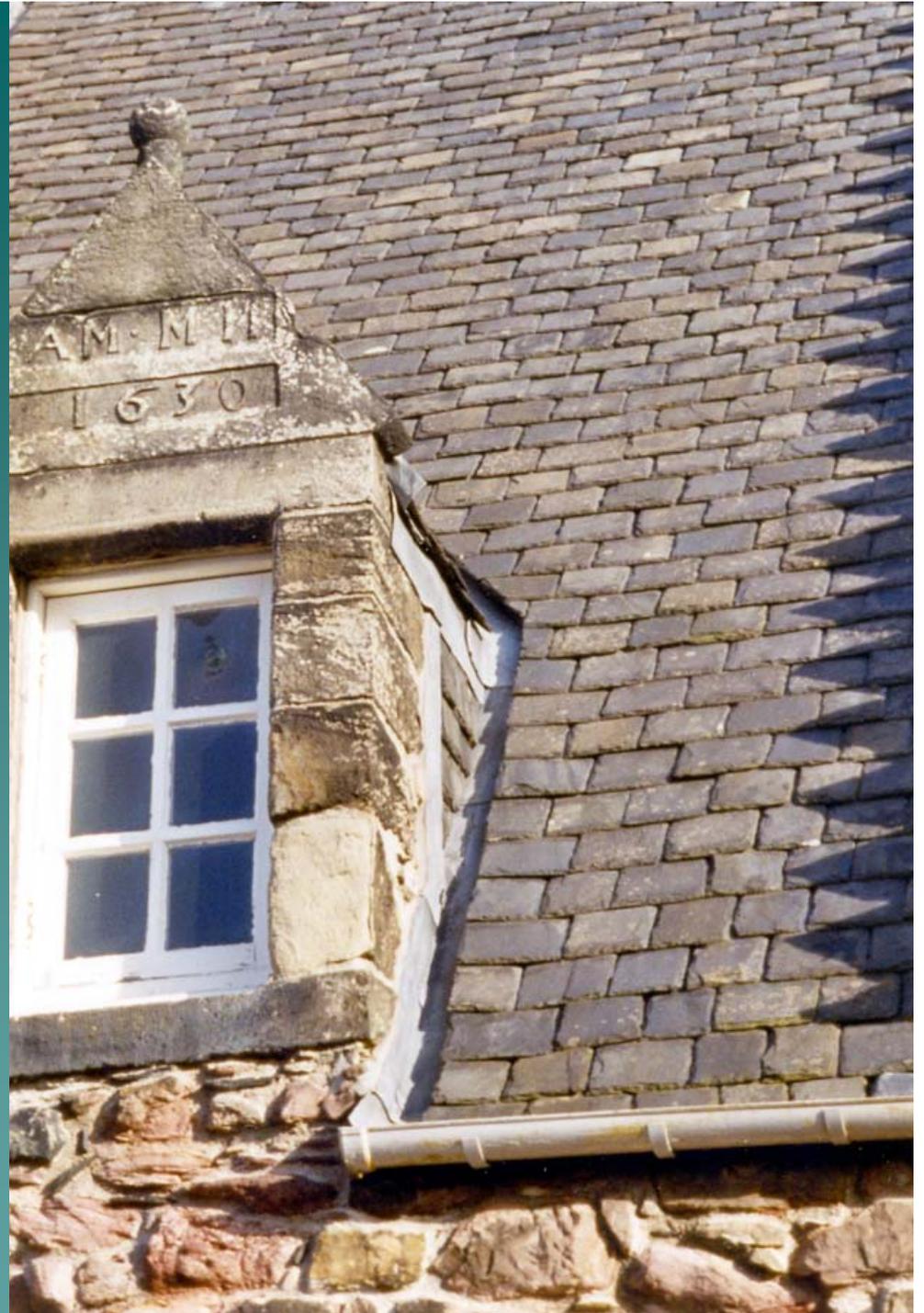
Same style of slate roof in France.



UK: an old, graduated slate barn
roof on traditional battens.



Scotland –
solid
sheathing
boards (not
lath),
graduated
slate, head
nailed, with
single nail.



Spain: Another lath system.



Spain: traditional slating style.



Spain: traditional slate roof



Spain: underside of traditional slate roof.



Italy: Heavier slates, more overlap.



Traditional Italian slate roof.



Underside of same Italian slate roof.



USA: solid board roof decks under slate are patterned after the Scottish system.



US: it's not uncommon to find lath with wood shakes under slate.



Solid board roof decks provide the best system for slate roofs.



US: mixed green hardwood roof deck on an outbuilding



US: new bank building with yellow pine roof decking to be slated.



Yellow pine
roof decking
on a tower
to be slated.



US: board decks with slate roofs are traditional, tried and proven systems.



US: this roofing system can easily be duplicated today.



US: felt underlayment is not necessary on slate roofs.



US: another 100 year old roof, on lath, with no underlayment and no leaks



When this 120 year old cathedral roof was reslated, it was found to have no underlayment under the original slates.



A lath barn being reslated by adding 1x4s between the lath.



Felt underlayment keeps the rain out until the slate is installed.



It's the slate and the flashings that permanently keep the water out, not the underlayment



The 40' ladder is buried two feet deep (two rungs) in cow manure.



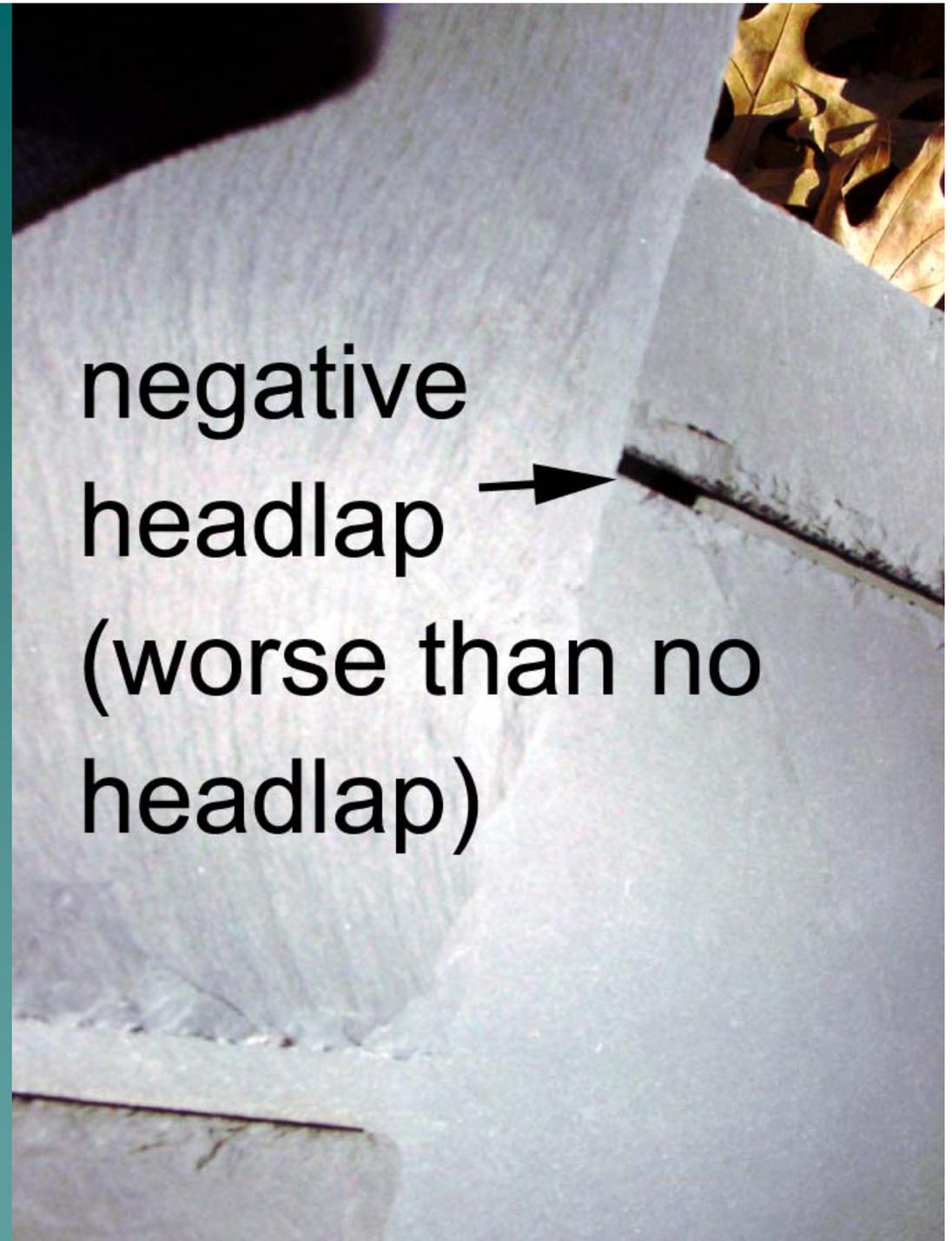
Scaffolding can come in handy when installing some slate roofs. For more details of installations procedures see the Slate Roof Bible.



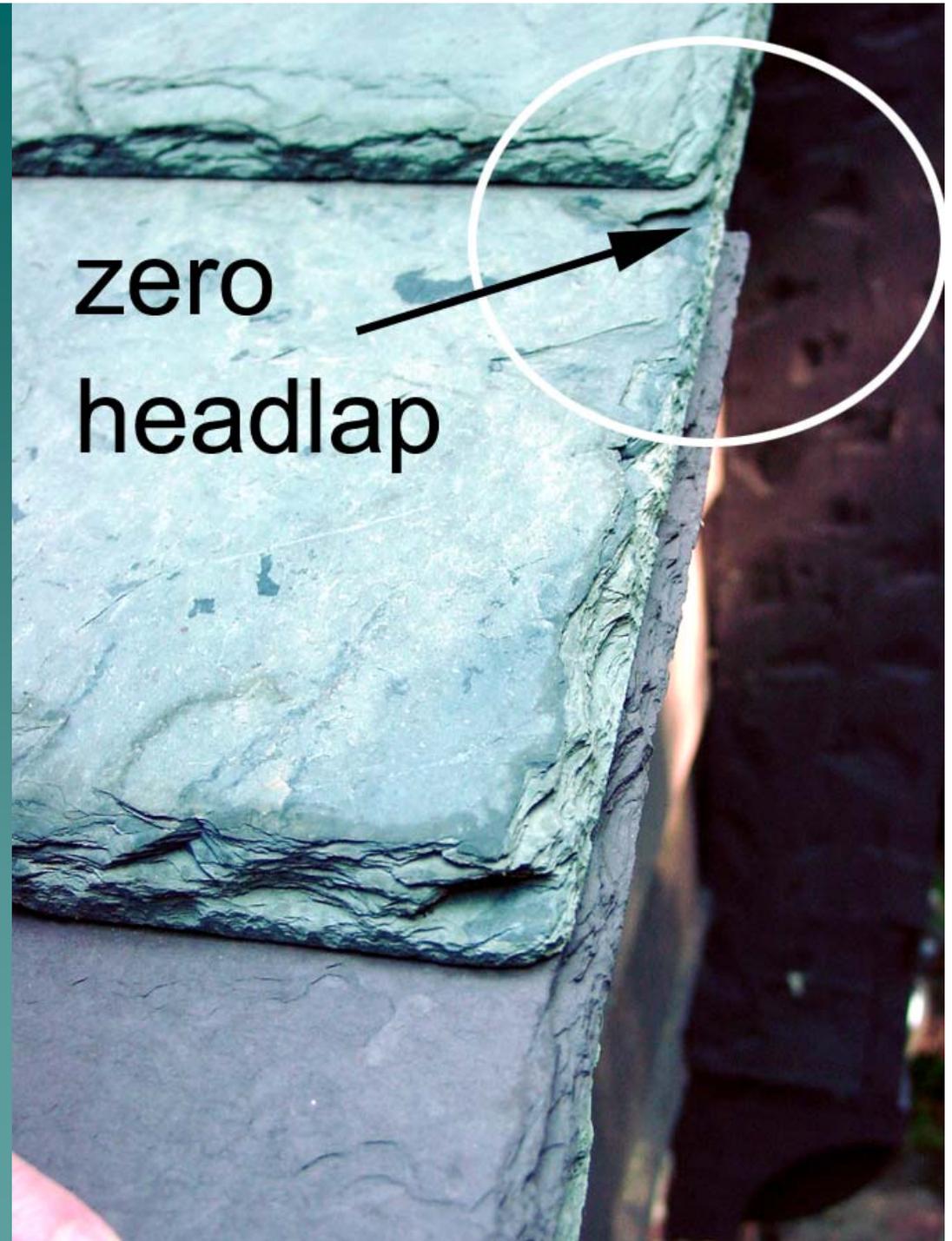
Proper HEADLAP is critical. This new slate roof at a university was installed incorrectly.



University roof
with areas of
negative
headlap. This
slate roof was
incorrectly
installed and
will probably be
condemned.



Another case of zero headlap on an historic building. The entire roof was also installed incorrectly.



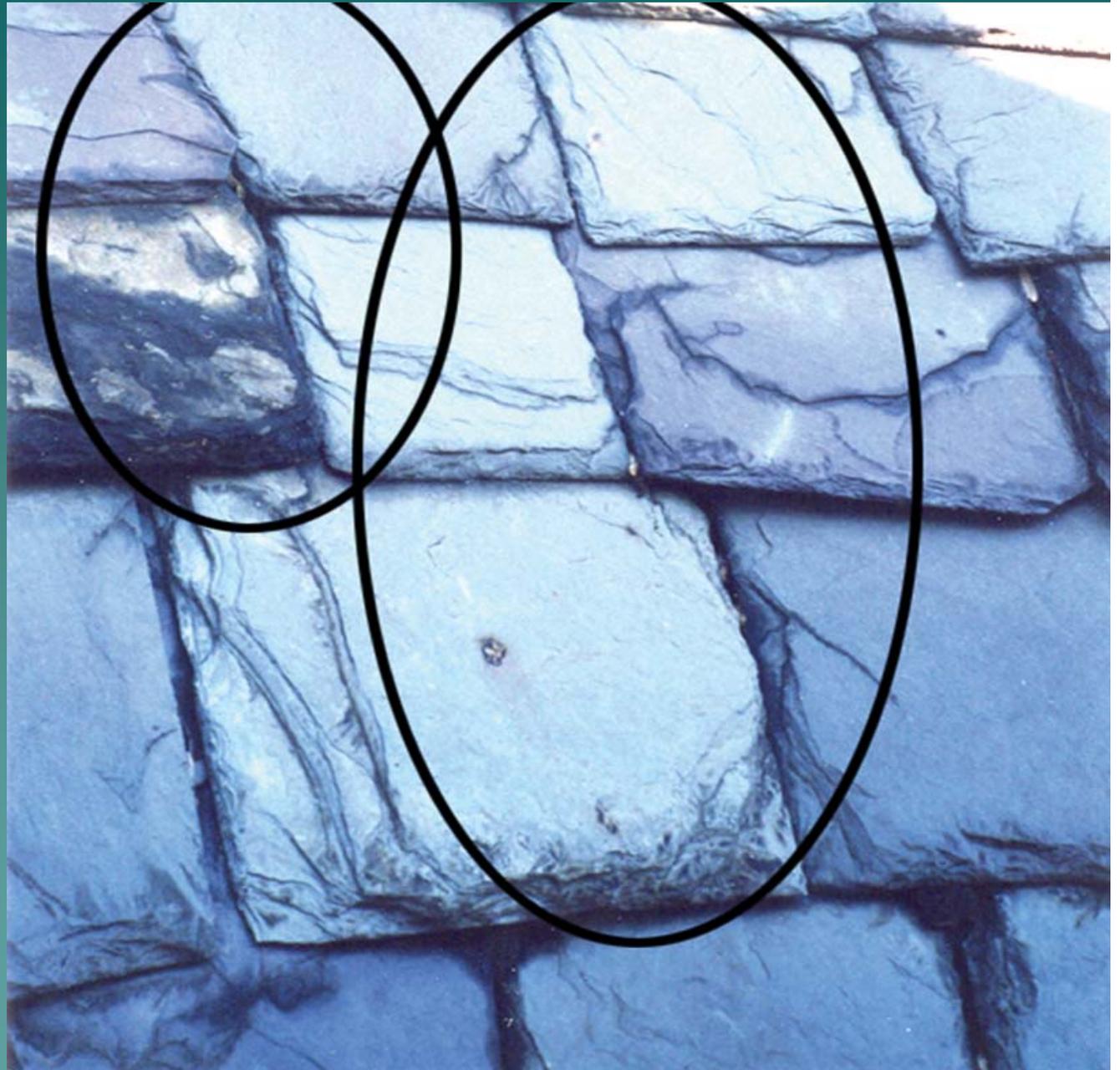
The entire graduated slate roof had to be removed and reslated.



It was done successfully, but at great expense.



Sielaps
are also
important.
These are
incorrect.



Slate is versatile and can be installed in many styles. This is a ragged butt style.



This ragged butt roof was condemned, although nothing was wrong with it.



Another ragged butt slate roof.



A staggered butt, rough textured, mixed color slate roof.



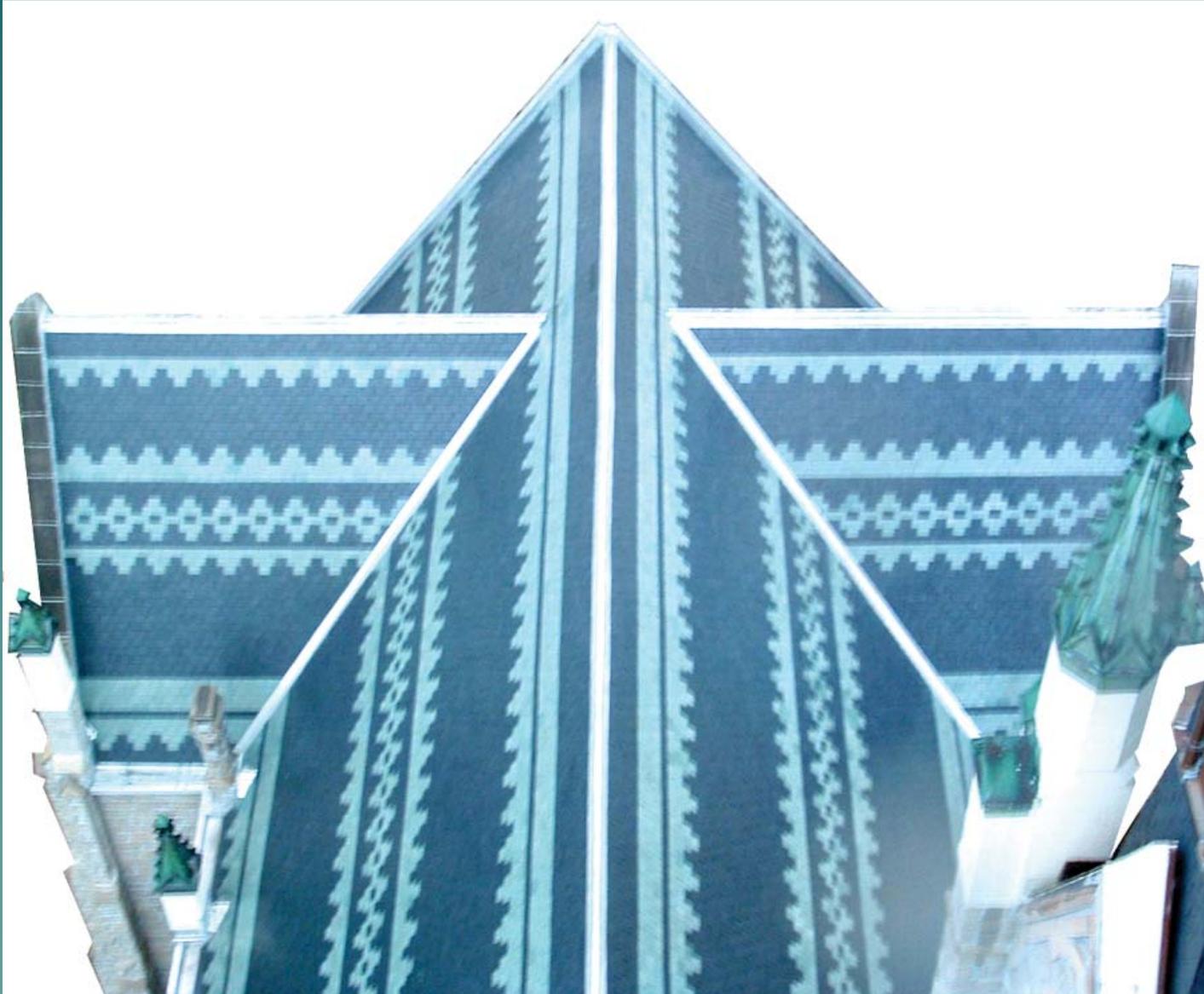
Another
staggered butt
slate roof style.



A one-color, rough textured slate roof.



Slate can be installed in patterns and designs.



It's easy to create a landmark roof with slate.



NEXT:
**Repairing and Restoring Slate
Roofs.**

The background is a solid teal color with a subtle gradient. At the bottom right, there is a silhouette of a mountain range in a slightly darker shade of teal.

Everything You Wanted to Know About Slate Roofs

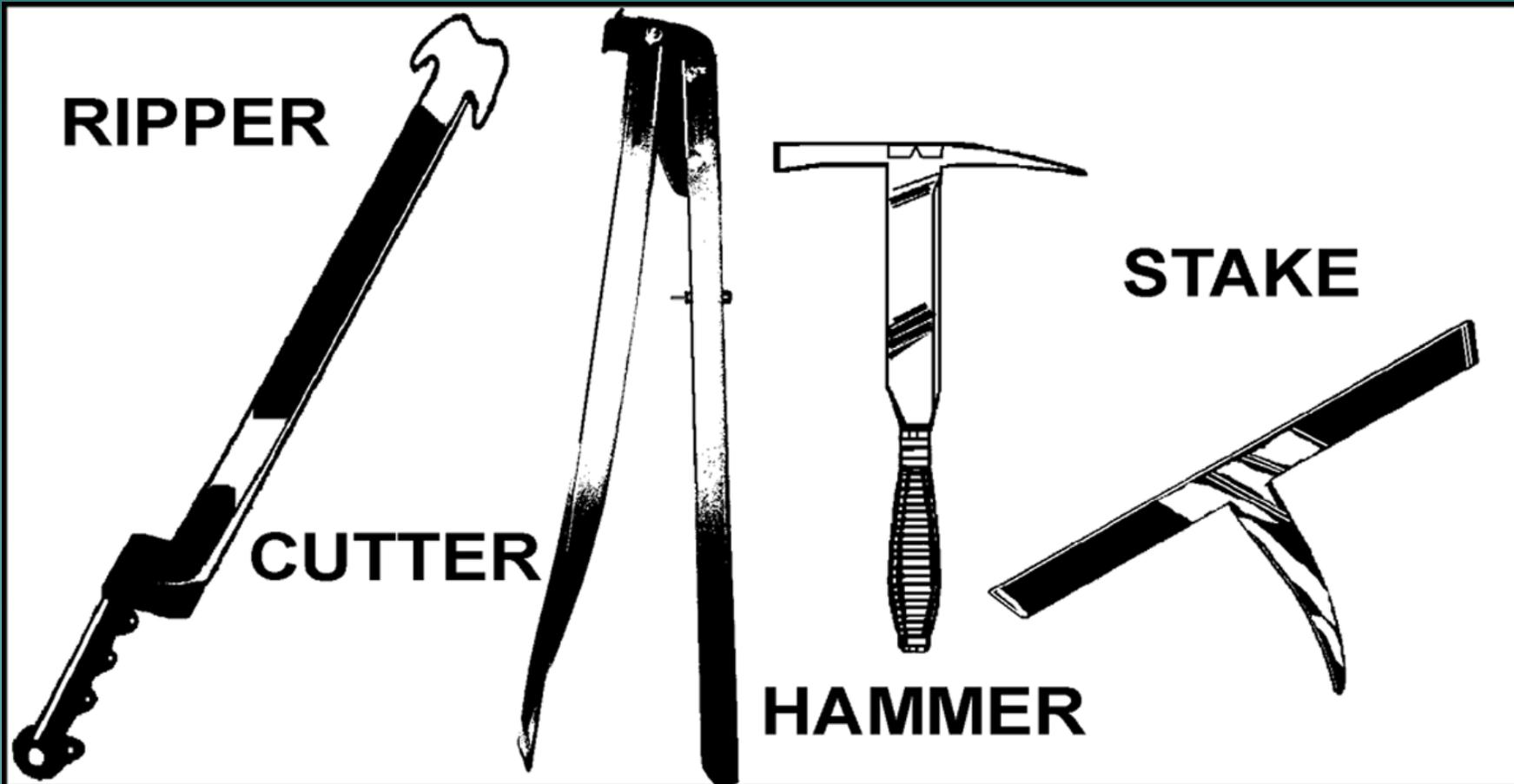
Part II: Repair and Restoration

Boston Restoration and Renovation Trade
Show April 22, 2004

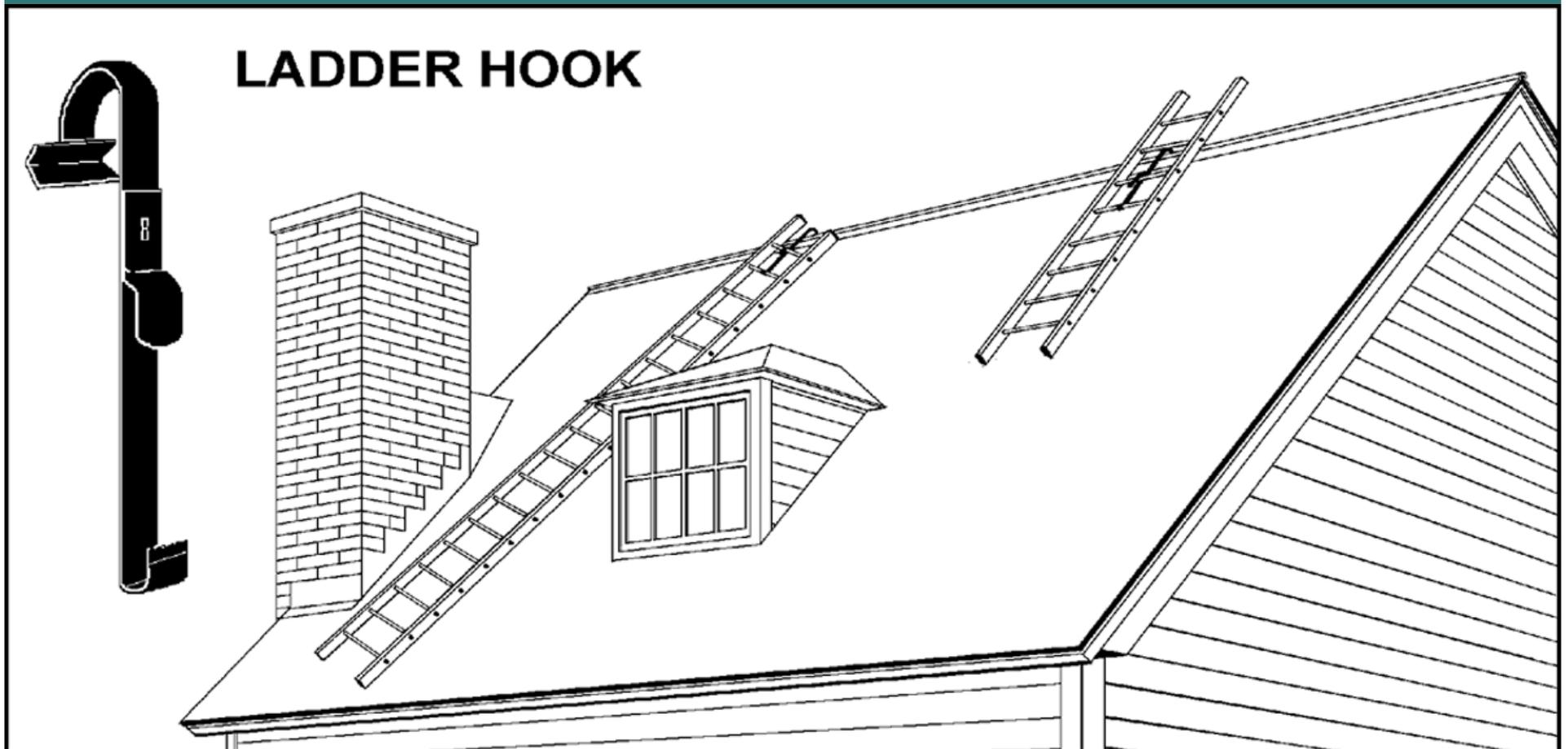
Joseph Jenkins

JosephJenkins.com

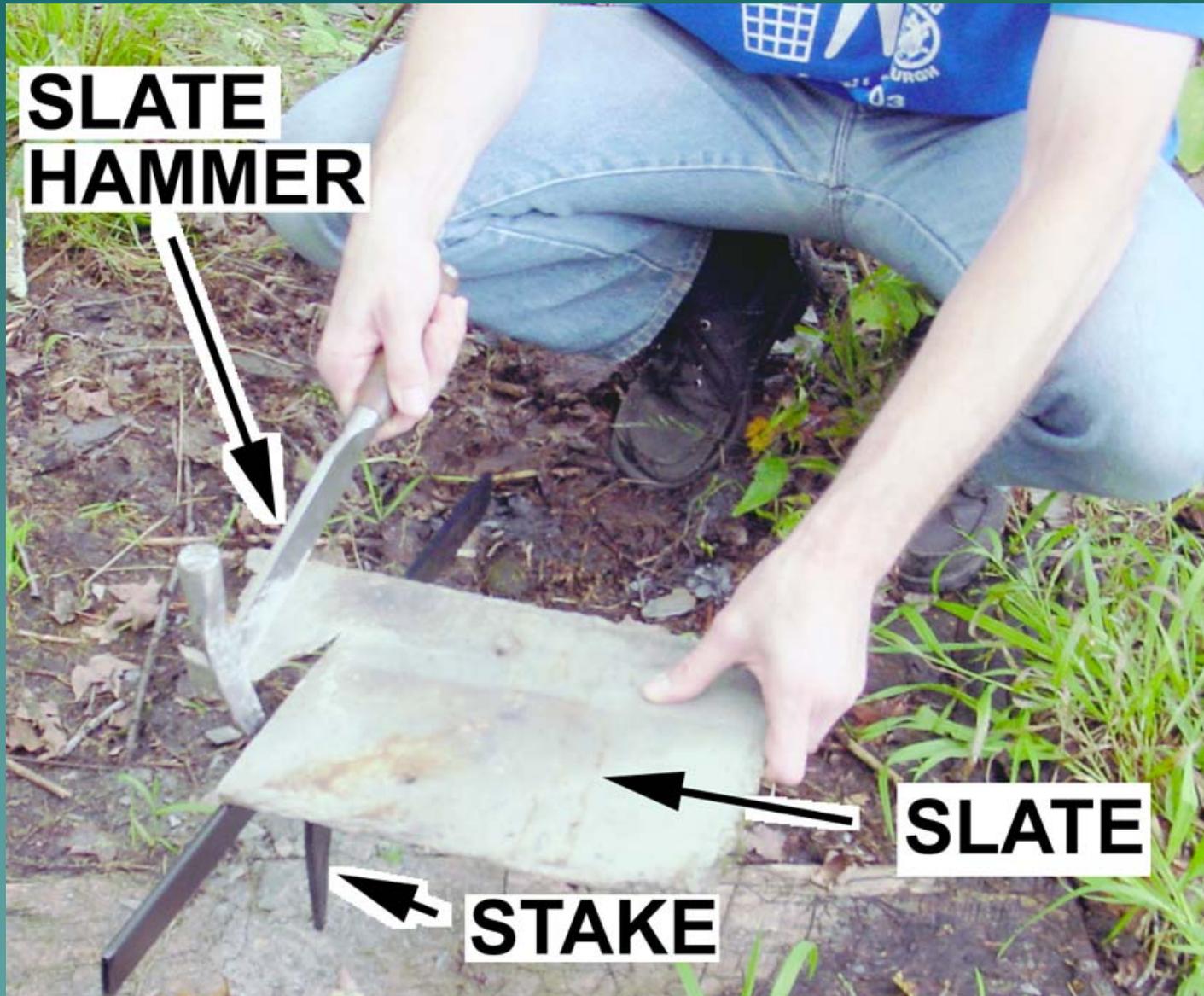
Proper tools are required:



Hook ladders allow access to the roof without walking on the slates.



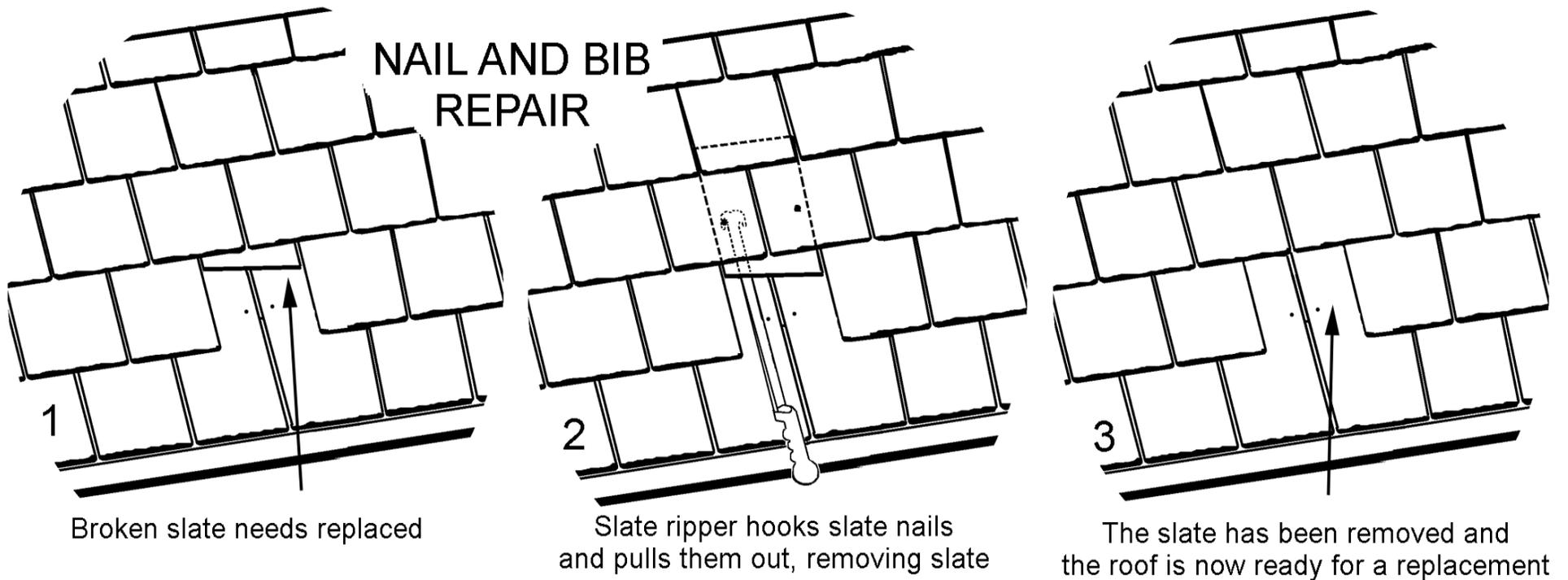
Slates can be cut with a hammer and a stake.



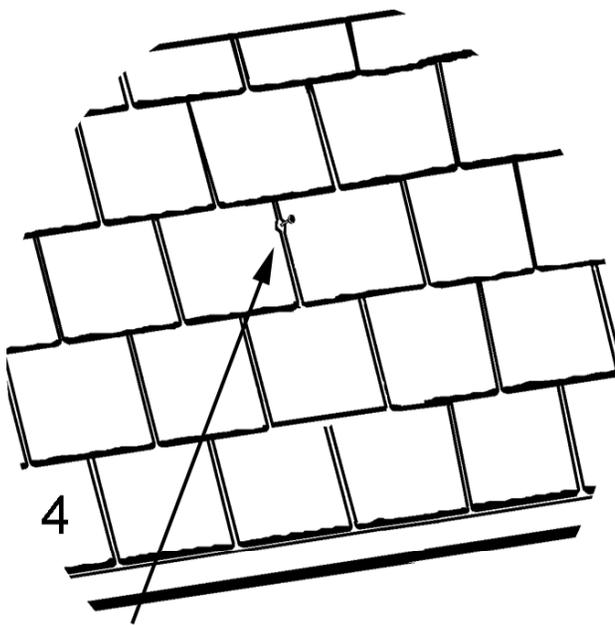
Missing slates are easy to repair.



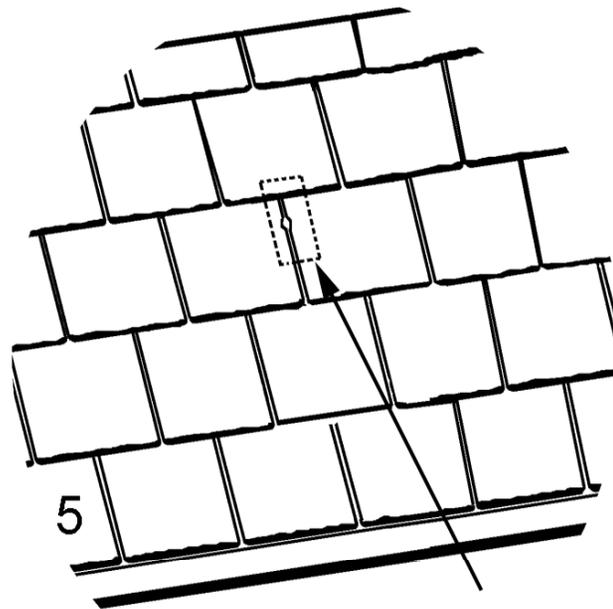
Any individual slate can be removed and replaced.



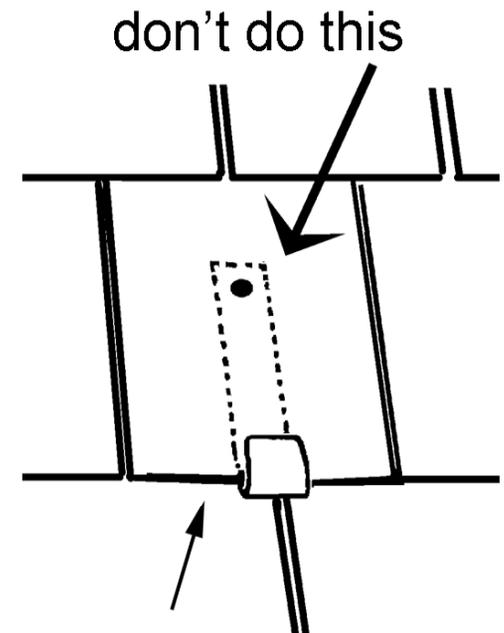
The nail and bib repair is common and acceptable. Exposed strap hangers are not acceptable.



Replacement slate is slid into place and fastened with a nail in the slot



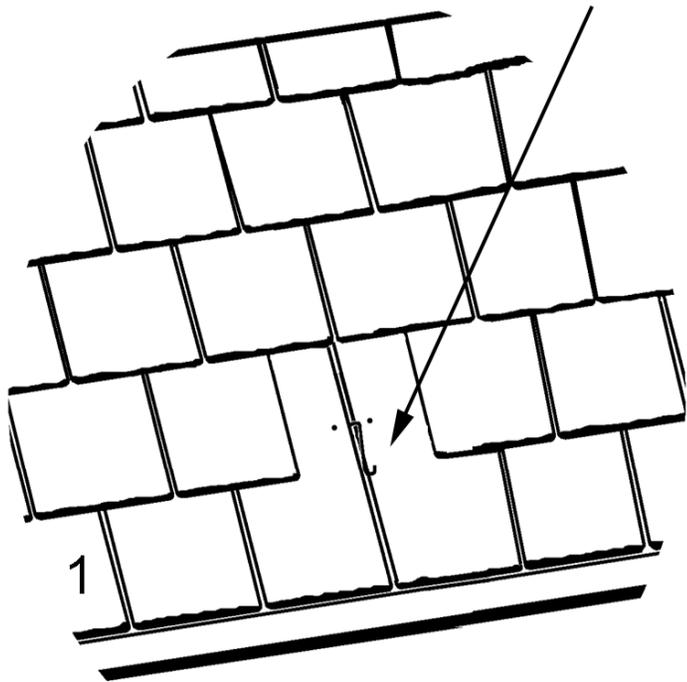
The roofing nail is tapped down and a bib flashing is slid under the slate but over the nail head



The above strap technique is undesirable for two basic reasons: it looks bad and the straps are easily bent open by sliding ice and snow

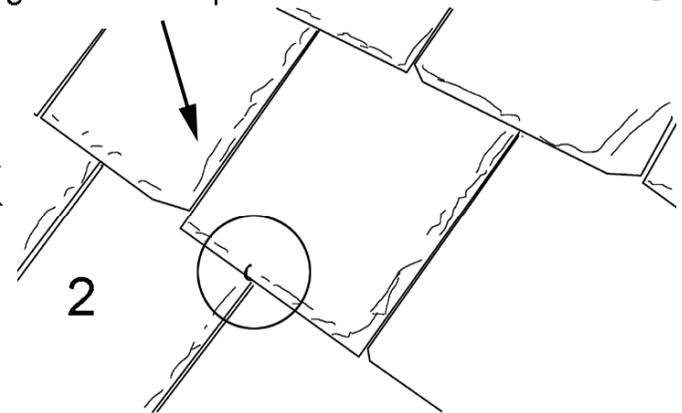
Slate hook repairs are also acceptable.

Alternatively, a copper or stainless steel slate hook can be nailed into place after the old broken slate has been removed

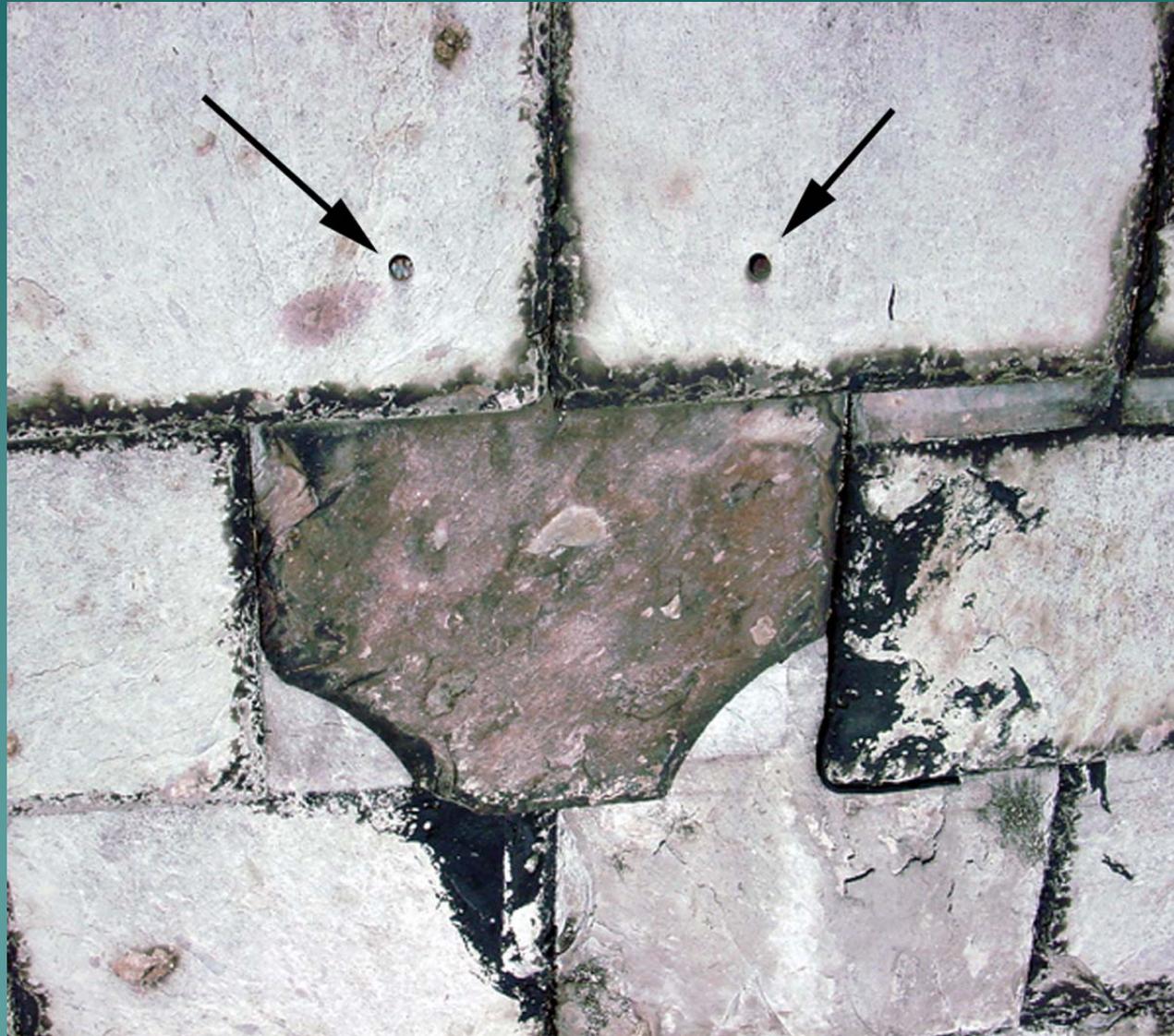


The replacement slate is then slid in place where it is permanently held by the slate hook. The hook can be pushed down between the underlying slates, if needed, in order to make more room for sliding the slate in place.

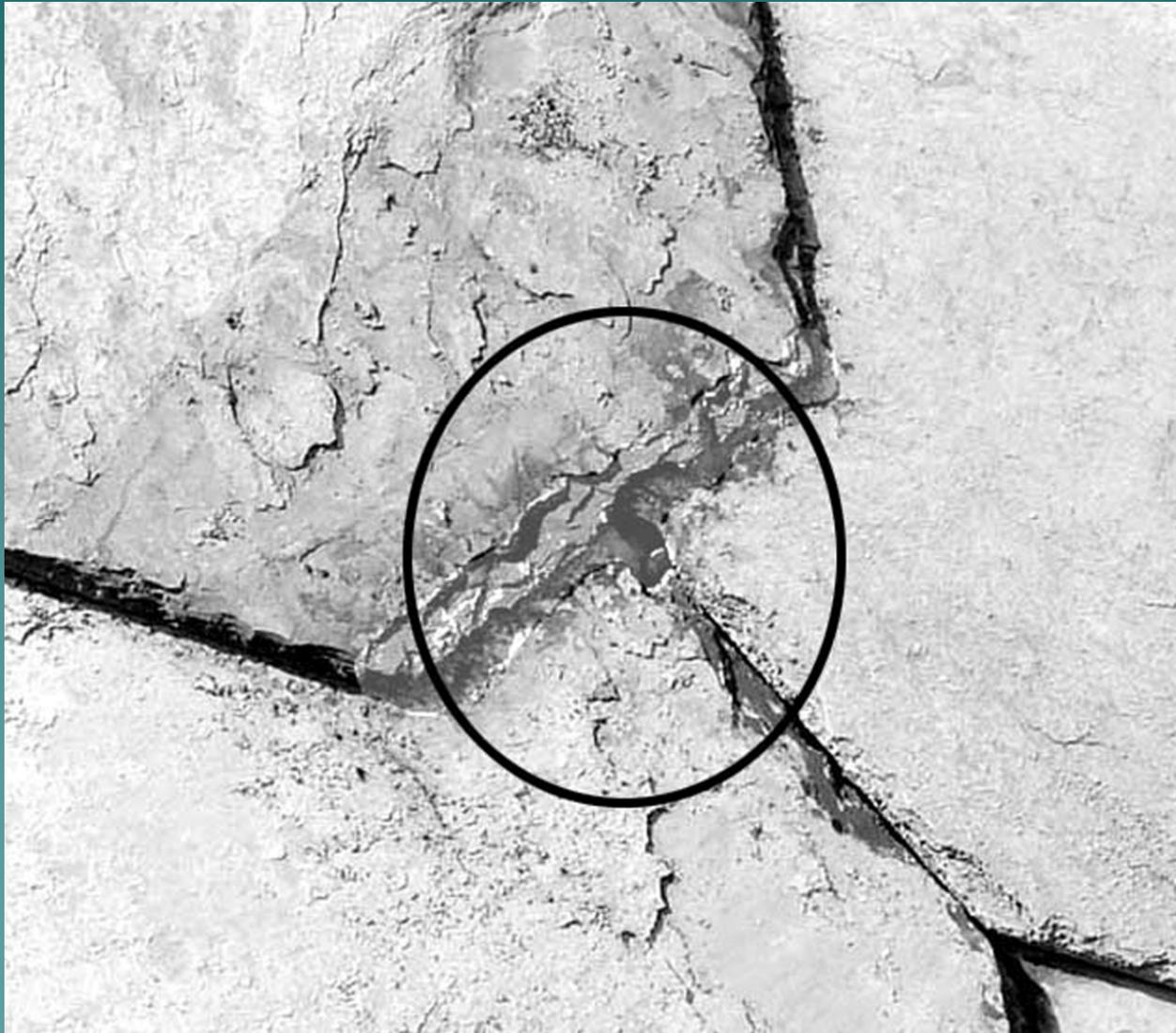
SLATE HOOK REPAIR



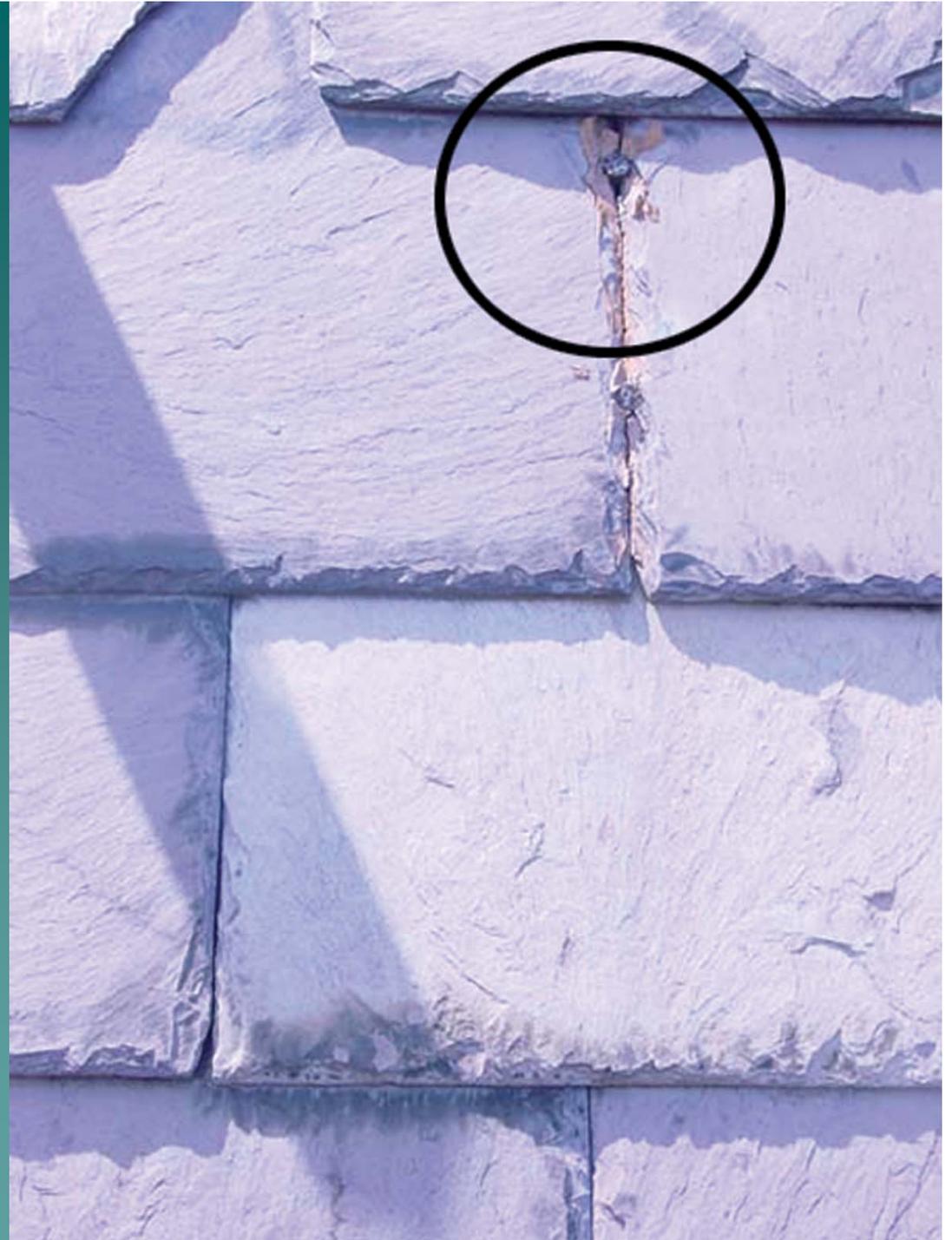
Bad repairs are a plague.



A hidden nail creates a hidden leak.



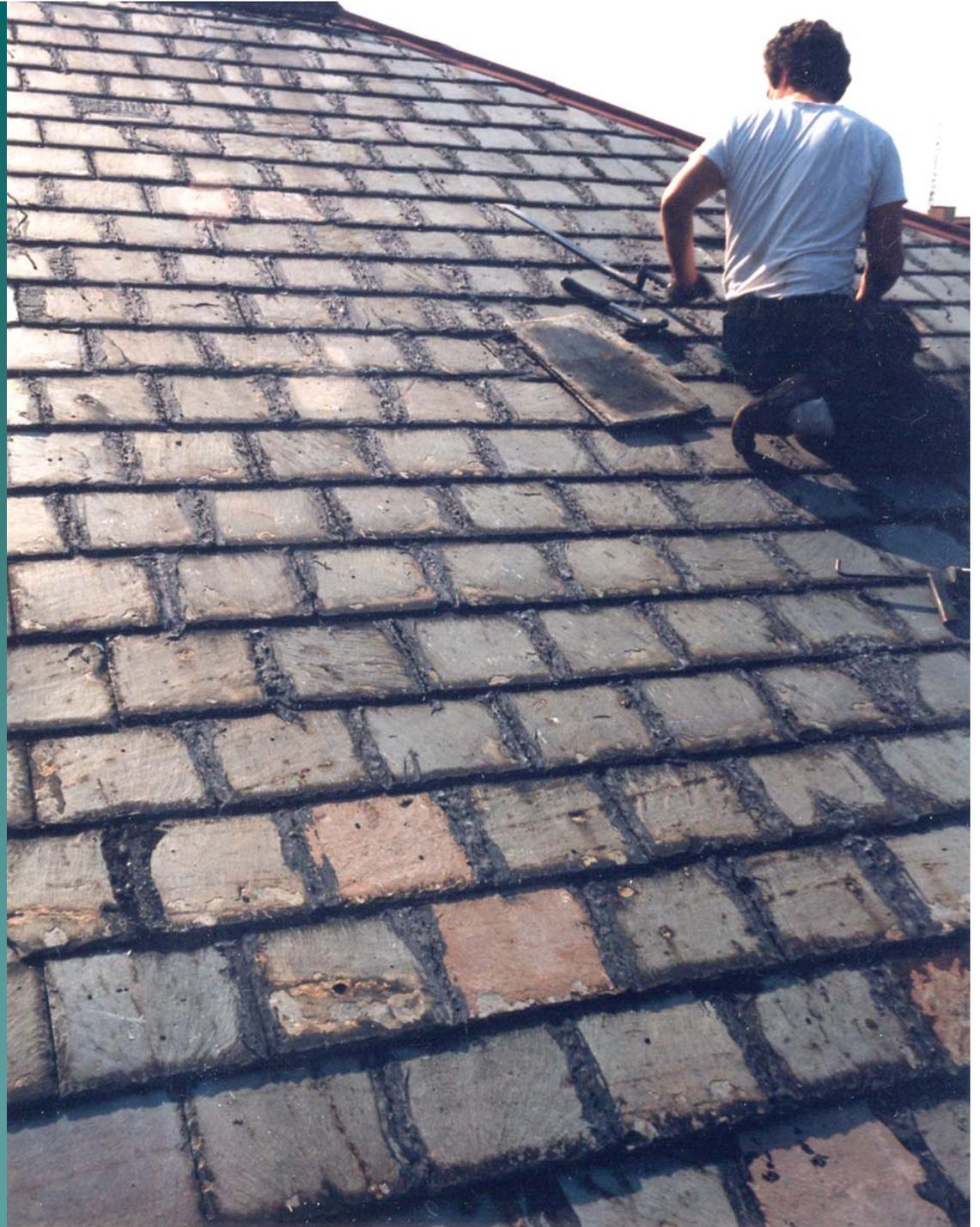
Nail without
a bib flashing
will leak.



Strap hangers are a mistake.



Surface tar
(roof cement
or “mastic”) is
a mistake.



Most leaks in slate roofs
are caused by

- 1) faulty slates**
- 2) faulty flashings**
- 3) bad repairs**

In many cases these can be repaired
or restored. Some can not.

Slates have limited longevities. Those that are worn out cannot be restored.



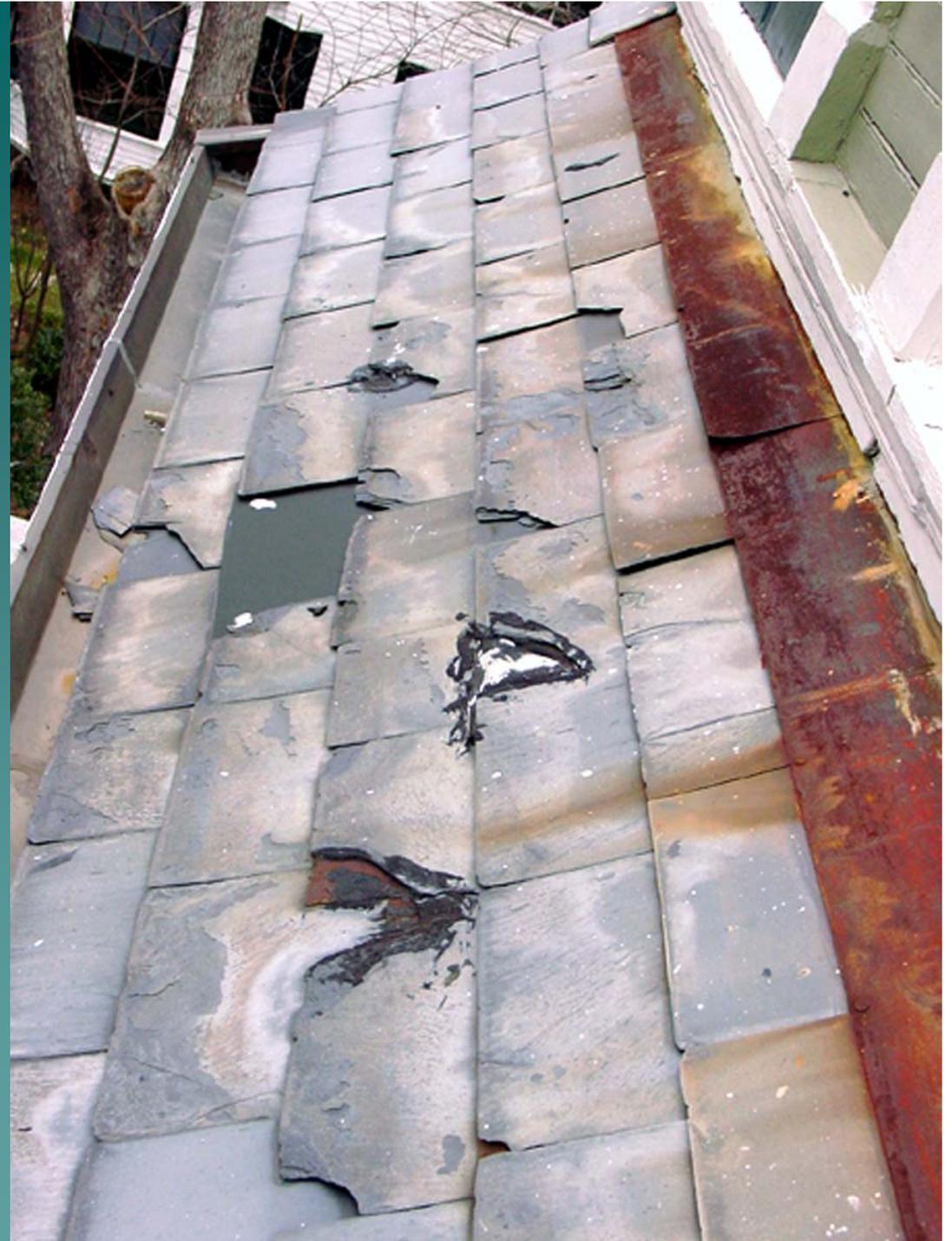
This roof is near the end of its life.



Old soft slates
will crumble
and fall apart.
These roofs
can't be
restored.



Another
example of
slates in
disrepair and
beyond hope.



This roof is still good, although it had been wrongly condemned.



A smooth surface indicates a good slate and a good roof, no matter how old.



Weathering VT slate can last
150 years or longer.



Chapman (PA) slate may last 125 years. VT unfading green may last 200 years.



A graduated mixed Vermont slate roof is highly restorable.



VT green and purple slate roofs are excellent and restorable.



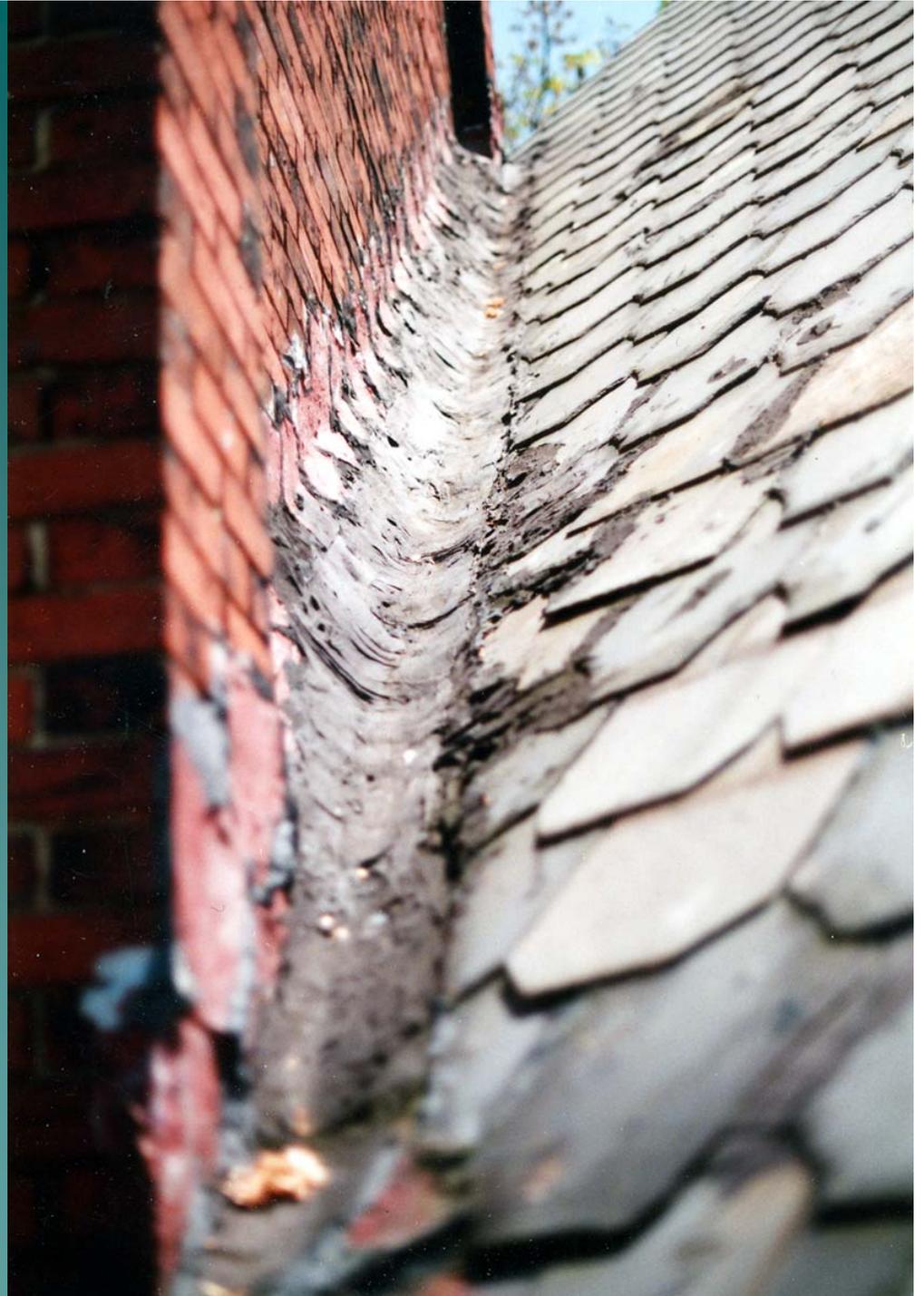
There is a
“how to identify your slate roof”
page on the web at

jenkinsslake.com

During restoration, old tin flashings, such as on this church, must be replaced.



This is a “soft”
PA slate at 104
years of age,
still restorable.



This is routine
work for a
slate roof
restoration
professional.



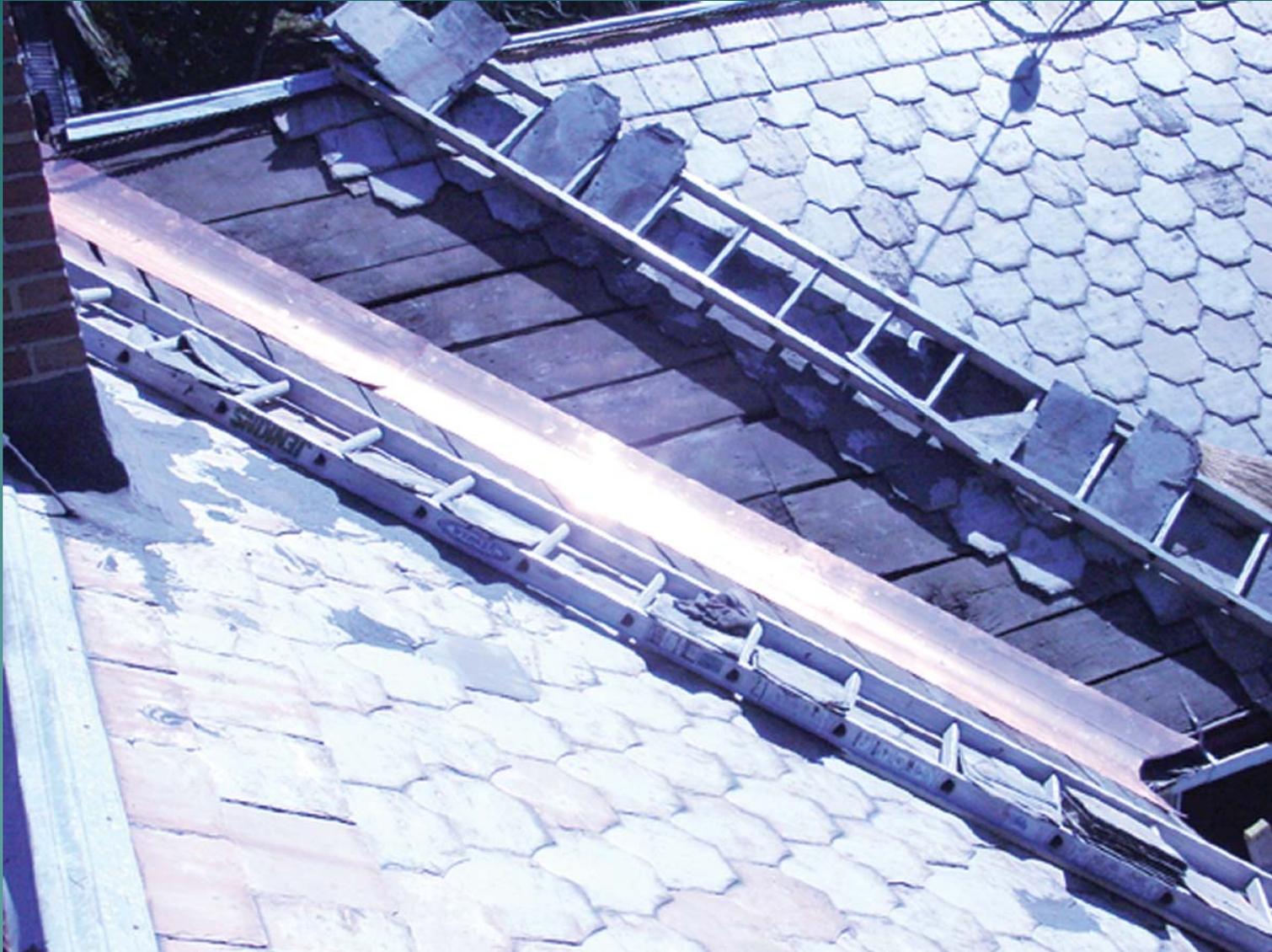
Same church getting new valleys. Note lack of underlayment (which is not needed).



Sea green roof heavily damaged by roofing contractors.



All flashing and tarred slates are removed and new flashing installed.



This is routine restoration work on a century-old residence.



Typical
“Neanderthal”
roof work.



Same chimney
after
restoration
work.



VT unfading green slate roof in good condition but with severe leakage.



The leakage was caused by poor workmanship.



Severe leakage on a church – does the slate roof need replaced?



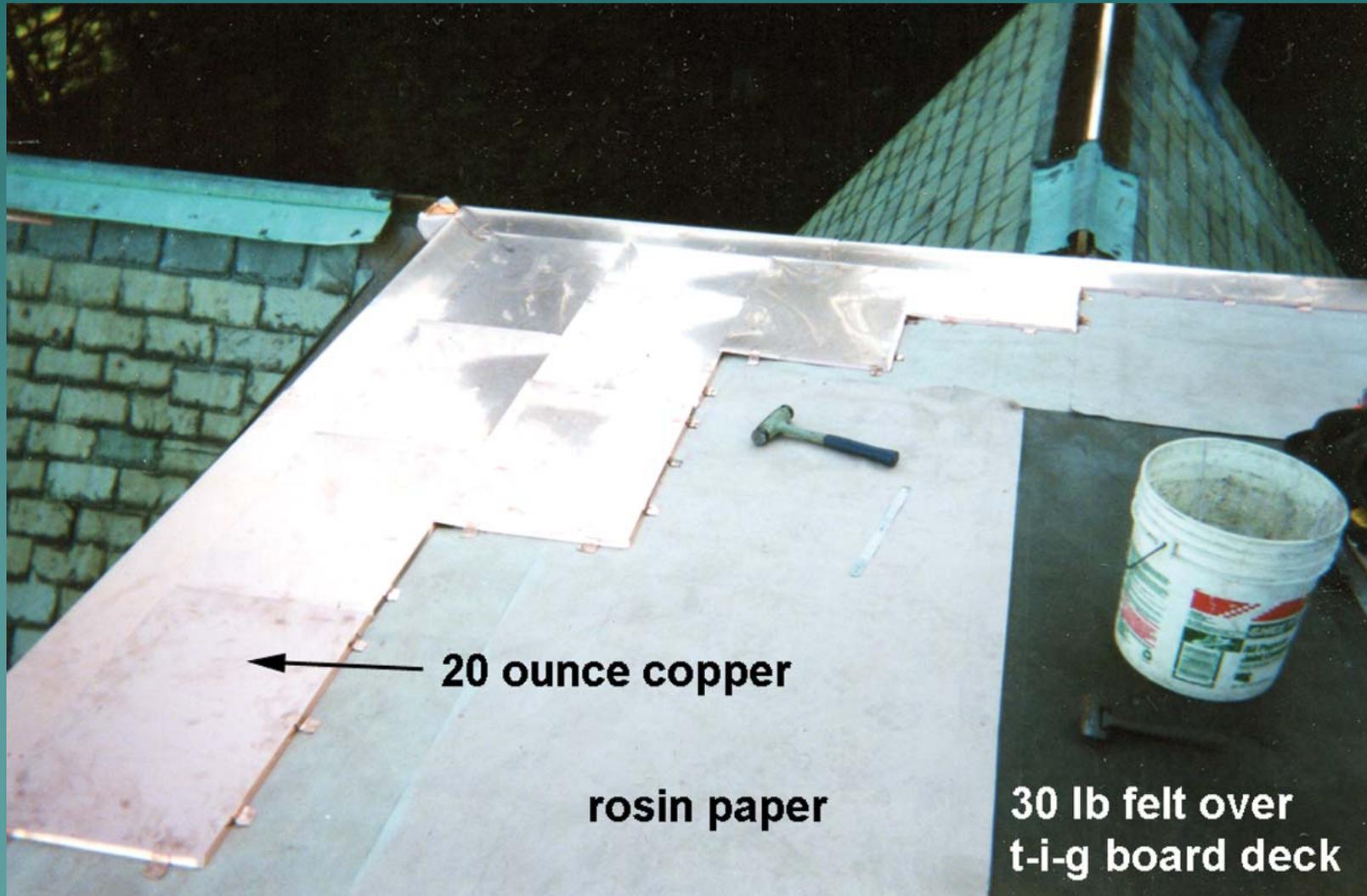
No. The leakage was not in the slate roof but in an adjoining low slope built-up roof.



Leaking low-slope areas can be re-roofed with soldered seam metal.



In this case, 20 ounce copper is being used.



The pans are soldered together to create a durable roof.



Ford's Theater: Another roof about to be condemned for a leak on an adjacent roof.



This slate roof was also condemned.



However, the minimal ice damage was covered by insurance.



Our consulting services help identify and solve slate roof problems.



Neglected slate roofs can be saved if the slate is still good.



Weather
damage
can seem
to
“condemn”
a slate
roof.



No matter how bad it looks, if the slate is good, it can be restored.



A properly restored slate roof appears original, with no visible repairs.



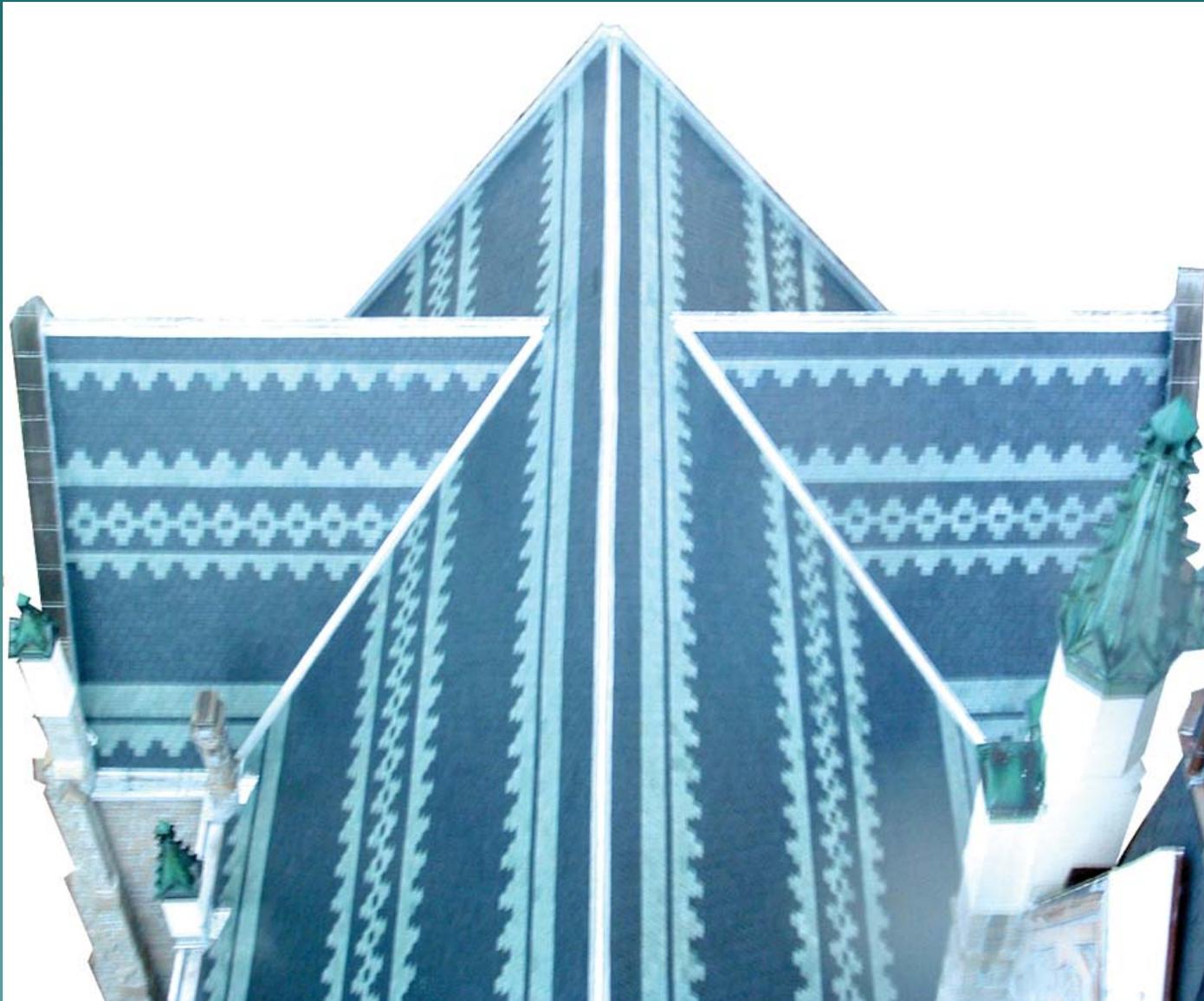
This cathedral
roof could not
be restored
without total
replacement.



The black slates had worn out, although the green slates were still good after 120 years.



New slates and stainless steel flashings have added 150 years to this building.



For More Information:

- ◆ SlateExperts.com
- ◆ TraditionalRoofing.com
- ◆ JosephJenkins.com
- ◆ **The Slate Roof Bible** (available on the web at amazon.com, via your local bookstore, here at this conference, or at SlateRoofWarehouse.com)
- ◆ Call us toll free at 866-641-7141