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# PHOTOSENSITISATION

by

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Fig. 1.—Swelling of the skin on a sheep's face and ears,  
due to photosensitisation  
From Onderstepoort Jnl.

**PHOTOSENSITISATION** is a type of sunburn. It results from the presence of certain foreign pigments in the skin, making it unusually sensitive to the effects of light (photosensitive); exposure to sunlight then results in a more or less severe inflammation of the skin (photosensitisation).

The parts affected are those white or lightly coloured areas which are not well protected by hair or wool, and which are most exposed to light.

## PLANTS RESPONSIBLE

There are a few plants that contain pigments, not usually encountered in the diet of the animal, which are absorbed by the gut and finally reach the skin causing it to become photosensitive. Notable examples are St. John's wort (*Hypericum perforatum*) and buckwheat (*Fagopyrum esculentum*), both of which contain red

pigments. Photosensitisation following the eating of these plants is well known, but neither plant occurs here.

On the other hand, the normal green colouring matter of plants, chlorophyll, may quite commonly give rise to photosensitisation under certain circumstances. During the process of digestion chlorophyll is changed into another pigment (phylloerythrin) which is an active sensitising agent. In the normal healthy animal phylloerythrin is excreted by the liver and does no harm. If, however, the liver is damaged by disease or by poisons



it is unable to carry out this normal function; the phylloerythrin then accumulates in the blood stream, is carried to the skin and sensitises it.

This is what happens in facial eczema, a serious disease which has been common in New Zealand on pastures dominated by ryegrass (*Lolium perenne*); the cause of the liver damage in this case has not been definitely determined but is believed to be a toxic principle, sometimes present in the ryegrass. In this State we have not uncommonly seen photosensitisation following liver damage from toxic plants:—"rattlepod" (*Crotalaria retusa*) the cause of Kimberley horse disease, lupins (*Lupinus varius* and *L. angustifolius*) and in one instance from wild radish (*Raphanus raphanistrum*). Other plants occurring here which are known to produce liver damage followed by photosensitisation are the caltrop (*Tribulus terrestris*), lantana (*Lantana camara*) and heliotrope (*Heliotropium europaeum*.)

In Western Australia photosensitisation is not common; most outbreaks have been in stock grazing on burr clover (*Medicago denticulata*), subterranean clover (*Trifolium subterraneum*), or on lush mixed pastures. The mechanism of the photosensitisation in these cases is not clearly understood. The outbreaks frequently occur when green feed first comes away in quantity after a dry spell. This observation led Bignold (1946) to suggest that under these circumstances the liver is temporarily unable to deal with all the phylloerythrin absorbed from the pasture; there being no apparent liver damage.

### OTHER CAUSES

Photosensitisation may also occur in poisoning with the following:—copper, phosphorus, carbon tetrachloride and phenothiazine. In certain rare disease conditions the production of abnormal pigments by the animal's own tissues may result in sensitivity to light (e.g. congenital porphyria in cattle). There is a congenital photosensitivity in Southdowns which results from an inherited derangement of the mechanism of phylloerythrin excretion by the liver; the organ shows no structural abnormality in these cases.

The above conditions are of more theoretical than economic interest to us here.

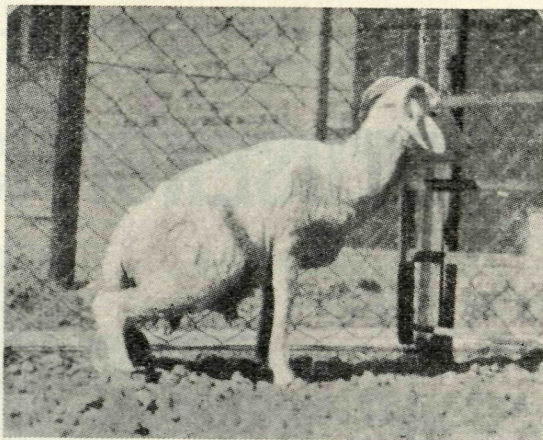


Fig. 2.—Sheep suffering from photosensitisation flinching in sunlight  
From Onderstepoort Jnl.

### ANIMALS SUSCEPTIBLE

Cattle, sheep, horses, goats and pigs are known to be susceptible, as well as some experimental animals and man.

Friesian and Guernsey cattle, which have white patches, are often affected. Other breeds may show lesions on the udder and muzzle.

White-faced sheep commonly suffer, and all sheep are susceptible after shearing.

In horses the "blaze" down the face is often scalded, as well as the body patches on piebalds and skewbalds.

Pigs are rarely affected, only one outbreak being recorded, in Large Whites.

### CONDITIONS UNDER WHICH PHOTOSENSITISATION OCCURS

A great amount of work has been done and is being done on the climatic, meteorological and pasture conditions under which losses occur. From a consideration of the causes, as outlined, it is evident that outbreaks are most likely to occur after the first rains, when greenfeed becomes available. The disease is seen here from June to September in most years.

If the liver is already damaged from the previous eating of non-lethal amounts of certain toxic plants, greenfeed plus sunlight may be expected to produce trouble at any time of the year.

As indicated, a great variety of plants has been associated with the occurrence of photosensitisation. In some cases, how-



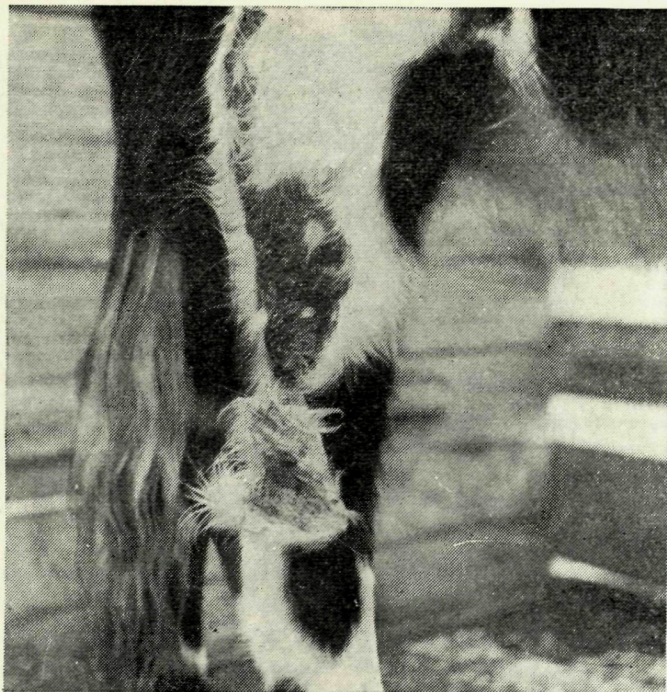


Fig. 3.—Sloughing of skin from the white portions of a Friesian heifer—a common result of photosensitisation

ever, the source of the trouble cannot be determined. It would appear that under suitable conditions, not yet fully understood, practically any green plant can produce the disease.

### SYMPTOMS

#### Sheep.

The animals first stamp their feet, shake the head and move about restlessly. The head is rubbed against fences. Pain may be so severe that the animal becomes violent and frantic. If the back is affected, as in shorn sheep, the animal flinches and crouches down.

Shade is sought, the head being thrust into bushes, or against fence posts or against other sheep.

Then, swelling of the affected skin appears, the ears thicken and droop, and the eyelids, face and lips enlarge. Such an appearance may be confused with swelled head in rams (see this Journal, September, 1945), but the latter condition is usually confined to rams and is invariably fatal.

Clear straw-coloured fluid oozes from the affected surfaces, and crusts form.

Rubbing of the part may cause abrasions. The ears shrivel.

In a few days the superficial layers of skin become dead and dry, and separate from the underlying layers. These are thereby protected from further damage and the irritation subsides. In two or three weeks the necrotic (dead) layers of skin peel off, leaving the new skin from which hair and wool grow again.

If the conditions are still suitable, a further scalding of the same area may occur.

These changes may or may not be accompanied by jaundice. If this condition is present, the mucous membrane of the of the eye will be tinged yellow.

There is severe loss of condition and in some cases death.

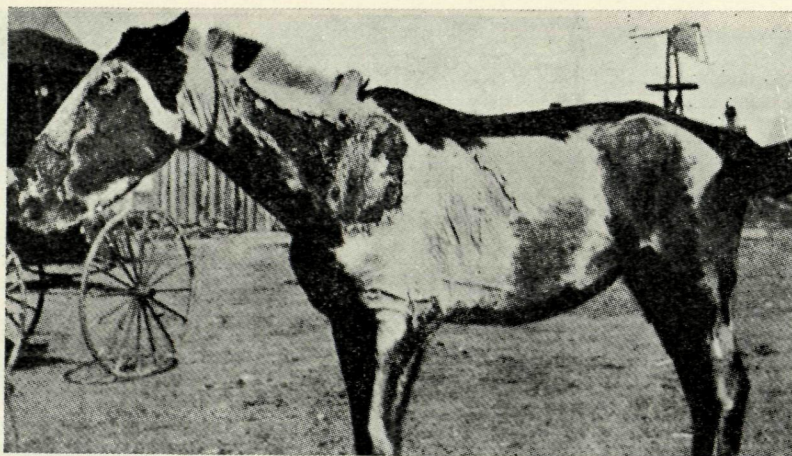
#### Cattle.

The symptoms are much like those in sheep. There is a sudden drop in milk yield, and the cow licks the affected parts, which include the udder, escutcheon, muzzle, eyelids and any white areas. Irritation is apparently less severe than in sheep.



Fig. 4.—Photosensitisation has caused lesions on the white areas of this skewbald horse

(Undalls Vet.  
Medicine.)



The lesions are remarkably discrete; for example a strip of white only half an inch wide may peel off leaving the surrounding dark skin unaffected.

If the udder is badly burnt, severe mastitis may supervene.

Jaundice may or may not be present.

Figure 3 shows a denuded area with the sloughed skin still hanging to the leg by a few hairs. The new skin is still covered by a scab.

### Horses.

In horses the symptoms are much like those seen in cattle.

### POST MORTEM

Animals dying or killed while suffering from photosensitisation show the skin changes just described. Also, in cases where liver damage has occurred, this organ is found to be tough, fibrous and in old cases shrunken. The surfaces are finely mottled (as in a normal pig's liver) and often green or yellow-green in colour.

If liver changes have occurred, jaundice will also be present, the tissues of the body generally being more or less coloured by the yellow bile pigments.

### TREATMENT

Suitable treatment will be obvious from a consideration of the cause. Any of the following measures alone or together, will be effective.

**Shade.**—Light from the sky as well as sunshine can cause irritation, hence tall trees do not give protection. Sheep and cattle may be confined in shearing sheds or barns in the day time and allowed to graze at night.

**Dry Feed.**—The trouble will subside if green feed can be removed from the diet.

**Protective Paints.**—In small outbreaks it may be found convenient to use a protective paint. Any dark coloured application may be used, which will not irritate the skin, damage the wool, be washed out by rain or be poisonous to an animal licking it.

A strong solution of Condyl's crystals, which darkens the hair or wool after drying, is suitable in many cases.

### PREVENTION

As the onset of the disease is usually sudden and often unpredictable, preventive measures are not very practical. The owner should be prepared to adopt suitable treatment at the first sign of the trouble.

### REFERENCE

Bignold, B. (1945).—J. Dept. Agric. West. Aust., 22: 317.



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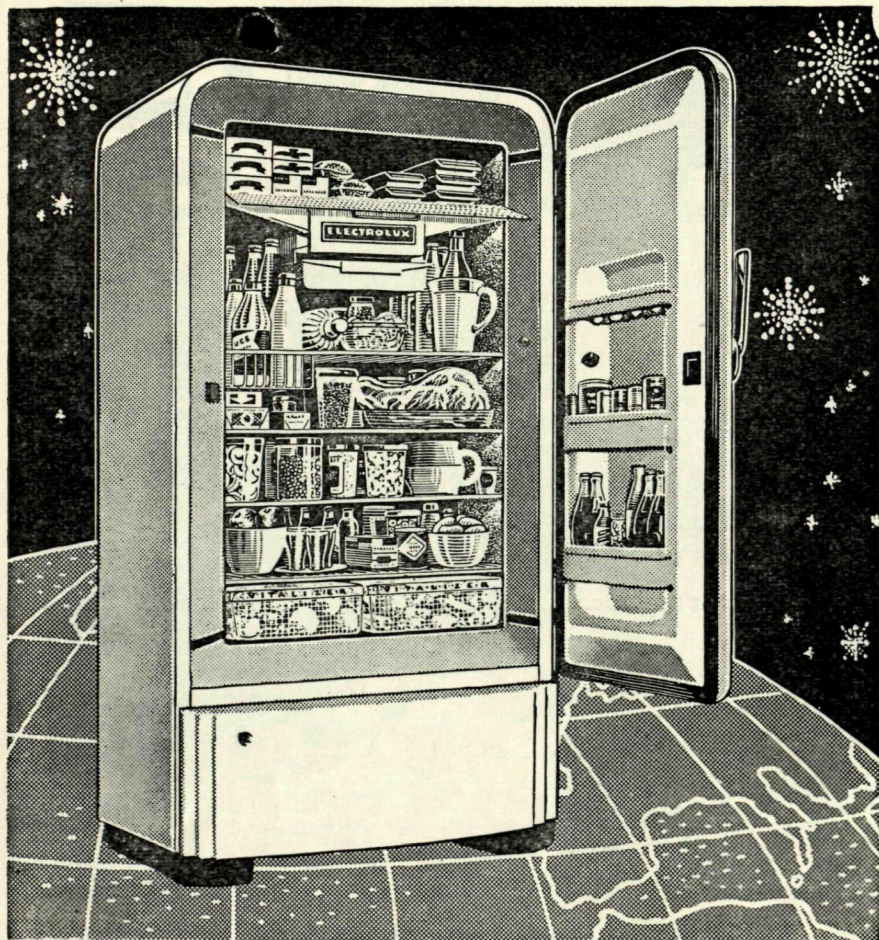
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