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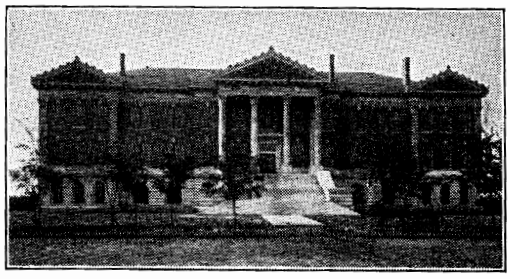
BERMUDA GRASS

AGRONOMY



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EXPERIMENT STATION, Stillwater, Oklahoma

BERMUDA GRASS

L. A. MOORHOUSE
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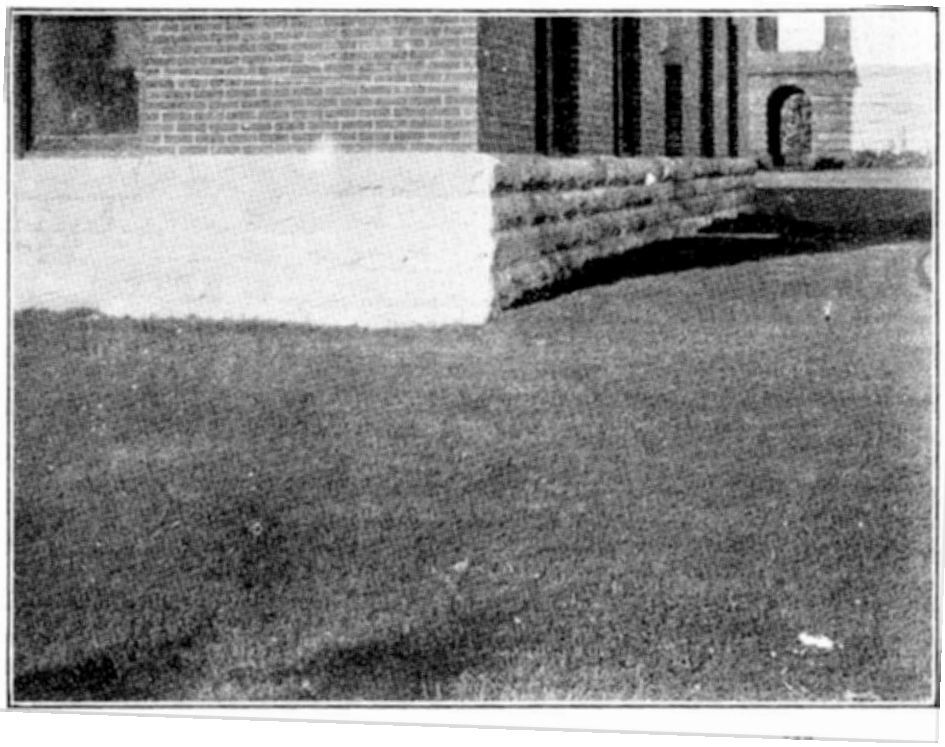
A Short History of Bermuda Grass

Bermuda grass is a well known plant in our southern states. It has been grown in the south for more than three-quarters of a century, and many are, therefore, familiar with the characteristics of this plant. According to the most authentic records this grass was formerly introduced from the tropical regions of the east, and it is not indigenous to the Bermuda Islands as the name might lead us to suppose. One of the earliest records of the appearance of this plant in America dates back to 1825, at which time it was found growing in Georgia. It was distributed to some extent at this early date; thus this grass has come to be of economic importance in southern sections. Bermuda grass seed was sown in Oklahoma in 1892, and a set was secured in the Experiment Station grass garden. The frosts of winter damaged the stand to some extent; however, a subsequent analysis of the plot led to the selection of some plants which survived these low temperatures. These plants when reset came through the winter in good condition, and a new growth started quite early in the spring. Later studies with regard to this feature have demonstrated the fact that this selection possessed a characteristic which has been described as hardiness.

The First Trial

In referring to the initial selections the following outline was made a matter of record in Oklahoma Bulletin No. 70, entitled "Hardy Bermuda Grass:" "Close observation of several different plats of Bermuda grass indicated that some of it withstood the cold weather better than others and began growing as early as April 1, even after a hard winter. In order to test this characteristic more carefully a large planting of roots was made early in July, 1904. Part of the roots were taken from a plat recently grown from seed. Other roots were taken from a plat that had been growing for at least ten years and



A DENSE BERMUDA SOD ON THE COLLEGE CAMPUS

which may have started from seed sown in 1892. Its source is not known, but it is certain that this grass passed through the freeze of February, 1899, when the temperature fell 17 degrees below zero with no snow on the ground.

"Little difference was shown in the growth of the grass from the different plats, and there was a heavy growth over all the field before frost. In the spring of 1905, after an unusually severe winter with a temperature of 18 degrees below zero, there was a marked difference. On March 29 all of the Bermuda grown from acclimated roots was green and growing vigorously. It soon covered the ground perfectly to the exclusion of crab grass. When roots recently grown from seed were planted, all the previous season's growth was killed; new growth did not start from the roots until May, and then only in patches. There was more crab grass than Bermuda grass on this plat throughout the season."

Distribution of Roots in Oklahoma

Bermuda grass roots have been sent out to a large number of districts within this State; and the reports which have come

from many of our correspondents are quite emphatic in their estimation of this grass as a type which is evidently well qualified to meet the needs of the Oklahoma farm. Although the grass crop of this State is usually not figured on a cash basis, it does bring in a large income in the aggregate, and it is not surprising that the newcomer should have many questions to ask concerning the adaptation of standard types to our conditions. Letters of inquiry which come to the Station office each week invariably contain a few questions on this subject. Within the past fifteen years a large number of the

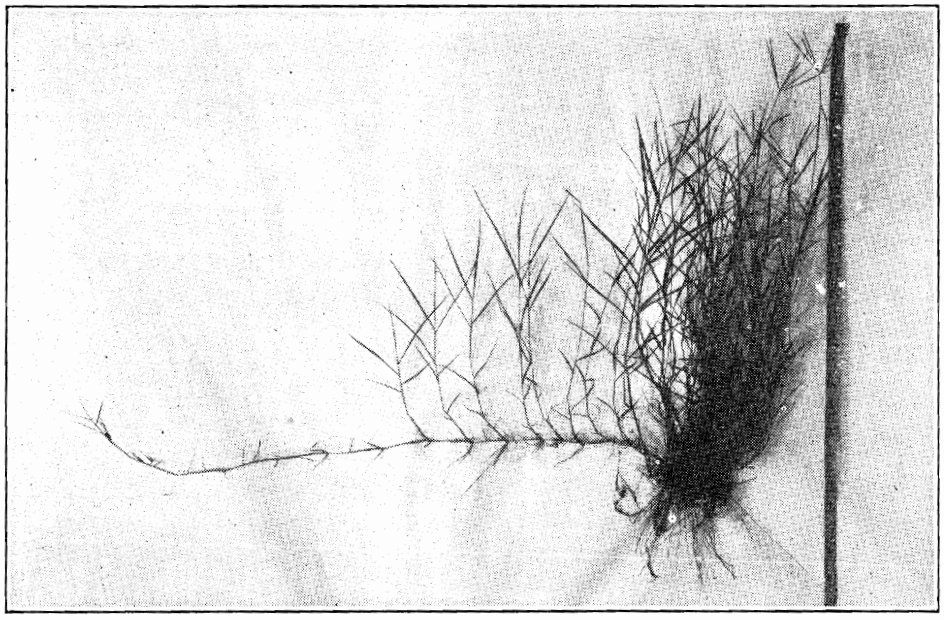
PREPARING BERMUDA ROOTS FOR SHIPMENT

standard grasses have been grown on trial plots at the Station farm, and it has, therefore, been possible to compare these types not only with Bermuda grass, but they have also been compared with our native pasture grasses. For the average upland soils of Central Oklahoma Bermuda grass is superior to such types as Kentucky blue grass, English blue grass or meadow fescue, and Bromus inermis or brome grass; after making these tests we are also firmly convinced that Bermuda grass has a wide range of profitable culture in the new State. In making field trials with the grasses which have been mentioned, it should be observed that some success might attend the efforts of the husbandman if these grasses were grown on very fertile soil, as the rich, alluvial river and creek bottom lands of the State; but we must remark that such areas are ideal for the culture of alfalfa, and, wherever this forage plant can be grown, it should be given the preference. The common grasses do

not return more than two cuttings per season at best, and the yield per acre would not exceed two or two and one-half tons; alfalfa, on the other hand, makes at least five crops per season, and will bring all the way from five to seven tons per acre on such land. The lesson which ought to be drawn from this discussion may be stated briefly. *Use the best land on the farm for alfalfa; the poorer sections can be set aside for the growth of Bermuda grass.*

Description of Plant

Bermuda grass is perennial in its habit of growth, and, when once started, it will continue to produce pasture or hay for many seasons in succession. It is a low spreading grass and makes a very desirable type for pasture purposes or for



A TYPICAL BERMUDA GRASS PLANT

lawns. The creeping stems take root at the nodes, and, under favorable soil conditions, they may extend some five or six feet from the original plant. The flowering stems are upright in growth and resemble in some respects the panicle of crab grass. Bermuda grass is propagated by root cuttings, and it may also be grown from seed. The supply of seed which is placed upon the markets of the south is imported mainly, and as it is produced under a different environment as compared with conditions in our own State, the plants which come from

seed usually lack somewhat in vigor. If the frosts of winter are severe, very few plants will come through. It is advisable, therefore, to start this crop by planting root cuttings, and as far as possible, material should be selected which is known to possess the hardy characteristic referred to in preceding paragraphs.

Types of Bermuda

The question has been asked, "Is there more than one variety or type of Bermuda grass?" The following inquiry came to the Experiment Station a few days ago: "Find enclosed a piece of Bermuda and let me know whether it is similar to the Bermuda on the Station farm. I am ready to put out twenty acres immediately and have set one acre with the type which is found in this section. The people from the south who are familiar with Bermuda inform me that I have a small growing variety and it will, therefore, not give as satisfactory results as the larger type. They also state that there is a yard Bermuda which has a spreading growth and is hardy the same as the taller type. I don't want to plant the wrong kind on my farm." An examination of the enclosed specimen led us to state that the sample appeared to be much finer in texture than the grass which has been under cultivation in this section for several years. Thus far no attempt has been made to study special types of Bermuda grass. We have the opinion that it *will be* possible to single out at least a dozen, or perhaps more than a dozen, types or varieties of Bermuda from the plantings which are located in this section; and if these types were cultivated on special plots, we are satisfied that distinct varieties could be developed within a very short period. One might make selections which would result in the production of a type particularly well adapted for hay; others similar to the sample which was submitted for comparison could be singled out for use on lawns, and still other types might be developed for pasture purposes. The Experiment Station expects to make a study of a large number of selections within the coming year.

Special Uses

While Bermuda grass is used as a pasture grass, and is also well suited for lawns, it may be grown for other purposes. In

rolling sections of the country large ditches or gullies are frequently washed out by the road sides, and if no attempt is made to check this erosion, the road bed itself may be cut to such an extent that it will be impossible to haul heavy loads over that portion. Bermuda grass may be used to check such washes. It may also be planted on very rolling fields. We have many field illustrations in this section which serve to

THE POND BANK SHOWN IN THE FOREGROUND IS WELL PROTECTED WITH A COVERING OF BERMUDA GRASS

show that continuous culture, whether it be with corn or cotton, results in such a disfiguration of the surface that many portions are finally discarded. Areas of this character should be devoted to pasture, and if planted to Bermuda, the soil will remain intact. Bermuda grass furnishes an excellent covering for pond banks, and it may also be planted in districts where the sand has a tendency to drift or blow. These are a few uses of this plant apart from the general economic features usually considered.

Preparation of Soil

Fields which are to be set to Bermuda grass ought to receive almost as careful preparation as in cases where the land is to be used for the production of Indian corn or cotton. Although this grass is a persistent and vigorous grower and

thrives fairly well, when planted on a poorly prepared surface, it will respond readily to good treatment. It can be grown on all types or classes of soil, from the sandy or open type down to the heavy impervious clay soils. If the soil is open in structure and does not have a tendency to bake, the plowing may be done two or three weeks prior to planting; the heavier soils should be plowed early in the season. A few severe frosts assist materially in securing a mellow surface or seed bed. A few days prior to planting the field can be worked down thoroughly with a disk harrow, and later, may be brought into level form with a smoothing harrow.

Time of Planting

In latitudes as far north as Central Oklahoma Bermuda grass does not produce very much pasture after the middle of November, and the plants lie dormant during the winter months. The new growth starts as early as the 15th of March, and if the spring is open, some pasture may be secured from the field during the latter part of April. Bermuda grass makes its best growth during the warm summer weather, and, for this reason, it is not advisable to plant roots much before the first of May. We prefer to do this work in May, at which time the soil is usually moist; hence the roots commence to grow and spread as soon as they are placed in the soil. We have already stated that it is not advisable to use seed. The planting season, then, opens about the first of May and the work may be continued throughout May and June. Fairly satisfactory sets have been obtained in cases where the roots were planted as late as July 15. The later plantings are not as desirable as the earlier plantings, for the reason that the dry summer weather checks the root in its growth, and a dense turf cannot be produced during the latter part of the season unless the weather is ideal.

Method of Planting

After the soil has been cultivated thoroughly it may be marked off in rows thirty to thirty-six inches apart and small pieces of Bermuda roots may be dropped at intervals of eighteen inches in the shallow furrows or rows. A corn marker or a cultivator with two heavy shovels set at the proper distance may be used to open the furrows. The roots should be covered

with a small quantity of earth. It is not a difficult matter to provide this covering either by using a hoe, or by moving the earth with the foot as the roots are dropped. If the seed bed is loose and will permit the rapid escape of soil moisture, this condition may be changed by using a roller on the field. Some growers make a practice of harrowing after the sods have been planted, but this operation has a tendency to bring many of the roots to the surface; hence they fail to grow. Others prefer to scatter the roots broadcast and disk them in; however, this method has not given as satisfactory results as the first plan. Bermuda plants produced from seed have in some cases made a fair showing the first season, but many of them lack vigor and the frosts of winter, if severe, will destroy the major portion of the crop.

Field Trials

The Experiment Station has conducted several field trials in order to secure some information concerning methods of planting. During the year 1902 four plats were set aside for this purpose and these plats were given special treatment.

Plat No. 1. The soil was given thorough preparation and was marked off in furrows three feet apart with a single shovel plow. Small pieces of Bermuda grass roots were scattered along these furrows and were covered with a small quantity of earth. A first class set was secured on this area.

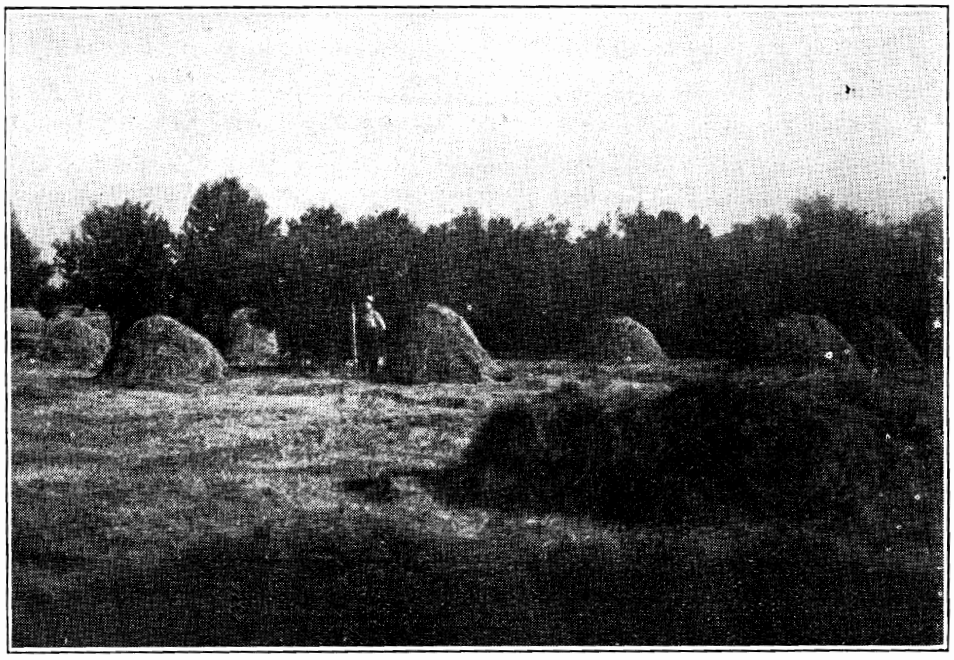
Plat No. 2. After the land had been plowed and was leveled with a smoothing harrow, Bermuda grass roots and sod were scattered evenly over the surface. These pieces were worked into the soil with a disk harrow. At the end of the growing season this plat contained only a partial stand.

Plat No. 3. The soil on this area was also well plowed and leveled down with a smoothing harrow. Bermuda grass seed was then sown as uniformly as possible over the plat and the surface was stirred slightly with a harrow in order to insure prompt germination. We failed to secure a set of grass on this area.

Plat No. 4 was given the same cultural treatment as No. 2 and was then planted to Kafir corn. Bermuda roots and sods were scattered over the surface and worked in slightly prior to planting the Kafir seed. The Kafir crop was cultivated in the

usual way throughout the growing season. A few spindling bunches could be singled out on the Kafir corn plat during the latter part of the summer.

Our conclusions are evident. The well prepared land which was properly planted gave a first class set. Poor treatment resulted in a partial stand and negative results were secured on the plat which was sown to Bermuda grass seed. This work was duplicated in part the following season and practically the same results were secured.

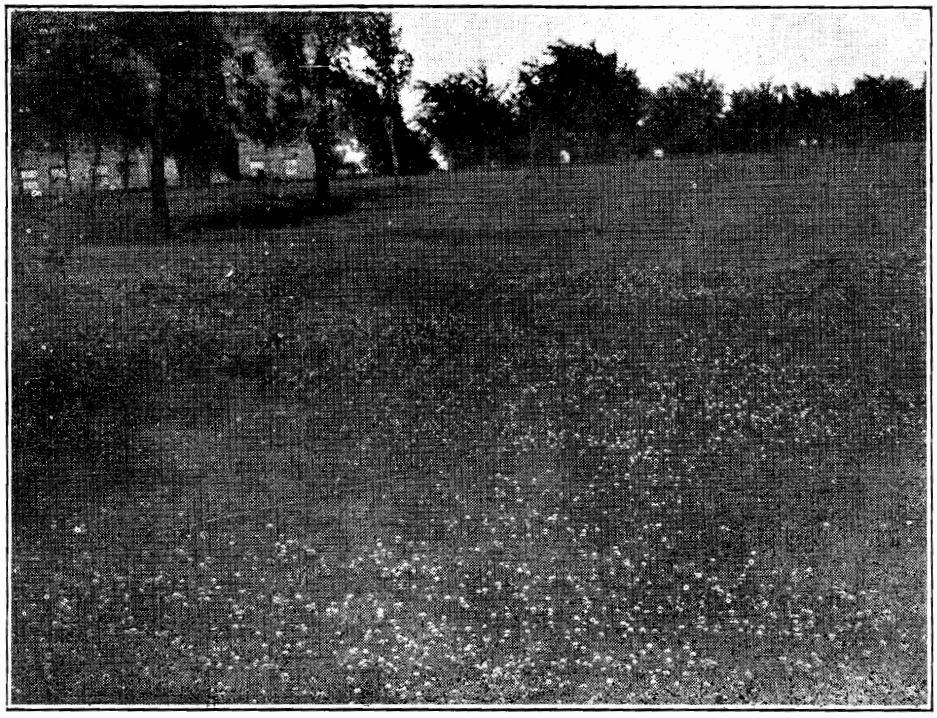


A CROP OF BERMUDA HAY IN PROCESS OF CURING

Caring For The Crop

It is doubtful whether the crop ought to be given any treatment the first season. Weeds will probably make their appearance, and it may be necessary to use the mower and thus prevent the formation and distribution of noxious weed seeds. Where the plants are set in rows three feet apart some cultivation might be given shortly after planting; it will require only a few weeks until the stems will spread to such an extent that cultivation will be impossible. In cases where the grass has been down for some four or five years it has a tendency to become sod bound and it fails to produce as much pasture or hay as it returned during the first season or two after setting. This

condition might be improved in part by using an alfalfa disk harrow. The latter implement pulverizes the surface to some extent, and such cultivation ought to open the soil partially at least. Air and water can, therefore, enter much more readily. The field may also be slightly improved through the application of small quantities of farm manure.



WHITE CLOVER IN A BERMUDA GRASS LAWN

White Clover and Bermuda Grass

Within the past two or three years white clover has been grown along with Bermuda on the College campus. We believe that this combination will prove to be very desirable. White clover belongs to the legume group, and it is, therefore, able through the medium of the micro-organisms associated with its root system to collect free nitrogen from the soil air. Nitrogen is an important element in crop production, hence in using a mixture of white clover and Bermuda some benefit ought to be derived through the collection of new supplies of nitrogen. Furthermore, the white clover makes its best growth quite early in the season; later in the season it lessens its growth and Bermuda furnishes a full supply of pasture. It has

been thought that burr clover might be used for the same purpose as white clover, but our tests have not proceeded far enough to enable us to state whether this type will be a success in central and northern Oklahoma.

Eradication

It has been stated that Bermuda grass should be planted only on those areas which are to be used for permanent pastures. There may be cases where it is expedient to plow up the grass after it has become firmly established. In such cases quite thorough treatment must be given. The soil should be turned to a depth of three or four inches during the latter part of November or early in December. The turf may remain exposed to the frosts of winter, and thorough surface culivation can be given in the spring of the year, A crop which will produce a dense covering or shade should be selected and planted. Cowpeas or sorghum answer well for this purpose. Bermuda grass does not thrive in the shade; thus the winter exposure and the check which is placed upon it during the summer months will assist in destroying the major portion of the crop.

Circular No. 31, issued by the Division of Agrostology of the National Department of Agriculture, contains the following suggestions with reference to the eradication of Bermuda: "The very qualities which render Bermuda so valuable as a pasture grass serve to make it an aggressive and pestiferous weed. On account of its tendency to spread and insinuate itself into the land where it is not wanted and to persist in fields which are to be used for other purposes, it has in many cases not been utilized to the extent that its good qualities would indicate. However, it can be eradicated from a field with comparative ease by proper cultivation. Since it will not thrive in the shade, it is only necessary to smother it out by some quick growing crop. The method recommended by southern agriculturists and which may be modified to suit conditions is to plow the land after the last crop of hay is cut, if the field is a meadow, or about this season if it is a pasture. Sow the field to oats, wheat, or to some thick growing crop. When this crop is harvested, plow the land immediately and plant to cowpeas. It is probably best to plant these in drills and cultivate

them until the vines meet, after which they will shade the ground and prevent the growth of Bermuda. Usually this treatment is sufficient to destroy the Bermuda completely, but if not, the process can be repeated."

Summary

Bermuda grass is a native of tropical countries; however, it can be grown as far north in this State as the Kansas line. A few samples of Bermuda grass roots have been distributed in southern Kansas.

Even if it is possible to start Bermuda by sowing seed, the crop should be propagated entirely by planting root cuttings.

Recent experiments appear to indicate that Hardy Bermuda grass, a type which has been developed by the Experiment Station, is a selection well adapted to Oklahoma conditions.

Many farmers are planting this grass not only for the purpose of preventing soil erosion on road sides and on very rolling fields, but they are also securing sets in order to provide the live stock of the farm with suitable pasture throughout the hot summer months.

Unless the soil is well prepared, the grower cannot expect to secure a complete stand if unfavorable weather conditions prevail.

During the month of May the rainfall is usually abundant, hence this is the best time of the year to plant Bermuda roots. A suitable temperature is an essential feature in starting this crop.

After the soil has been placed in good tilth, the roots or sods may be dropped in rows which are thirty to thirty-six inches apart; eighteen inches is a suitable distance for spacing the pieces in the row.

Grass which has been down several years may be improved by cultivation and manuring.

Reviewing the experiences of a large number of growers we find that this grass is regarded with favor in many widely separated districts.

A few observations with white clover which was sown on a Bermuda grass lawn have given us some reason to believe that these two plants can be used as a pasture mixture with profit.

Some feeding tests have been made with Bermuda hay; it compares very favorably with such standard types as timothy, or Kentucky blue grass.

Since this grass reproduces by underground root stems as well as by seed, some have thought that eradication would be impossible; however, by adopting the proper plan this grass may be destroyed, and other crops can be grown upon the same area. In planting roots the grower should confine this grass largely to areas which are to be used for permanent pasture.