

October 15. Vereeniging. Met in the morning by J. Burt-Davy, who took me out to his ranch.

The Vaal river runs past the town. It is a beautiful, deep stream, 100 yards across, lined with weeping willows. On the Orange Free State side there are great forest plantations,--4000 acres and 4-5 million trees. The Vereeniging estate covering 40 miles of river front has planted out these trees. The best trees are Pinus pinastus, P. insignis, Quercus pedunculata, Eucalyptus veriminalis, E. emaladora (?), E. rostrata, and E. sideroxylon.

The principal apples in this section are the Onehemuri, Roman Beauty, White Winter Pearmain, Jonathan and Cleopatra. There are about 4000 trees and they returned about L5000 of income last year.

The forest trees of this estate are 20-25 years old.

It is typical high veld, a great grassland interrupted by nothing in the way of tree vegetation. It is a corn and cattle country. Each cow is accompanied by two egrets which pick off the ticks, or pick them up when they fall on the ground. They are handsome birds. Might do well to introduce a few of this species into our cattle-tick country in the South.

The water supply here is unusually good. Wells are about 160 feet deep, but once bored the water comes to within ? feet of the surface. Burt-Davy has three wells yielding 60,000, 30,000 and 1000 gallons per day respectively.

This soil is very deep, usually a red sandy loam, but often a gray or chocolate in color. It is usually 6-8 feet deep. The surface is rather dark for a foot to 16 inches, but then gradually changes to reddish or

yellowish iron stone at 3-5 feet.

One of the most successful windbreak trees is Eucalyptus veriminalis, which grows very rapidly, -12 feet in two years. This tree should certainly do well in Texas.

Butt-Davy's ranch is ten miles across. It is not regarded as an abnormally large ranch. Land sells at about four pounds per acre and will grow 20-30 bushels of corn per acre. It will graze 1 head of cattle to 3 acres.

Among the trees which will stand a temperature of 18-20° are Eucalyptus melevdora and E. sideroxylon, and E. rostrata.

The worst weeds, that is, the first stage in the succession, is the Mexican marigold, Tagetes minuta, which came in during the Boer war in hay imported by the English from South America. With this there also occurs an Erigeron cannadensis. The second stage in the succession is Gnaphalium, and grasses. The third stage Eragrostis, which the final stage is Themeda. All stages are relatively rapid, 10 years or so sufficient to bring about the change. In many instances Bermuda grass is the permanent grass.

The high veld, tall grassland type, resembles very much the western edge of our tall grass area. Themeda has the color and general appearance of Andropogon scoparius in Kansas and Nebraska. ~~That~~ there ^{is} ~~are~~ a large number of other grasses, chief among which are Eragrostis and Cymbopogon. The term "sour veld" or sour grass" is applied to any grass not eaten by cattle, while the "sweet veld" or "sweet grass" is applied to grass eaten by cattle. Of the introduced grass Bermuda, Kikuya, Bouteloua gracilis, and Bubilis dactyloides seem to do well.

There are no shrubs. At least there are none above the ground, but

there are a good many that are burned to the soil surface each year and perpetuate themselves by perennial roots. Zizyphus is one of the most abundant and prominent of these. Many of the plants which occur on the high veld push through soon after rains begin, and some of them before. Lasiosiphon linnifolius is prominent here. The following are the more important grasses: Sweet grasses eaten by cattle, --Themeda triandra and Eragrostis curvula; those not eaten by cattle are Rottboellia compressa L., --vley grass; Urelyt^fum squarrosu^m; Trachypogon polymorphus (is an Agropyrum-like grass); Elionurus argenteus, a turpentine-flavored grass; Andropogon ceresiae formis; and Cymbopogon marginatus. The last is one of the larger thatch grasses.

It freezes on the high veld but not very hard. Spineless cactus can be grown. This region suffers from terrific drought. They are now approaching the end of one of these long drought periods. The grasses have made a slight start and there are a few other things above the soil surface. But the conifers are dying rapidly as a result of drought. Pines and junipers seem to die out at about the same time and in a similar manner. In most cases they are in competition with the grasses and die very rapidly. Even very large trees lose all their limbs simultaneously.

While the rainfall is heavy, at times it is very uncertain. This year the average on Burt-Davy's ranch is as follows: January, 5.52, Feb. 4.23, March 2.70, April 1.03, May 0.42, August 1.19, September 0.59, October 2.99, November 6.07, December 5.49 inches. In 1918 August at 3 inches, and in 1917 November at 14 inches. The average for 20 years is about 28 inches, but in 1918 they had 59 inches of rain in 9 months, or 41.9 inches in 5 months, --November to March.

October 16, 1919.



El-8. A general view of the grassland, showing Themeda triandra, Eragrostis curvula, Cymbopogon marginatus. The mountains in the background are covered and Acacia horrida.



El-9. An old termite hill with Cynodon incompletus, and at the edge of this Themeda triandra and Cymbopogon marginatus.



El-10. A termite hill, typical of the high veld. The bird droppings, which is characteristic of all these termite hills, are largely egrets.



El-11. Succession on the high veld. The first stage is a weed stage,--Mexican marigold; the second a light weed stage,--Rhigozum; third, Bermuda grass; fifth, Themeda.



El-12. Similar to El-11, but *Eragrostis lehmanniana*.



Fl-1. Typical Themeda high veld, with Burt-Davy's ranch in background, surrounded by eucalyptus, pine and other plantings.



F1-2. Making reims. Raw strips of oxhide are wet with hot lard or tallow and twisted up. When thoroughly twisted they are allowed to unwind and twist in the opposite direction. After five days of twisting they are dried and used universally where oxen are handled.



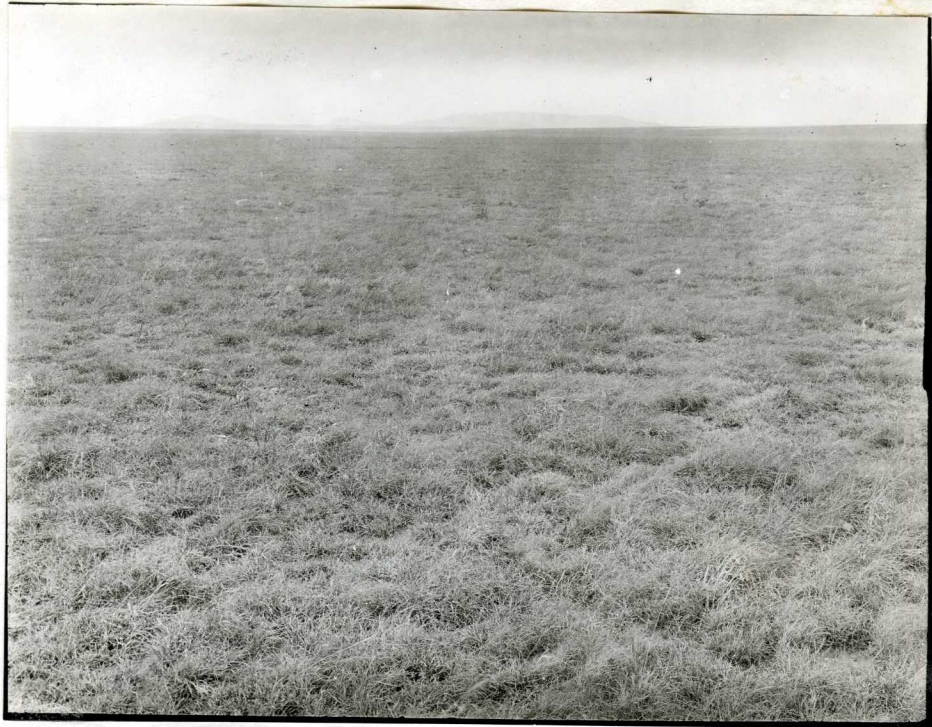
F1-3. As F1-2.



F1-4. Burt-Davy's ranch house with *Themeda* and *Cymbopogon* in the foreground, and *Pinus insignis* in the back.



F1-5. A succession due to an old hay stack and the trampling done by cattle about the stack. *Cynodon incompletus* on the trampled area, with *Themeda triandra* at the right and in the back, and *Eragrostis curvula* more abundant on the land previously occupied by the stack.



F1-6. Themeda triandra, Cymbopogon marginatus, Acalypha peduncularis,
Vernonia crassiana.



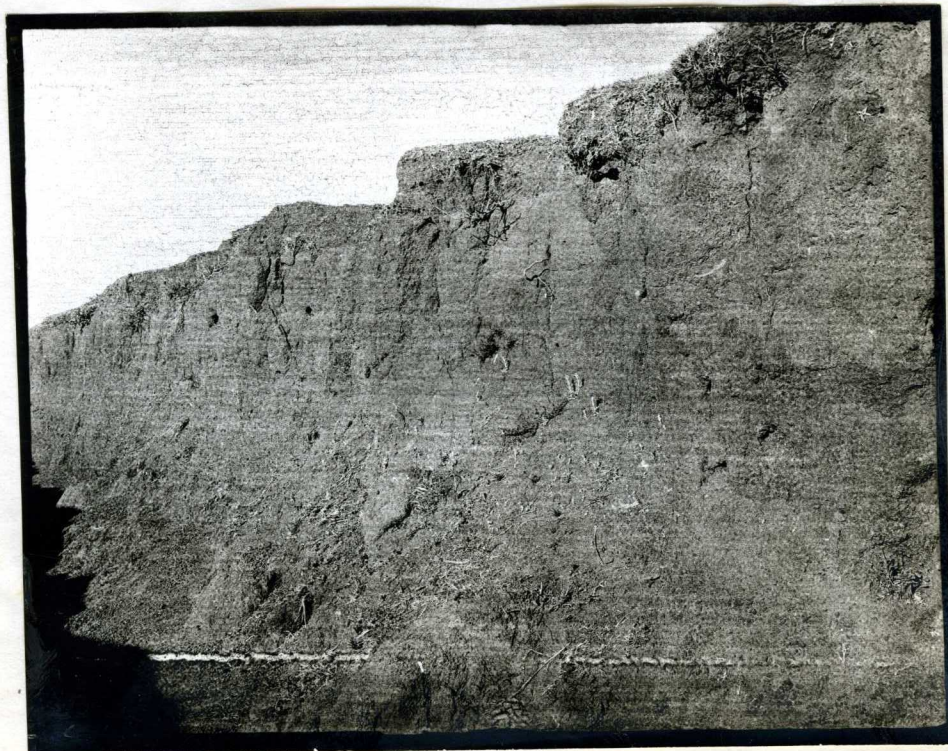
F1-7. Closely-grazed Themeda, and Eragrostis curvula, -which constitutes the
lighter patches. Also an occasional plant of Cymbopogon.

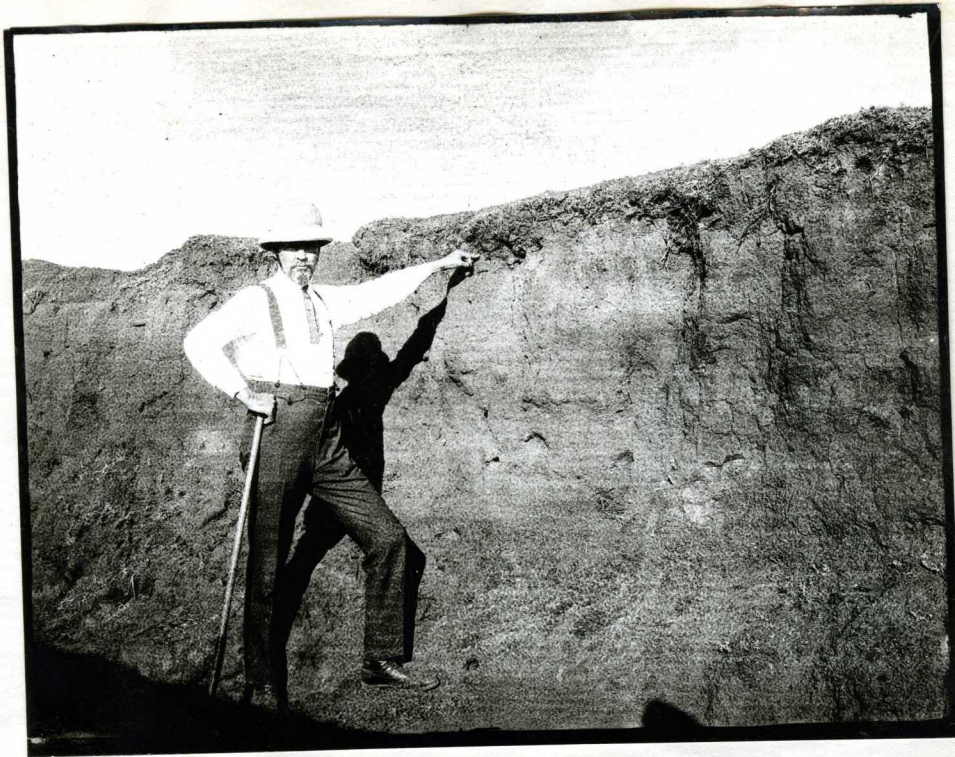
Fl-8.

A profile of soil on the high veld. The surface is thrown up about 8 inches above the actual soil surface. Soil sample #10, surface foot,--chocolate; sample 11, at second foot,--becomes more reddish. This red character of the soil increases and it becomes pebbly with ironstone at about 3-5 ft. Sample 12 was taken near the top of this area and sample 13 near the bottom.



Fl-9. A general view of the soil of the high veld.





F1-10. Similar to F1-8, showing Burt-Davy.



F1-11. A grass fire on the high veld, chiefly Eragrostis plana.



F1-12. A general view. Shows Cynodon dactylon, and Eragrostis plana,--the bunches.



G1-1. Eucalyptus veriminalis, 4 years old, 6 inches in diameter, 2 years old in the back.



G1-2. A dipping tank thatched with Cymbopogon marginatus.

In the ranch garden one of the principal plants is the winter rhubarb.

Left Vereeniging at 6 p.m. for Johannesburg.

General notes:-- At Pretoria Dr. Phillips gave me five ears of corn representing types grown by the Basutos and collected and sent in by Mme. Dieterlen. These ears were sent in in order to enable the types to be studied here:

S.P.I. 48828,	<u>Zea mays</u> ,	a waxy type, somewhat mixed.
" 48829	"	Yellow Flint.
" 48830	"	White Flint.
" 48831	"	A White Dent.
" 48832	"	A small waxy type, apparently pure.

At Johannesburg I secured seed of a few varieties from local growers:

S.P.I. 48827,	<u>Zea mays</u>	A bread mealie, eaten green as is our sweet corn. This corn is grown on the high veld.
" 48826	<u>Vigna sinensis</u> ,	The standard cowpea of the high veld.
" 48815	<u>Eragrostis abyssinica</u> ,	a teff, the staple hay crop of the high veld.