

Fire Protection and the Art and Craft of Thatching.

By CHARLES H. BUTCHER.

FOR the small country house there is, perhaps, no roof so pleasing in its general appearance as "thatch," and it is to be regretted that the fire risk usually associated with this type of roofing not only demands a higher rate of premium in respect of fire insurance, but also compliance with the local bye-laws prohibiting its use for houses which are not in an isolated position. This danger from fire, however, is to be apprehended more in the case of new roofs, compared with old roofs which have been exposed to the weather and have become covered with a protective surface of mosses and lichen. The present-day revival of thatch, therefore, calls for some means of fire-proofing the straws or reeds which are used.

STRAW THATCH.

As a roofing material thatch has many advantages—it is light in weight, impervious to moisture, and of good weathering qualities. The materials usually employed—wheat straw, rye straw and reeds—are also good non-conductors of heat, and the buildings thus roofed are warm in winter and cool in summer, a feature which is especially desirable in the case of cowsheds and dairies. Its liability to strip during high winds, if the verge and eaves are not properly secured, is often put forward as one of its disadvantages in addition to fire risk, and another

is that to some extent it provides a harbourage for birds and for vermin from which it may be difficult to dislodge them.

Of the straws used, rye straw is preferable to wheat straw; barley straw and oat straw should only be used if wheat straw is unobtainable. The produce of a fairly dry summer is also preferable, and the straw should be cut just before it is fully ripe, only unbroken straw (which has not been through a threshing machine) being of any use as a thatching material. In many districts hazel rods are used, in conjunction with twine, for securing the straw, pieces being laid at the verge and eaves to consolidate the surface and resist the action of the wind. These rods also serve to break the surface of the roof, with good effect when skilfully fixed.

One ton of good wheat straw will cover about four "squares" of roofing (a total of 400 feet square) at a thickness of 12 inches, and will repair from five to six "squares" of old thatch. The life of wheat straw thatch is usually 15 to 20 years; rye straw should last about twenty-five years or more, but oat straw will perish in seven or eight years. A reed roof, however, will last from sixty to seventy years, if properly cleaned down and "knocked-up" about once every seven years.

REEDS AND OTHER MATERIALS.

Reeds for thatching purposes are grown chiefly on the Norfolk

FIRE PROTECTION AND ART OF THATCHING.

Broads and in the Fen district, but may be obtained at other places throughout the country. They are cut when fully grown at the commencement of each year, preferably after a sharp frost which tends to remove waste grass and rubbish, and are then dried and stacked ready for use. When the roof is rafted they are secured by tarred cord in much the same way as straw thatch, but when laid over closely-set boards, iron hooks are used in conjunction with hazel rods laid horizontally across the reeds. The ridge is made separately in the form of a hood fixed at the completion of the roof, firmly secured to stout ridge poles built up with reeds, the actual capping being of hazel or willow.

In those districts where heath and furze are available picturesque effects are obtained by employing them as a finishing coat. It should be borne in mind, however, that a solid underlayer of good wheat straw must be provided, as three or four years' exposure will strip these materials to the bare fibre, leaving but little protection against the weather in consequence. In some counties the long shavings or "chips" produced in the manufacture of wooden hoops are also used for thatching, the ridge capping being carried out in rye or wheat straw.

SOME METHODS OF FIREPROOFING

The fireproofing agents which are commonly used for structural timber cannot be successfully applied to thatch, for the majority of these chemicals are soluble in water, and would be easily leached out by the rain. The exposed position which it necessarily occupies as a roofing material, is, however, not the only factor which

has to be taken into consideration in selecting a suitable method of treatment, for all thatch has a certain characteristic texture which would be marred by the application of fire-resisting paint.

Although alum water is often recommended as a fireproofing medium, it must be pointed out that there is little to be gained by spraying the completed roof, for a few good drenchings by rain will quickly remove the whole of the alum which has been deposited or absorbed by either straw or reeds. If the solution is applied from the inside of the roof, however, or whilst the roof is in course of construction, using alum water to damp the straw, there is little doubt that the inflammability of the straw will be somewhat mitigated, but no measurable degree of fire resistance is assured if other conditions are favourable for an outbreak of fire. A solution prepared by dissolving sulphate of ammonia (28 lb.), carbonate of ammonia (14 lb.), boracic acid (7 lb.), lump borax (7 lb.), and lump alum (14 lb.) in 50 gallons of water is, however, more satisfactory than plain alum water.

Silicate of soda, which has also been recommended, is liable to make the straw brittle, but this brittleness is not so marked if the silicate is used in conjunction with powdered asbestos, the necessary solution being prepared by treating *solid* silicate of soda (120 lb.) and powdered asbestos (120 lb.) with 50 gallons of boiling water.

PROTECTION BY THE USE OF "MINERAL WOOL."

So far as the actual fire risks are concerned, a certain amount of protection may be obtained by

interposing layers of "slag wool" (sometimes known as "mineral wool") between the individual layers of the thatch. This material which is produced as a by-product in the steel-making industry, consists of a mass of very fine fibres which interlace in all directions with some resemblance to cotton wool, and is perfectly incombustible and non-conducting. On this account it has been employed in large quantities for the insulation of walls and floors, and for "casing-in" hot flue pipes, but in connection with thatch its use is something of a novelty, and is to be especially commended in that it cannot mar the æsthetic appearance of the roof.

"ALUMINA" AS A FIREPROOFING MEDIUM.

An insoluble fire-proofing body formed within the cell walls of the thatch, where it will retain its fire-resisting qualities under all conditions of weather, and give little or no indication of its presence in the treated thatch, is probably the most desirable method of treatment. Of such materials which are available, "alumina" is one which not only proves satisfactory, but is fairly easily applied.

The materials used are aluminate of soda and bicarbonate of soda, both of which (like the chemical products already mentioned) may be obtained (as can the other materials referred to in this article) from the "C.G.A.," or from a wholesale chemist and druggist, or by placing an order with the local drysalter. Treatment is carried out by soaking the thatch in a solution of the aluminate of soda, which is freshly prepared and made up to a

density of 1.13 (as tested with the aid of a hydrometer), allowing fifteen to twenty minutes' immersion so that the solution is able to permeate into the cell walls of each individual reed or straw. The thatch is then transferred to a solution of the bicarbonate of soda (of the same strength or density), allowing the same period of immersion as before, and the material thus impregnated is rinsed in clean water and subjected to the action of steam for the purpose of decomposing the chemicals which have been absorbed, and so produce the insoluble "alumina." The treated thatch is then spread out to dry and is ready for laying.

The strength of the solutions specified is important, and should be carefully checked, as the extra expense involved in the purpose, the purchase of a suitable hydrometer, need not exceed five or six shillings. Watertight tubs should be used as receptacles in which to soak the thatch. On no account should galvanized iron tanks be used. The steaming operation may be carried out by spreading the impregnated thatch on boards laid on the ground and playing over it for from five to ten minutes with steam from a hose.

The provision of an adequate supply of steam is the chief difficulty associated with this work, but high-pressure steam is not a necessity. It is, therefore, advisable to hire a small vertical boiler where any large quantity of thatch has to be treated, although for a roof of, say, 1,600 feet super a coke-fired boiler of the type used for central heating may be pressed into service. If facilities can be obtained for doing the work at some laundry where a

proper steam plant is available, or if it is possible to enlist the services of a stationary traction-engine for the supply of the steam, so much the better.

In many cases the thatch may be treated *in situ* (for buildings which are already thatched), the respective solutions of aluminate of soda and bicarbonate of soda being applied by spraying, with the aid of a large garden syringe or a small spraying machine similar to those used for the treatment of crops with an insecticide. A spell of dry weather must, of course, be selected for carrying out this work, and sufficient time should be allowed for each application to soak in. Five good drenchings with the aluminate of soda, followed by one of clean water to rinse the surface of the thatch, and then five more drenchings with the bicarbonate of soda solution will give a good factor of fire resistance after the final treatment with steam.

A COLONIAL METHOD OF TREATMENT.

As an alternate method of treatment (without the necessity for steam), the thatch may be soaked in a solution of common salt and sal-ammoniac, prepared by dissolving 2 lb. of each of these materials to every gallon of water used. After fifteen to twenty minutes' immersion, the thatch is air-dried, and placed in a second tub containing river "silt" suspended in water (using one bucket of silt, or mud, to three or four buckets of water). In this way the solution which has been absorbed becomes "fixed" within the cell walls of each individual reed or straw, so that it is immune to the action of the rain. The thatch is then spread out in the

sun to dry, dipped into powdered asbestos which has been mixed with water to the consistency of a pulp, and allowed to dry once more. It is then ready to be laid.

From some obscure reason the thin coat of asbestos applied in this manner shows no tendency to scale under the influence of the weather, and neither does it affect the appearance of the thatch in any way.

THE ART AND CRAFT OF STRAW THATCHING.

To these remarks some notes on the actual operation of thatching with wheat or rye straw may be appropriate, more especially as there are, at the present moment, many rural cottages which are lapsing into delapidation for lack of pluck in organising the repair of the thatch. It is generally overlooked that this work may be taken in hand by any intelligent working gardener or farm labourer (with no previous experience) if the services of a professional thatcher cannot be procured.

The actual operation applied to ordinary shaped roofs is quite simple though seemingly laborious at first. The only materials needed, besides the straw, are round rods or battens, and a supply of stout hemp twine which has been well tarred. The tools comprise a pointed wooden bodkin about 2 feet long, with an eye large enough to take the tarred twine; a wooden "bat" for consolidating the straw, so that the bundles lie closely together; an ordinary wooden rake as used for haymaking; and a long, sharp curved knife for trimming the surface and edges, a tool ably provided by an old scythe blade mounted in a suitable wooden

handle. To this equipment must be added a ladder long enough to extend from the ground to the top of the roof, lying parallel with the slope.

The straw is first prepared by being spread out, well doused with water, and turned over with the fork until thoroughly moistened. It is then drawn from the heap in bunches, grasped by the heads, and arranged in bundles by whisking it through the air with a circular motion. These bundles—which are known as “yealms”—are then tied near the head with a twist of tarred twine and are passed up to the thatcher for the thatching operation.

Assuming that the roof has been battened in the usual way—by nailing the rods to the roof timbers about 12 inches apart—the work is started from one of the gable ends or from a hip, and is carried on from right to left, working upwards from the eaves to the ridge in strips which may be conveniently reached without removing the ladder. These strips are usually about 2 ft. 6 in. wide. Throughout the operation the “yealms” are pressed and beaten sideways, so that they lay tightly against each other, and in position (laid one above the other, so that the fixings are covered) they are secured to the battens by the tarred twine which is thrust through the thatch, with the aid of the bodkin, by the worker on the outside of the roof to his assistant inside the roof, who passes the twine round the batten

and secures it. A thickness of at least 12 inches should be aimed at, as this will diminish when the straw settles down.

The ridge may be finished in various ways, but the simplest is to lay a reversed top row of “yealms” with the butts uppermost, bearing one against the other on opposite slopes of the roof, and to secure these by hazel runners tied down through the thatch to the ridge pole. On completion, the roof surface is raked to remove any tangled or loose straw, cleaned up with the knife to a smooth, unbroken surface, and trimmed at the verge and eaves. The eaves should be secured against the effects of the wind by pinning or tying hazel rods on the surface, taking care to drive the pins into the thatch in a horizontal direction instead of directly downwards through the thatch.

The eaves should always be carried well over the face of the wall, and when cut on the skew, or at right-angles to the vertical, they should stand out 18 to 24 inches from the face of the wall, in order to throw the rain clear. In cases where they are within reach of cattle, damage may be minimised by tarring that part of the straw, or by covering it with galvanized iron wire netting. This netting, carried over the whole of the roof surface and fixed by staples driven into the thatch, will also prevent severe attacks by birds which are a menace to thatched roofs where they are relatively uncommon.