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Cobalt

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COBALT

Its Use to Control "Wasting Disease"

By L. C. SNOOK, B.Sc. (Agric.), D.Sc., Animal Nutrition Officer

COBALT is one of the most interesting of the so-called "trace" elements. Particularly is this so to West Australians as the use of cobalt has permitted farmers to rear healthy sheep and cattle where previously this was impossible. Also, it was in this State that Filmer and Underwood carried out much of the fundamental work which led to the discovery of the vital importance of cobalt.

Minute traces of cobalt are essential in the diets of ruminants, that is in the food of animals which chew their cud. Only about one part of cobalt in every ten million parts of dry matter is present in average herbage but this seemingly insignificant trace **MUST** be present, otherwise sheep and cattle will waste away and eventually die. Strangely enough, non-ruminants do not need cobalt. Horses and rabbits, for example, will flourish on cobalt-deficient pastures where sheep and cattle are dying. Apparently, cud chewing animals need cobalt because this element is used by organisms which live in the rumen or paunch. These organisms seemingly build up certain nutrients vital to the welfare of sheep and cattle.

DENMARK WASTING DISEASE

Cobalt deficiency caused serious losses among dairy cattle in Western Australia when the coastal areas of the South-West were developed as Group Settlements after World War I. "Denmark Wasting Disease," as it was called, resembled "Bush-sickness" which had caused similar losses in New Zealand and which was then assumed to be due to iron deficiency as it was cured by feeding an iron ore called limonite.

Tests showed that limonite would cure Denmark Wasting Disease also, but Filmer (1932) deduced that it was not iron which was needed by the animal but something present along with the iron. Subsequent work by Filmer and Underwood (1935, 1936) clearly demonstrated that the cobalt present in limonite was the curative principle.

Limonite is still used as a cheap practical source of cobalt to prevent "Wasting Disease" but pure cobalt salts are equally effective and, when available, can be cheaper.

AREAS WHERE COBALT DEFICIENCY OCCURS

As far as we know, in this State cobalt deficiency is almost entirely restricted to the coastal areas, specifically to coastal country consisting of sand and limestone. Heavy clays and rich loams grow pasture containing adequate cobalt. Where alluvial silt has been deposited along creeks and estuaries cobalt deficiency is not a problem. The karri soils of the South-West appear to be an exception. In spite of their rich appearance and loamy texture the pasture growing in karri country can be seriously lacking

in cobalt. The cobalt status of some of the South-West jarrah-red gum country is also low.

Cobalt is not a plant food. This means that excellent pastures can be grown on soils deficient in cobalt. As occurred when "Wasting Disease" was a serious problem in the Denmark area, cattle and sheep could waste away in paddocks containing an abundance of green herbage of apparently excellent quality.

SYMPTOMS OF COBALT DEFICIENCY

Sheep and cattle receiving inadequate amounts of cobalt develop "Wasting Disease." This is an excellent descriptive name because, in the absence of cobalt, ruminants lose their appetite and waste away. Affected animals become weaker, develop "weepy" eyes, and if not treated will die within three months to two years after symptoms are first noted. Both sheep and cattle often become anaemic.

Symptoms become apparent at any time of the year but are most obvious in the spring and early summer when green feed is abundant. Milk production in dairy cows is seriously reduced and sterility is common. Where deficiency is only marginal, the animals may only appear unthrifty, that is, they will become lean, develop harsh dull coats, and give the appearance of suffering from internal parasites. This unthriftiness may only be obvious among young stock in areas where the adult animals seem to obtain sufficient cobalt for their needs.

This has been illustrated during the last two years where breeding ewes have been taken into coastal areas by dairy farmers. The ewes remained in good health but the lambs were weak at birth, developed "weepy" eyes, and lost the desire to suckle the ewes. The administration of cobalt solution per medium of a spoon quickly restored the appetite, followed by complete recovery.

Filmer and Underwood (1936) in their original paper, give the following hints to assist in determining whether a disease characterised by loss of condition is "Wasting Disease":—

1. Wasting disease occurs in the presence of ample feed, and is most common when the feed is green.
2. Horses are never affected with wasting disease.
3. Young cattle, especially those between six and 18 months, are more susceptible to wasting disease than mature cattle.
4. Sheep, and lambs especially, are more susceptible to wasting disease than young cattle.

By analysing the livers of suspected animals lack of cobalt in the diet can be determined. As very little cobalt is present in a normal liver, however, special care has to be taken to avoid contamination with foreign material when collecting livers for investigation.

"COAST DISEASE"

This is due to a dual deficiency of cobalt and copper. It occurs typically on the fine coastal sands and limestones developed from windblown shell. Light land further inland ("banksia sands") can also be affected.

Animals affected with "coastiness" generally die of "wasting disease" due to lack of cobalt before there is time for gross symptoms of copper deficiency to develop.

TREATMENT

Limonite Licks.—Selected iron ore (limonite) containing at least 500 parts per million of cobalt is still used as a cheap and convenient source of cobalt for stock. Limonite is the major ingredient of Denmark Lick.

The original Denmark Lick contained linseed meal and di-calcic phosphate along with salt, limonite and bluestone. These ingredients together made a palatable, general purpose lick.

For reasons of economy, however, the Denmark Lick now sold has been made more specific. It consists of two-thirds common salt and one third limonite plus copper sulphate. If sheep consume one ounce of this lick each week, or cattle one ounce a day any deficiency of cobalt or copper should be corrected.

The method of supplying this lick to stock will vary with circumstances. It may be placed in boxes or troughs in the field, so long as the lick is protected from rain. Sheep are generally fond of salty mixtures and will eat enough lick to satisfy their needs. In coastal areas, however, sheep sometimes ignore salt licks so the stock-owner must never neglect to make sure that enough lick is consumed by ALL the animals needing it. Particularly is supervision necessary where cattle are concerned. The mere placing of Denmark Lick in boxes is no guarantee that "Wasting Disease" will be prevented. The medicine has to be taken.

With dairy cows it is preferable to mix the lick with the feed given in the bails. Each cow then necessarily consumes the recommended amount.

At the present time (January, 1952) Denmark Lick costs £12 5s. a ton (ton lots) f.o.r. at the superphosphate works. The average dairy farmer will only need about four or five bags each year so that any likelihood of cobalt deficiency can be eliminated at a trifling cost.

If the farmer wishes to make up his own lick he can purchase limonite from the superphosphate manufacturers at about 25s. per bag of 180 lb. Where freight charges are heavy and stock salt is available on the property, the purchase of the ground limonite may be a worthwhile economy. The limonite can also be mixed with bone-flour or bonemeal where this is fed to cattle. One ounce of limonite a day will be ample for three cows or thirty grown sheep.

Cobalt Salts.—Until 1951, commercial cobalt chloride could be purchased for as little as 10s. a pound. This provided a cheap and convenient source of cobalt

for the farmer, one ounce containing about as much cobalt as is present in 100 lb. of Denmark Lick. Unfortunately, cheap cobalt salts are no longer available. This means that the farmer must necessarily use limonite as the source of the cobalt needed by sheep and cattle in coastal areas. Should cobalt chloride become available, however, it can be used to make salt licks or be added to the drinking water.

To prepare a salt lick one ounce of cobalt chloride should be mixed with each 100 lb. of common salt. This lick can then be used in the same manner as Denmark Lick. Generally it is most convenient to dissolve the weighed amount of cobalt chloride in water so that this can be sprinkled over the salt before mixing.

Where bonemeal or boneflour is being fed to cattle, the cobalt chloride may be mixed with this supplement. Alternatively cobalt solutions can be prepared for sprinkling on to meadow hay.

On certain pastoral properties on the North-West coast, the lack of cobalt and copper in the herbage has been corrected by adding the salts to the drinking water. One ounce of cobalt chloride will suffice to treat the water consumed by a thousand sheep in one week. In the absence of cobalt salts, pastoralists will necessarily have to use limonite licks. By including 4 ozs. of bluestone in every 100 lb. of lick a compound cobalt-copper lick can be prepared for use in "coasty" country.

SUPPLYING COBALT THROUGH THE PASTURE

In some countries, cobalt salts are added to the soil with the fertilizer. Although cobalt is not needed by the plant, sufficient is absorbed to supply the needs of the grazing animal.

This method of prevention is not recommended in this State, however, chiefly because of the difficulty in obtaining cheap water soluble cobalt salts. It has also been shown (Rossiter *et al.* 1948) that less than 1 per cent of the

cobalt used in the fertilizer is recovered in two years by the grazing animal. It seems much more efficient to feed the cobalt direct to the animals which need it.

SUMMARY

"Wasting Disease" in ruminants is due to lack of cobalt in the diet.

In Western Australia pastures deficient in cobalt are known only in the coastal areas.

Cobalt deficiency may be corrected by feeding limonite licks, by use of cobalt salts in the feed or drinking water, or by the application of cobalt salts to the soil.

Under present conditions the feeding of limonite is the cheapest and most practical method of correction.

Limonite mixed with salt is sold ready for use as a stock lick under the name of Denmark Lick.

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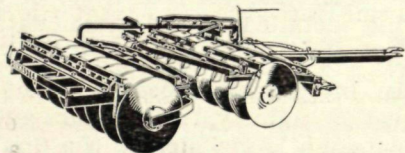
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GRADE HERD RECORDING Increase in Fees

THE Superintendent of Dairying (Mr. M. Cullity) has announced that from March 1, 1952, onward, dairy farmers whose herds are included in the Grade Herd Recording scheme will be asked to pay a fee of 5s. per cow, instead of 3s. 6d.

The increase in fees has been made necessary because of the steadily rising costs of the scheme. Since 1946 the South-West basic wage had risen from £4 19s. 7d. to £10 4s. 7d. and other costs had risen accordingly. Mr. Cullity pointed out that even at 5s. per cow, the farmer is paying less than one third of the total cost of the scheme, the balance of the expenditure being carried in almost equal proportions by the State and Commonwealth Governments. The cost of the State Government's contributions has risen from £2,826 in 1946-7 to £6,936 in 1950-1.



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