CANTERBURY CHAMBER OF COMMERCE
AGRICULTURAL BULLETIN

HAY BARNS OF THE DUTCH TYPE

Prepared by the Canterbury Agricultural College, Lincoln

Bulletin. CHRISTCHURCH, JUNE, 1946. No. 203

Much of the hay made each year is spoiled because of inadequate covering. Such waste is preventible and the adoption of the Dutch barn for hay storage has much to recommend it.

In other countries, Europe, America and Australia, the provision of a permanent hay storage barn is regarded as essential for the adequate protection of the winter feed reserve but in New Zealand we have been slow to adopt the idea, preferring to stack "loose" hay with a good pitch on the roof and covering the stack with straw or thatch —when any cover at all was used. More often the stack is topped off, tied down and left. In the months between harvest and winter the stack settles and, depending on the skill of the stack builder, becomes more or less water tight.

With baled hay, stacking in the open still goes on, the stack being covered with straw or a sheet cover. Good wheat straw which, if well laid on can give adequate cover, is becoming scarce as the heading of wheat crops is now general; sheets for covering are expensive not only because of their high initial cost but also because of their high rate of depreciation due to "wear and tear" under wind and rain.

Since hay for wintering is becoming more widely and extensively used, and oat sheaf chaff is on the wane and turnips are diminishing in area as the years go by, we could well begin to take the question of hay storage seriously and provide permanent barns in which both loose and baled hay may be stored free from damage whatever the weather may be.

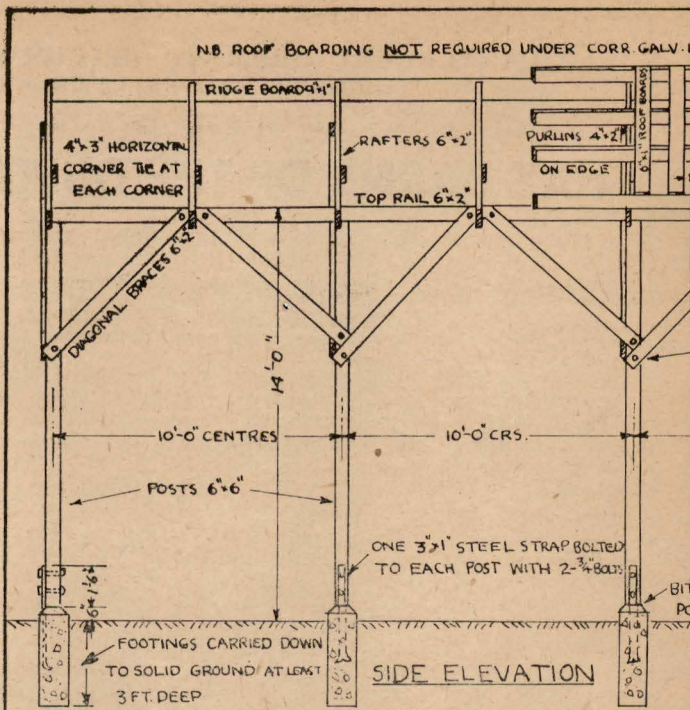
The "Dutch" barn is suitable for the job. It is relatively cheap to erect, its construction is not beyond the ability of the average farm staff, and if well built it will serve the purpose for many years.

One of the main problems is the selection of a site for the building. Unlike the hay stack it cannot be moved about from year to year but must remain permanently on the spot. The following are some of the alternatives to be considered in determining the site:

1. In the hay paddock: Where a paddock is regarded as a permanent hay paddock as with lucerne, the erection of the barn close to a gateway in the paddock may be adopted. This has the advantage of easy haulage of bales or sweeping in of loose hay with a minimum loss of time at a season when farm work is proceeding under pressure. It has disadvantages, however. It takes up a valuable area of hay-producing land: the hay may be stored in such a position on the farm that long cartage in winter is required to feed out to the stock: carting out in winter may be held up by the wet condition of the land.

2. At the homestead: Where the homestead is centrally situated this has the advantage of storing the hay where it is "handy" for both carting in from the hay paddock and carting out to the stock. Should the homestead be so placed that the carting in and out involves undue haulage this location of the barn is not good.

3. On paddocks where winter feeding is generally carried out: This site is most suitable on farms where the hay is grown on heavier or wetter land while the sheep or cattle are run on lighter, well-drained areas in winter. It has the disadvantage at times of long haulage from the hay paddock at a busy time, but with motor transport and the fact that the land is normally dry at haymaking time, the disadvantage is not severe. The fact that much of our hay is baled makes it much easier and quicker to transport than is the case with loose hay. Winter carting—always a trouble on farms—is eliminated



SCHEDULE OF QUANTITIES

ITEM	DESCRIPTION	QUANTITY
POSTS	6"×6" RIMU BUILDING A	8/13'-6" LENGTHS
RAFTERS	6"×2" "	14/10'-0" "
PURLINS	4"×2" "	250 LINEAL FEET
COLLAR TIES	6"×2" "	7/13'-0" LENGTHS
KNEE BRACES	6"×2" "	8/9'-6" "
DIAGONAL BRACES	6"×2" "	12/7'-6" "
CORNER TIES	4"×3" "	4/7'-6" "
SIDE & END RAILS	6"×2" "	6/16'-0" "
ROOF BOARDING (WITH MORTISES)	6"×1" PINUS INSIGNIS	52/10'-0" "
RIDGE BOARD	9"×1" RIMU BUILDING A	32 LINEAL FEET
PURLIN CLEATS	3"×2" "	30 LINEAL FEET
GABLE STUDS	4"×2" "	80 " "
GABLE SHEETING	CORR. OF FLAT SHEETS	72 SQ. FT NETT
ROOFING	10 FT CORR. SHEETS	620 SQ. FT. NETT
ROLL RIDGING	GALV. IRON OR ASBESTOS	31 LINEAL FEET NETT
BARGE MOLD	12" "	40 " " "
SPOUTING & BRACKETS	4" "	62 " " "
DOWN PIPE	3" "	30 " " "
FOOTING STRAPS	3"×1" MILD STEEL	8/3'-6" LENGTHS
RAFTER STRAPS	2"×¼" "	8/4'-6" LENGTHS
BOLTS (BRACES & TIES)	⅝" COACH	24/5", 8/7" 8/9" + WASHERS
BOLTS (POST FOOTINGS)	¾" COACH	16/8" + WASHERS
BOLTS (RAFTER STRAPS)	½" ENGINEERS	12/7½" + WASHERS
CONCRETE 1:2½:5	CEMENT	4 BAGS
"	SAND	½ CUBIC YARD
"	SCREENED SHINGLE	1 " " "
NAILS	3"×4", 6" ALSO ROOFING NAILS OR SCREWS	AS REQUIRED
CREOSOTE	B.S.P. NO. 144 – 1936	5 GALLONS

TOTAL TIMBER, ALLOWING 5% FOR WASTE = 1170 SUP. FT. RIMU BU
+ 290 " " PINUS IN

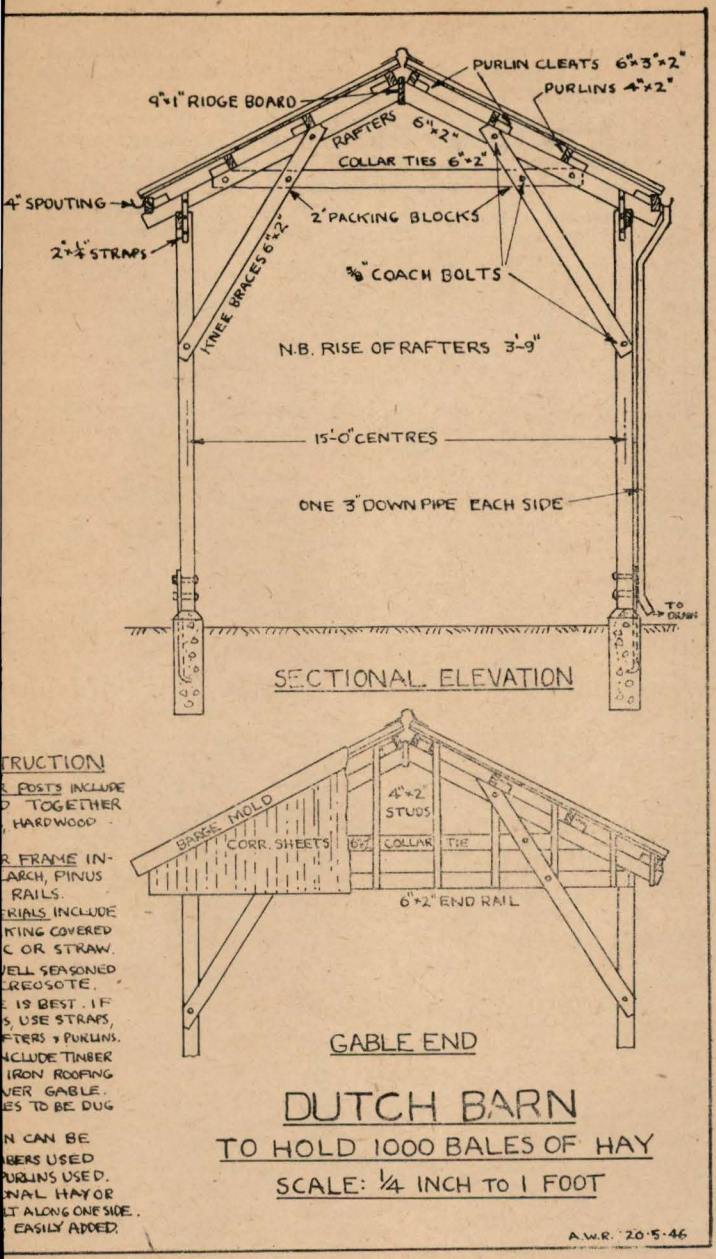
and with it the cutting up of paddocks which so often occurs. The hay is handy to the stock and so the burden of winter work is considerably lessened. The building should be in a dry, sheltered spot.

The selection of the site must of necessity be one for the individual farmer to decide for his own farm, but it is important to realise that nothing is worse than a badly located barn which winter after winter causes inconven
man who is feeding ou
stock.

SIZE OF BARN:

The following are
which may be taken
guide to the size of the

1. Hay to be store
farm the amount of ha
year should tie in wit
carried. Where hay **alo**
provision should be 2½



TRUCTION

R POSTS INCLUDE
D TOGETHER
HARDWOOD

R FRAME IN-
ARCH, PINUS
RAILS.
ERIALS INCLUDE
KING COVERED
C OR STRAW.
ELL SEASONED
CREOSOTE.
IS BEST. IF
S, USE STRAPS,
FTERS & PURLINS.
NCLUDE TIMBER
IRON ROOFING
VER GABLE.
ES TO BE DUG

N CAN BE
BERS USED
URLINS USED.
NAL HAY OR
LT ALONG ONE SIDE.
EASILY ADDED.

ve, i.e., 2,500 bales or
r a 1,000 ewe flock.
r supplementary fodder
ps, choumoellier, green
on—are provided, the
hay required is lessened,
ld not be below 1,000
tons for 1,000 ewes if
d and green fodder are
ance.

cows the allowances
0-35 bales (1 ton) per cow and for winter milkers 2-3 tons per cow. For store cattle the usual allowance is ½ to 1 ton depending on the grazing available, while handfed fattening bullocks will require up to 3 tons for the winter. Having decided how much—or how little—hay it is advisable to save, then the size of the barn can easily be worked out.

LOOSE HAY:

When hay is first made it usually

requires about 16 cubic yards for each ton, but once the hay has settled it runs out at about 12 cubic yards per ton. On the basis of 30 tons for 1,000 ewes—or 30 dry cows —the space required would be approximately 500 cubic yards.

BALED HAY:

There is a certain measure of variation in the number of bales per ton of hay—depending on the way the press is worked, but an average figure would be about 30 bales per ton. Bales from a standard baler measure 3' x 1'6" x 1'3" and so for 1,000 bales the space required would be about 200 to 250 cu. yds. allowing 10% for waste storage space. The economy in space where baled hay is used is well worth considering since one ton of stacked loose hay requires as much storage space as two tons of baled hay.

SIZE OF DUTCH BARNS:

Reverting once again to our 30 ton figure, it may be seen that for loose hay the size required for storage—500 cubic yards—would require a barn 45ft. long, 24ft. wide and 14ft. high. For a similar quantity of baled hay (1,000 bales) the size would be 30ft long, 15ft. wide and 14ft. high. The height—14ft.—is considered to be the average for economy in building material and for efficiency in avoiding undue weathering of the side bales where an eave is provided along the sides of the shed. It is not wise, however, to make the barn too high, especially when the floorspace is small, as the building becomes top-heavy and liable to wind damage. Again beyond the 14 foot mark the handling of bales becomes unduly hard work which can be avoided by a slight increase in the floor space.

The barn should be built on a well-drained site with its end turned to the south so as to limit the exposure to weather. It may be worthwhile to board in this southern wall so as to give complete protection from the southerly, but this is not essential. The eaves of the roof should carry spouting as the water in heavy rain can do considerable damage to the upper bales if a direct run-off is allowed. Storm water can be led off clear of the barn so as to keep the site dry.

STRUCTURAL DETAILS:

Included is a plan and list of the materials which might be used in constructing a Dutch barn 30ft. x 15ft. x 14ft. with span roof. The construction shown is economical of building materials and easy to build with unskilled labour.

Although there is at present a great increase in hay baling, building materials are in very short supply, and subject to strict control. Thus it may be found necessary to use materials other than those shown on the plan.

For example, instead of the 6" square timber parts, and the 6" by 2" framing and 4" by 2" purlins, a wide variety of other material might be used, such as old railway rails, hardwood poles and larch, bluegum, or pinus insignis saplings, as indicated in "Notes on Construction" on the drawing.

Similarly, alternative roofing materials may be used, such as rough sawn pinus insignis roof sarking covered with 2-ply bituminous fabric and battens, or covered with straw wired on to the sarking with wire netting. Bituminous fabric would need periodical maintenance by tarring and sanding, and the straw will have to be renewed every few years, but would tide over the present shortage.

The design could readily be adapted to a greater width of 20 feet to give greater storage, by using 8" by 2" timbers instead of the 6" by 2" shown on the drawing and using an additional purlin each side, while a longer barn could be constructed by increasing the number of 10ft. bays.

There would be little difficulty in adding a lean-to shed to one side of the barn at a later date if desired, thus providing increased hay storage or possibly implement storage.

If it is decided to wall in one or more of the sides, it should be realised that the pressure of the wind on this wall will tend to cause the building to rack, and this should be guarded against by appropriate diagonal bracing, as is usual in shed and house construction.

If desired, additional protection from rain may be obtained by walling in all round the top 2 or 3 feet of the structure under the eaves.

It will probably be necessary to fence around the barn if it is accessible to stock, or to provide wall panels from ground level to a height of 5 or 6 feet between the posts of the barn, one or two of the panels being removable.

ELLESMERE GUARDIAN PRINT