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1 Small 19th-century barn-dwelling at farm museum, Saaremaa Island, Estonia. Doors to threshing floor on right; entrance to dwelling on left.

Traditional Log Building in Estonia

ESTONIA is the northernmost of the three independent nations that make up the Baltic region of Northern Europe and, with a population of 1.29 million, one of the smallest states in Europe. The people are Finnic and their official language, Estonian, is closely related to Finnish and Hungarian. The territory of modern Estonia covers about 17,000 sq. mi. (slightly smaller than Vermont and New Hampshire combined), half of it covered by forest. The north and west of Estonia are bounded by the Baltic Sea, the east by Russia and the south by Latvia.

Estonian territory has been governed by powerful neighbors throughout most of the last 800 years, starting with the Germans in the 13th century and followed in succession by Danes, Swedes and Russians. Estonians largely lived in rural areas under feudal serfdom through the 18th century. The country gained independence in 1918 but was caught in the vortex of World War II. It was invaded and annexed by the Soviet Union in 1940, occupied by Nazi Germany 1941–44 and then remained a Soviet Socialist Republic until 1991, when it regained independence. Today Estonia is a member of the European Union and a so-called Baltic Tiger, known for its prosperity and progressive social policy.

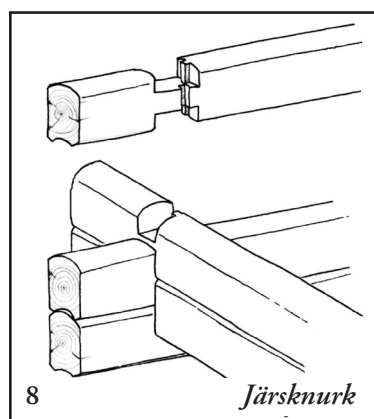
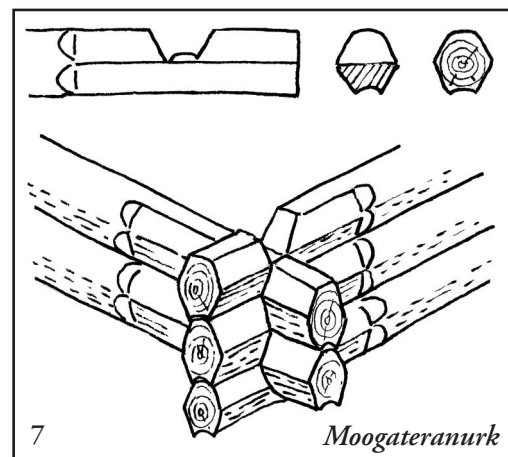
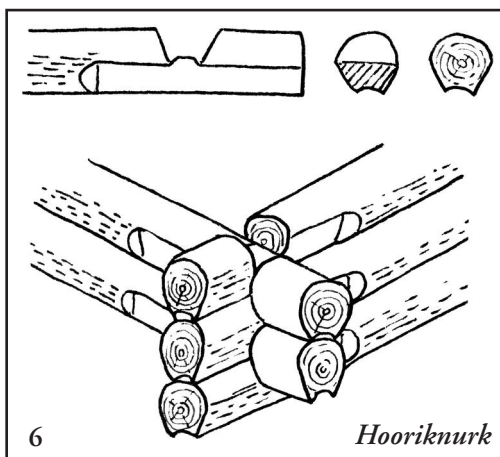
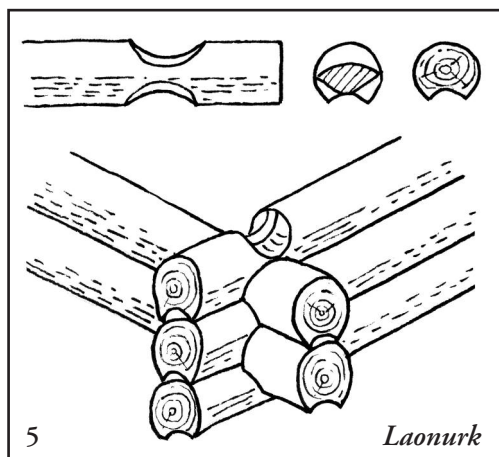
Historically, Estonian architectural heritage can be divided into two different branches: local (vernacular) and European (international). Vernacular farm architecture of local origin is without ornament or decoration, simple formally and in its division of rooms, traditional and quite stable over time until the middle of the 19th century (Fig. 1). Urban, manor house and church architecture of European origin, which appeared here beginning in the mid-13th century, has been more open to change and more individualistic. In this discussion, we cover only the traditional buildings of vernacular rural architecture, built prevailingly of logs (but also of clay and quarried stone) and notably plain and modest.

Native Estonians were locked into a serf-and-manor system well into the 19th century. The general population was not allowed to own land or buildings and forced to rent from the lord of the local manor. Rent contracts were signed only for few years and dependent on the landlords' judgment. In addition, one had to labor grievously for the manor (two men six days a week for an 11-acre

property was not unrepresentative at the end of the 18th century) and the tax burden, the portion of grain the peasant had to turn over to the manor from his own allocated land, increased in proportion to the tenant's prosperity. Obviously, under this feudal system peasants had little incentive to develop or improve the buildings they occupied. At the same time, modern, often gorgeous houses of stone and local wood were built in the towns and centers of power for the aristocracy (mostly German) and aldermen, merchants, artisans and other bourgeoisie.

Matters changed in the middle of the 19th century when peasants gained the right to own farmland and buildings. This change brought about a golden age of rural vernacular building for the next century, which saw the brisk development of building techniques and architectural styles. This golden era ended in Estonia by the 1950s, when Soviet occupation and central control quashed the local building style. Still, large quantities of log houses 100–130 years old persist in rural Estonia today and, since independence in 1991, numerous companies have been established that revived the craft of traditional building.

Traditional building Historians believe that the first log buildings (*ristpalkmaja*) in the Estonian region were built at least 2000 years ago and presume that Estonians learned their building skills from the Baltic tribes; the Estonian words for axe (*kirves*) and wall (*sein*) originate in Baltic languages rather than in the dominant Finno-Ugric. In vernacular peasant architecture, both dwelling houses and outbuildings typically were built of round logs until the middle of the 19th century, while hewn logs were used for manors and public houses. Axes were the sole tools employed in the construction of log buildings until the 1860s, when crosscut saws won a place in the carpenter's toolkit. Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*), both indigenous to Estonia, were the traditional species of choice for log builders, a preference that continues today. Historically, woodsmen cut and brought timbers to the jobsite in midwinter during the old moon (December to February), peeled and stored them for spring, and the building was cut and raised during the same summer.



2 Deteriorated wall with keys and grooved door jamb for short tenons.

3 Modern log scribing in process. Note wedged kerfs in unseen surfaces to control checking.

4 Next log laid out for corner notch and full-scribe cut. Tradition notches corner first to bring next log closer for lengthwise scribe.

5 *Laonurk* (round corner), was earliest, here in locking form.

6 *Hooriknurk* (saddle) followed, cut two lower faces.

7, 7b *Moogateranurk* (locking), cut four faces plus draft stop.

8, 9 *Järsknurk* (straight lap), popular in 19th century, here locking.

10 *Puhasnurk* (dovetail), usually for hewn logs, often sheathed.

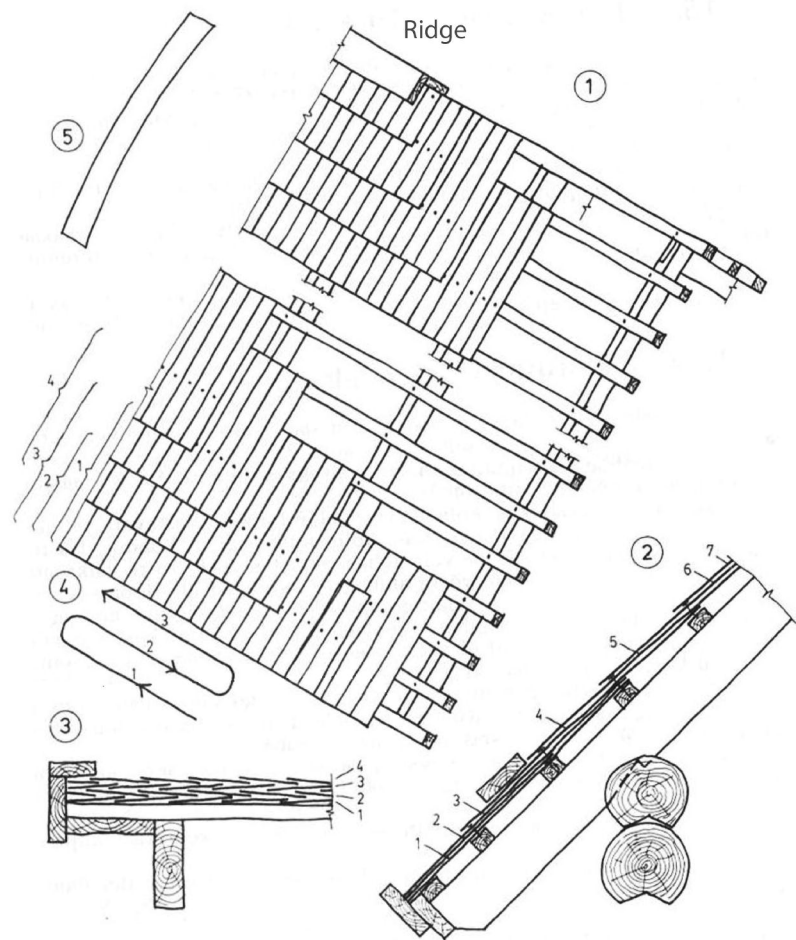
Foundations were generally primitive, with walls supported by piers of quarried stone, infilled with loose stone, rubble, clay or sand. Often outbuilding foundations were not infilled at all. After the second part of the 19th century, lime mortar use became widespread even in rural areas, and henceforth the quality of the foundations increased and the lifespan of the buildings lengthened. Birch bark served as a barrier against damp between the first log and the stone foundation.

Dowels or keys placed at intervals along the logs helped bind larger walls. To keep walls in plane at door and window openings, plank jambs (*tender*) were grooved into log ends at the openings. Side jambs typically cut 5 percent short allowed wall logs to shrink and settle (Fig. 2).

Log diameters varied with building type. For houses and barns it was generally 7 to 10 in. In the traditional full-scribe procedure, not always used today, the corner joint (neck) was scribed first and

then, once the logs were in proximity, the bottom of the upper log was grooved and scribed to fit the lower (Figs. 3, 4).

Joinery Estonian carpenters employed a wide range of lapping joints to bind the corners of their buildings (Figs. 5–11). Though the topic warrants fuller treatment, here we show the most nearly typical corner joints, in order of historical development. (*Nurk* means corner, *tapp* means notch.) With widespread use of the crosscut saw in the mid-19th century, the *järsknurk* (“steep corner”) joint, faster to build, became the most popular for buildings with log walls exposed to the exterior. In the town milieu, and in rural areas beginning in the 20th century, the *kalasabatapp* (“fishtail notch”) became the preferred corner joint (*puhasnurk*). This notch was generally used for logs hewn flat on their vertical faces, to accept sheathing or plaster; it was more rarely used on round-log buildings, with logs hewn flat near their ends to allow for a clean joint.



14

From T. Masso, *Palkmajad*. Tallinn, 1991



12 Lashed purlin poles provided support for traditional thatch.

13 Coauthor Andres Uus shingles roof of wooden bridge at Lemmaku, Estonia, in 2102 (see *Scantlings* 174). Note untapered, curved shingles, method of laying starter courses, edge laps of shingles alternating direction in successive courses.

14 Diagram showing further details of method, triple coverage generally, quadruple coverage at second course. View 3 taken at edge of roof looking straight up rake. See also Fig. 19.

15 Andres demonstrates short grain of curved shingle, exaggerating to obtain splits. Laid correctly, the shingle's grain thus directs flowing water down and outward.

Roofs In farmstead architecture the hipped roof prevailed, typically in regular form with a pitch of 45 degrees. Round rafters about 6 in. in dia. carried round purlins lashed down by willow switches or spruce roots, on which the roof covering was fixed (Fig. 12). Until the end of the 19th century, thatch was the most common roof covering in rural areas. Typical thickness of a thatched roof was around 10 in., with an expected lifetime of 50 years. Straw from winter rye, the staple cereal crop, was the most common material.

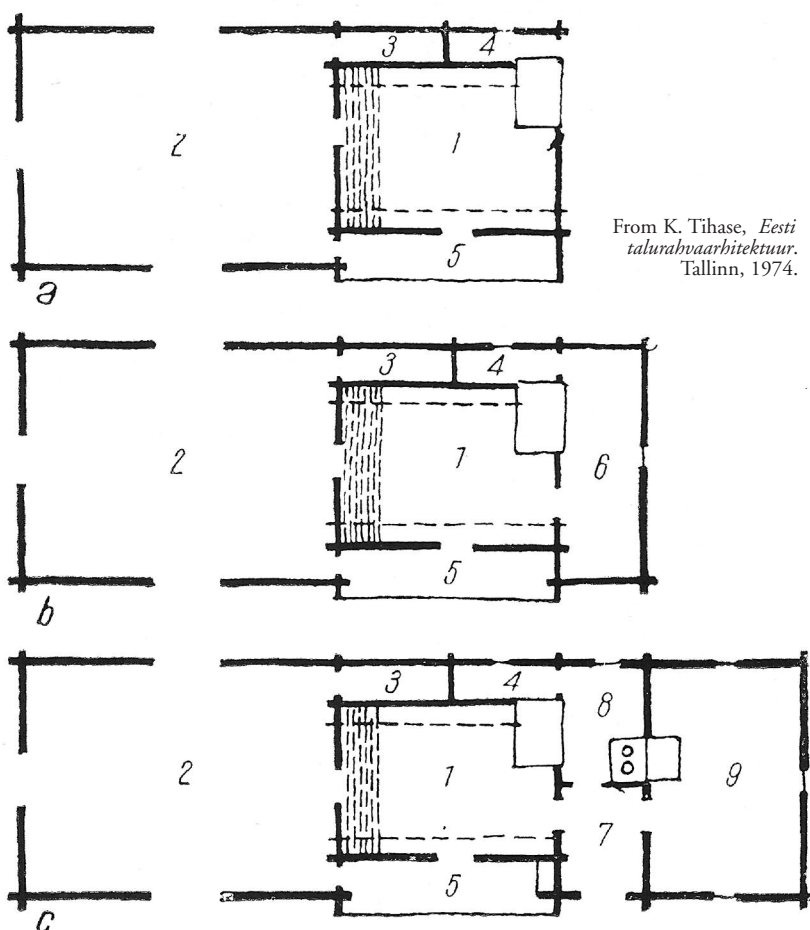
With the arrival of the threshing machine (which rendered rye straw useless as thatch), and better availability of nails in the early 20th century, wooden shingles replaced thatch. In 1890, 80 to 90 percent of rural buildings were thatched, but by 1930 the percentage had reversed in favor of wooden shingles.

There are four distinct traditional types of wooden shingles in Estonia: *pilbas*, split from a block by hand, 2–3 mm thick; *sindel*, sawed from a block and rabbeted one edge to fit over the next

shingle; *kimm*, taper-sawed from a block; and *laast*, cut from a block by special machine, 4–5 mm thick, not tapered.

The machine-cut *laast* is the most common, produced by a special reciprocating cranked arm in the mill that yields a shingle curved in its length presenting short grain to the wide face. Laid convex side up and firmly nailed, the shingle clamps down the course beneath and on its lowest third exposes shedding grain to the weather (Figs. 13–15). Shingles were laid exposed to obtain triple coverage, with an expected 30-year lifetime. Norway spruce and aspen (*Populus tremula*) were the most commonly used species. In towns roofers used wood planking and stone as roof coverings.

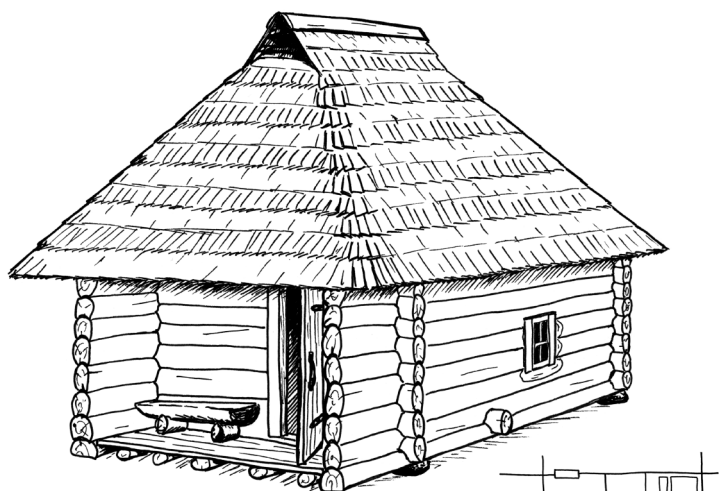
Until the middle of the 19th century, closely spaced small logs, sometimes hewn on the underside, framed ceilings. From the mid-19th century onward, wooden boarding, known as a Polish ceiling, covered the underside of the joists. Moss, sand, clay or soil piled on top of the ceiling served as insulation.



From K. Tihase, *Eesti talurahvaarhitektuur*. Tallinn, 1974.

16 Stages of ground-plan development of original barn-dwelling: (a) early 19th century, (b) mid-19th century, (c) mid-20th century. 1, *rehetuba*, threshing room; 2, *rehealune*, threshing floor; 3, *aganik*, threshed grain storage; 4, pantry; 5, *ulualune*, shelter; 6, *kamber*, room; 7, *esik*, entry; 8, *köök*, kitchen; 9, *elutuba*, living room.

17 Below, *suitsusaun* or smoke-sauna, typically about 10x16 ft., with bench, stove room and antechamber inside (plan view sketch).



From A. Uus and R. Lõbu, *Soovitud käsitööna palkmaja ehituseks*. Ristipalo (Põlvamaa), 2007

The resulting attic space sometimes stored hay or other materials; it was never finished. Ground floors were also very simple until the middle of the 19th century, typically stamped clay, soil or stones. With the golden age of building, wooden floors came into use, the oldest made of riven boards over dry sand. Sawn and planed floorboards came into use at the beginning of the 20th century. The practice of sheathing walls with boarding (typically horizontal) then expanded in rural areas when the dovetail notch

(*kalasabatapp*), which yields flush, sheathable corners, came into wide use. In general, decorative details, relatively simple, appeared only minimally, for rafter tails or to garnish posts, for example.

Rehielamu Among the typical classic buildings of Estonian vernacular architecture, the barn-dwelling (*rehielamu*, from *rehi*, threshing barn, and *elamu*, dwelling) is one of the oldest and most important (Fig. 1). A multipurpose building and one of the largest rural buildings of traditional Europe, the barn-dwelling sheltered the household and provided space for drying and threshing grain, carrying out different kinds of farm work and housing domestic animals in winter.

The barn-dwelling developed in Estonia early in the second millennium AD, shortly after the cultivation of winter rye and the attendant agrarian lifestyle became widespread. Early on it was a smoky two-room building with a threshing floor and a threshing room with open stone hearth, or *kerisahi* (Fig. 16a). Later, the dominant dwelling type, it consisted of three parts: *rehetuba* (1), threshing room; *rehealune* (2), threshing floor; and *kamber* (6), unheated room for personal belongings (Fig. 16b).

Typically 19x19 ft. and 11 ft. 6 in. high, the threshing room was located within the walls of the building. During the rest of the year, it housed the farm family, but with the autumn harvest (August to October) the family moved outside and grain was dried there, hung on wooden bars fixed 6 ft. 6 in. off the floor.

The *rehealune* was reached through wide doors in both eaves walls, allowing grain to be loaded into the building easily and good airflow to winnow chaff during threshing. Walls of all rooms were unfinished logs, the floors packed soil. Until the mid-19th century, threshing rooms, with their low interior doorways and high thresholds to minimize the flow of cold air into the room, typically lacked windows; with exterior doors closed, the only light came from a small opening, shuttered or covered with a swine bladder.

In the back corner of the *rehetuba*, the threshing room, was the quarry-stone open hearth without chimney, where the cooking was done. Numerous stones sat on the hearth to retain heat. Smoke from the fires left via the entrance of the threshing room. Richer farms had storehouses into which the family moved during the summer, and cooking was done in outdoor summer kitchens.

Ultimately the barn-dwelling form expanded to include a year-round living space separate from the grain-drying room, and chimneys were built to vent the open fireplaces (Fig. 16c). It wasn't until the abolition of serfdom in the mid-19th century, however, that the life and housing culture began to change for Estonian peasants. The most significant modernization in farm architecture of that period was a dwelling house detached from the threshing barn. Glass windows and porches (verandas) came into fashion, and dwelling houses began to look like the houses we see nowadays.

Suitsusaun The second classic structure in the Estonian building tradition is the sauna, which best preserves the old practices of architecture as well as traditional customs and beliefs. The typical sauna was built away from other buildings, if possible near a body of water. When establishing a new farm, the sauna was often the first building to be put up, to live in while the barn-dwelling was built. Saunas varied in size, corresponding to household size and wealth. The sauna, like other vernacular structures, preserved ancient building traditions for a long time. Saunas were still built without foundations until the 20th century.

The *suitsusaun* or smoke-sauna (*suitsu*, smoke) is one of the oldest types, still popular today and retaining much cultural significance. Traditionally the only place on a farmstead with hot water, the sauna was the place of recreation, bathing, healing, childbirth and many rituals and rites. A smoke-sauna is a small, low building, about 10x16 ft., with one or two rooms (Fig. 17).



18



19



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18 Firebox in a *suitsusaun*. Note water cauldron and lack of chimney. Flames rise through stones. Soot has only just begun to accumulate; eventually entire interior of sauna will be black. Smoke is evacuated before guests enter.

19 New *suitsusaun* in Mooste, Põlvamaa with hewn corners and *laast* shingle pattern. Note alternating-course edge laps.

20 Round log wall fit-up at yard of Tender Ehitus in Tudu. Note grooves for window and door jambs. Topmost log in position for new scribe. Compression straps take up shrinkage.

21 Logs sawn two sides with *järsknurk* (straight lap) corners. Hand-bored holes underway for dowel joints.



21

The identifying feature is that it's heated by an open firebox without a chimney. Many large stones are piled right on top of the firebox, heated directly by the flames; smoke rises into the room. A cauldron nests in the pile of stones on top of the firebox (Fig. 18). Water is dipped out onto the surrounding hot stones to make steam. A fire must burn for at least 3 to 4 hours until the stones have stored up enough heat for the entire duration of the sauna. When the fire has burned long enough and the flames have died to coals, the firebox is closed and a window or door opened to let the smoke clear before guests enter.

In Estonia, taking a sauna can easily last an entire evening (or an entire night), with incredibly hot sessions in the sauna punctuated by plunges in the nearby icy pond or river, and cold beers. Even today many traditions persist in smoke-saunas, from beating oneself with birch switches (to exfoliate and increase blood flow) to placing aromatic and healing herbs in the cauldron of water on top of the fire. Nowadays relatively few smoke-saunas stand in the north and west of Estonia, but they are ubiquitous on the farms of the southeast, including many newly built (Fig. 19).

State of the industry In the decades since independence from the former Soviet Union, Estonians have come to value their traditional building, natural lifestyle and environment. Renovation of old log houses, the use of traditional details and building new log houses in the traditional manner have become more and more popular (Figs. 20, 21). In the 1990s, about 300 companies sprang up to build traditional houses. Many of them also exported to the rest of Europe, taking advantage of cheap domestic labor and materials. As Estonian wealth and living standards have grown, these comparative advantages have shrunk and many traditional-building start-ups have closed, but many others survive and continue to revive and develop the craft of traditional log building in Estonia.

—PIRET AND ANDRES UUS

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