PLATE I.

GASCOYNE RIVER POISON OR TREE BALSAM (Euphorbia boophthona C. A. Gardn.): A—Plant nearly natural size; B—Leaf; C—Fruits showing the gland-bearing cup or "cyathium" and the stalked fruit; D—The same, natural size; E—Gland; F—Seed (much enlarged); G—Aril and basal portion of seed; H—Inflorescence.

(E, F, G and H much enlarged.)

Jimba Jimba, Gascoyne River.

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THE TOXIC SPECIES OF THE GENUS EUPHORBIA

The genus Euphorbia comprises nearly one thousand species, a large number of which yield a milky juice or latex. Some of these plants are familiar as garden plants, e.g. the Poinsettia, the Mexican fire bush, the "crown of thorns", and the strange cactus-like Euphorbia lactea that is a familiar object in our parks and gardens.

A large number of the plants are useful, both medicinally, and as fish and arrow poisons. Many native tribes of various countries use the latex as a cure for snake-bite; the Australian aborigines used desert spurge as a fish poison in calm pools and streams, and the peasantry of Southern Ireland used E. hibernia for a similar purpose.

Medicinally, E. pilulifera, a common weed in most tropical countries, including Northern Australia, is the well-known "asthma plant", used in asthma conditions and chronic bronchitis, the tincture being used in hay fever.

Some of the plants yield dangerous poisons, and in some the latex produces injury when applied to the skin, or if accidentally introduced into the eyes. Lindley states that E. phosphorea derives its name from the fact of its sap emitting a phosphorescent light on warm nights.

A common local weed, the petty spurge (E. peplus L.) is to be regarded as poisonous, and is stated to cause loss of appetite and cessation of egg-production in fowls. In 1912 Chapman and Petrie observed that the latex of Euphorbia peplus was formerly used by surgeons in the treatment of rodent ulcers, and carried out experiments to determine whether any radioactive materials were present capable of affecting a photographic plate. Their experiments showed that the latex, spread on a glass in a thin layer, caused an image to appear on a photographic plate at a distance of 1 cm. (about half an inch) in from three to seven days. The interposition of thick paper, thin aluminium foil or gold leaf did not interfere with this action, while glass and mica did. In this connection it is interesting to note that E. heterodora, a Brazilian species, is said to have been used with extraordinary success in the treatment of cancerous and syphilitic ulcers.

It is, however, with Euphorbia as a stock poison that we are concerned here. Although by far the greatest losses in stock at one particular time and place have been caused by Euphorbia boophthona and other species of this genus in Australia, we know very little of their toxic properties. The Gascoyne River poison has been responsible for the death of thousands of sheep and hundreds of cattle in the Gascoyne and Murchison districts, and other losses are attributed the desert spurge and the mat balsam.

Many poison plants contain toxic alkaloids which render them dangerous to stock at all periods of their growth. Examples are our pea-flowered poisons. Others, such as a number of grasses, may be valuable forage plants under normal conditions, but under certain other conditions may become toxic by reason of the presence of the plant of a cyanogenic glucoside which under these particular conditions is acted upon by an enzyme which produces hydrocyanic (prussic) acid. Examples are couch grass, kangaroo grass, button grass, crab grass, crowfoot grass (Eleusine indica), maize, and Sudan grass, as well as woolly-finger grass. There are many others. Poisoning with some is much more common than with others. Some years ago woolly-finger grass (Digitaria eriantha) was introduced in Western Australia where it has proved exceptionally hardy, but it has not been distributed on account of its toxic properties.

The toxicity of these grasses depends upon the amount of prussic acid present in the plant, which varies considerably according to climate and soil conditions, and also upon the rate at which the plants are eaten. Conditions conducive to the formation of fatal amounts of cyanogenic glucosides (or prussic acid) in the above mentioned grasses are: wilting and withering, especially during spells of hot dry weather; disease; frost; bruising or trampling; soils of certain composition, e.g. plants grown respiratory paralysis. Smaller doses cause accel-
PLATE II.

DESSERT SPURGE (*Euphorbia cluttioides* (Forst. f.) C. A. Gardn.): A—Upper part of plant, showing habit of growth; B—Leaves; C—Inflorescence and fruit; D—Seed (C and D enlarged).

Gascoyne River.

Icon. origin.
erated and depressed respiration, accelerated irregular and weak pulse, bright red mucous on good soil contain more prussic acid than those grown on poor soil, and fertilising with nitrates stimulates the production of prussic acid. The younger and more succulent the plants, the more likely they are to produce lethal amounts of prussic acid. During the process of desiccation most, if not all, of the prussic acid disappears from the plant. The more rapid the drying, the more rapid the loss of the prussic acid.

It is important to remember that prussic acid is so rapidly eliminated from the system that large doses of these harmful plants are needed to cause ill-effects. Stock habitually grazed on these plants may not be affected, while hungry travelling stock placed on the same pastures may succumb to the poison.

The statement concerning cyanogenetic grasses is taken from Steyn’s "Toxicology of South African Plants", since it is recorded there that in some species of Euphorbia the plants are cyanogenetic. This has already been demonstrated in the case of Euphorbia Drummondii, and strongly suspected in both E. boophthona and E. clutioides. There are probably other species implicated. It will readily be appreciated that when plants become toxic only under certain conditions these only imperfectly understood—feeding trials may give negative results.

It should be remembered that it was only when several tests had been made that E. Drummondii was found to contain prussic acid. This has not yet been demonstrated in Gascoyne poison and desert spurge, but the effects of ingestion of these plants under certain conditions would indicate that these plants are cyanogenetic.

**Symptoms of Poisoning by Prussic Acid.—**

According to Steyn, the symptoms vary according to (1) The size of the dose, (2) The time in which the amount is taken, and (3) The mode of application. Prussic acid is a poisonous substance which acts extremely rapidly, large amounts causing death almost instantaneously with spasms and membranes which later turn purplish in colour; increased salivation and frothing at the lips, muscular twitchings, shivering, staggering, falling down, dilatation of the pupils, alternate contraction and relaxation of the muscles (especially of the fore-legs), pronounced bloat, and death due to respiratory paralysis. The heart continues to beat for some time after respiration has ceased. Symptoms in human beings closely resemble those in animals. There are no pronounced post-mortem appearances, but after opening the body, there is a smell of bitter almonds from the opened rumen and body cavities.

In the case of Gascoyne River poison, stockman state that the animals most affected are **hungry travelling stock**, in other words animals that are most likely to devour such plants at resting spots such as water points. Mortality occurs amongst such animals in dry weather (see remarks on dry weather and wilting above), usually in seasons when feed is scarce, and according to some stockmen, in the morning following one or two previous heavy precipitations of dew. Losses occur at any time of the year, but mostly between July and the end of October.

The symptoms in the case of Gascoyne River poison agree substantially with those described for mat balsam at Ariah Park in New South Wales.

With mat balsam poisoning a distinct swelling of the head and neck of the affected animals has been observed, but these are probably caused by some other poisonous principle in the plant. The losses experienced are almost invariably among hungry travelling stock which eat considerable amounts of the plant, usually in a wilted condition at the end of a dry day, and usually in places where the plants are common. The symptoms recorded at Jimba Jimba are not incompatible with those of prussic acid poisoning.

The third plant—the desert spurge—(E. clutioides)—is closely related to Gascoyne River poison. It is so often suspected of poisoning stock, and so widely recognised amongst stockmen as a sheep poison, that it is probably toxic under the same conditions that mat balsam and Gascoyne River poison are toxic to stock. In any case, the deviation of the stock route on the Gascoyne River to an area free from the poison has resulted in freedom from further losses.

The illustrations which accompany this article should prove sufficient for the recognition of the three plants concerned. It should be stated, however, that they contain a milky juice or latex which exudes from the green plant when the stems are cut or broken, and the seeds or seed-pods are three-lobed, or of three compartments each containing one seed. The fruit is surmounted by a three-cleft, usually purple short style, and the ripe fruit splits at maturity into three parts, each containing a seed.

**1. GASCOYNE POISON, OR TREE BALSAM (Euphorbia clutioides (Forst. fil.) C. A. Gardn.)**

The plant is an annual 12-15 inches tall, with a stout roof and erect stem, usually grey-green in colour with widely spreading branches, green, pointed toothed leaves, and pendulous fruits. The ripe seed is covered with elongated white wart-like processes, and at the top where the seed is attached to the placenta, there is a broad hat-shaped aril separated from the seed by a slender stalk. The plant occurs in loamy or silty soils from the Gascoyne River and Daurie Creek northwards to the De Grey River. It is most common along the Gascoyne River and its principal tributaries, the Lyons, Arthur and Wyndham Rivers, and Daurie (Dairy) Creek. It is also found along watercourses as far south as Byro Station, in the vicinity of Meekatharra and eastwards to Laverton. North from the Gascoyne River it is scarce, growing in occasional patches, the largest seen being at Peedamullah homestead, and near Mount Herbert in the Hamersley Range.

**2. DESERT SPURGE (Euphorbia clutioides (Forst. fil.) C. A. Gardn.)**

Somewhat like Gascoyne River poison, but with slender erect stems and leaves, the leaves narrow, larger and blunt, without, or with indistinctly toothed leaves. The pods remain more or less erect. The seed is granular or rough,
PLATE III.
MAT BALSAM (Euphorbia Drummondii Boiss.): A—Plant showing prostrate habit and strong rooting system (slightly enlarged); B—Leaf; C—Branchlet with leaves and fruits; D—Fruit and cyathium (cup); E—Stamen; F—Dorsal view of carpel; G—Seed.
Icon. origin.
and the aril is seated on the seed. It inhabits sandy spots over the greater part of tropical Australia extending in Western Australia southwards to the 28th parallel of latitude in the east, and as far south as Lake Barlee and the latitude of Geraldton towards the west. It is usually found in sandy areas.

3. MAT BALSAM  
( *Euphorbia Drummondii* Boiss)

This plant is a prostrate herb, probably perennial, the stem and branches being typically close to the ground, very rarely short and erect, and typically pink or reddish in colour. The leaves are small (usually less than a quarter of an inch in length), and ovate to ovate-oblong, entire or minutely toothed at the tip, often red-margin. The fruits are very small (less than 2 mm.) and the pale brown seeds are angular, oblong, slightly rough or pitted, and there is no aril.

The plant is to be found almost anywhere in Australia, showing a preference for sandy silty soil in depressions or watercourses, or in the red desert sand of the interior. It is not common in South Western Australia except in cleared country, usually along watercourses.

### FREE SERVICE TO FARMERS

Do you know that the Department of Agriculture provides a comprehensive service of advice and technical assistance to farmers, free of charge?

When in need of advice, get in touch with your District Officer whose name and headquarters township will be found in the list of Departmental personnel on Pages 434 and 435 of this issue.

These officers are there to help you and will make personal visits to your property to assist with on-the-spot advice. In addition, they will, where necessary, arrange for the services of specialist officers—all without cost to you.

### BUTTERFAT RECORDS BROKEN

New records for junior four-year-old cows were recently created by "Grass Vale Golden Cream 37th", a Jersey owned by Messrs. R. H. Rose & Son of Burekup. By producing 10,165 lb. of milk (average test 6.92%) for 704.3 lb. of butterfat, "Grass Vale Golden Cream 37th" set new State records for junior four-year-olds in the all-breeds class; for the Jersey breed and for West Australian-bred animals.

This animal won second prize at the 1951 Perth Royal Show as a three-year-old and first prize as a four-year-old in milk last year. She is due to calve in August to "St. Magnus Lactiflora's Sultan".

The previous all-breeds and W.A.-bred records were held by Mr. A. W. Padbury's Guernsey cow "Koojan Ace's Jewel 2nd" whose production was 13,169 lb. of milk for 683.5 lb. butterfat.

The record for the Jersey breed was held by "Trelawney Golden Ray" owned by Mr. J. C. Bushell. This cow gave 603.8 lb. of butterfat.

All yields quoted were in the standard period of 273 days.

### STUD DISPERSED

It is to be regretted that since the announcement of the record-breaking achievement, the famous "Grass Vale" Jersey stud has been dispersed. "Grass Vale Golden Cream 37th" was sold for 300 gns.—a record price for the breed in Western Australia—to Mr. D. G. Jarvis of Balingup and the imported bull "St. Magnus Lactiflora's Sultan" was bought by H. R. Bonython, the South Australian breeder from whom he was originally purchased. His purchase price of 350 gns. was another State record for a Jersey bull.

All Jersey enthusiasts will regret the passing of the "Grass Vale" herd which was the result of some four decades of skilled breeding and selection from carefully-chosen stock. Breeders from all over the State and from as far afield as Tasmania attended the sales.

"Grass Vale Golden Cream 37th"  
—Photo. Elder's Weekly.
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