



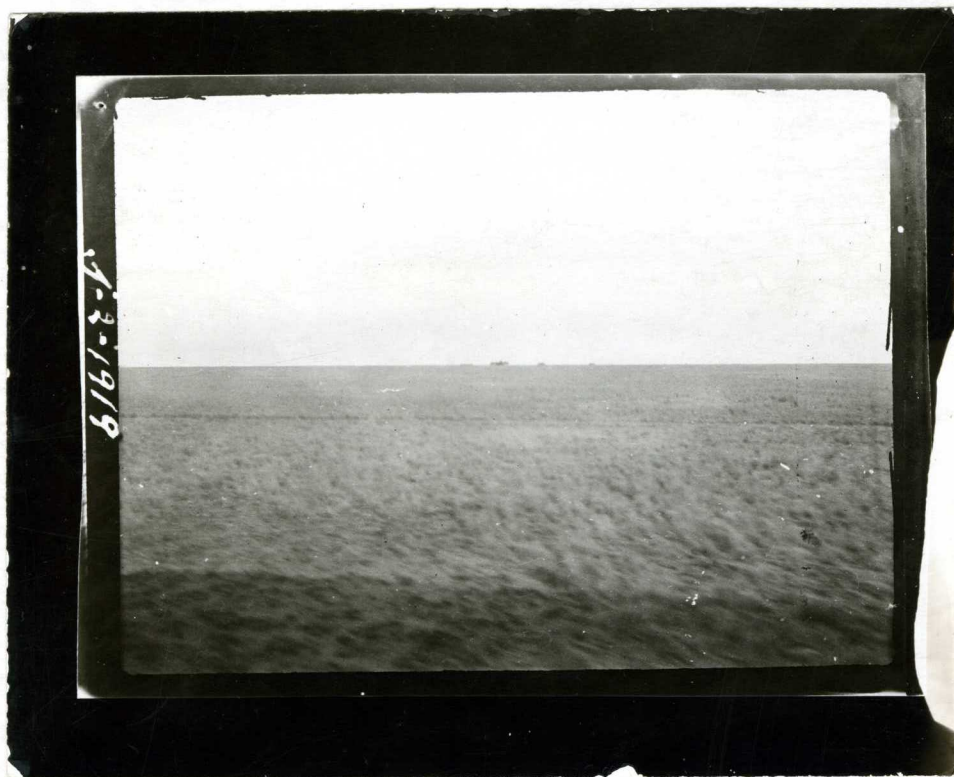
J-1. Desert grass recently burned over. This grassland looks a little better than the Oregon bunch grass type..

We arrived at Vryburg just about dark. Vryburg is the center of an agricultural and stock country extending southwest to Kuruman. The annual rainfall here is about 25 inches and the length of the rain period about 65 days. There is some good hunting on the Kalahari side. The rainfall at Kuruman averaged from 1902-10 about 18-9/10 inches, sufficient for dry farming. There will probably be ultimately a railway line leading from Vryburg through Kuruman to Prieska.

Vryburg is an attractive little city with abundance of street trees.

October 1, 1919. Vryburg to Mafeking. Just beyond Vryburg we passed through a cut with about 4-6 inches of chocolate soil on the surface and red rock for about 8-10 inches and a light lime subsoil below this point. We then passed out on to high land

with grass and only an occasional bush. Fire, which sweeps through the grass regularly, is probably a prime factor in keeping out grass and acacia. The soil is again red and the grassland a reddish bunch grass, habit similar to that of Andropogon. This grassland is Themeda trianda. The termite hills are not of the form previously seen--low mounds--but stand up like stakes and are about 2-4 feet high. There has been no rain here for many months.



j-2. Beautiful bunch-grass country. Farm house on the horizon in the back.

Devondale. A soil apparently not as deep. Lime rock near the surface. In places there are more brush and trees, but this is a grass country with wind mills and ranch houses. We are apparently on the very edge of the acacia desert grass. Possibly

this should be thrown with the tall grass of the east. The type is intermediate, reminding one somewhat of our *Aristida* and bunch-grass areas which occur at the western edge of the prairie or the eastern edge of the high plains. On the shallower or eroded soil trees become more abundant. Both the mound-shaped and the stake-like termite hills are noted along here. I have seen no cultivation this side of Vryburg. This seems on this account to be a white community, since the natives usually cultivate the land, while the whites rely on cattle.

Curnow. A great grass county, with stubble field of corn as evidence of cultivation. Brush is distributed very unequally here. There are large pure grass areas, also areas of brush, especially on the slopes of hills.



j-3. Probably pure *Themeda* grassland.



j-4. On the opposite side of the track similar type, the grass just burned off.

Kameel. Here a lot of thorn and a prominent bush not thorny. There is a greater variety of vegetation than in most of this country.

Y-7. Shows acacia in the foreground and other bushes, - Themeda grass, Eragrostis and Sporobolus are also abundant. Only a few of the acacias are now coming into bloom and these have yellow flowers.



y-8. similar to y 7.



y-8



Y-9. Shows a more upright acacia at the right. This type of growth is exceptional in acacias (see Herb. 224). It is just coming into leaf.

A short distance beyond we passed alternating areas of pure Themeda grassland and of Themeda with scattered thorn. This is probably acacia desert grass or acacia tall grass,--could be classified as either. There is very little farming done here.

Doornbult. Is above Wirsing. Native huts. Natives again. They seem to be pastoral also. The country is badly overgrazed and looks very desert like. Probably is as good as any. (Goats may not change the climate but they certainly can produce a desert).

Maribogo. Center of an overgrazed area. Beyond more brush and good grass, but the soil gray. There is also camel thorn and white thorn. About 1/10 of the trees are coming into leaf and there are also occasional areas plowed by the natives. We then passed through a large area similar to that photographed

at Kameel.

Kraaipan. Elevation 4175 feet. A stock center, overgrazed, and a great deal of acacia (Herb. 223). The soil here is gray, especially the lower areas. Further on the soil is again very red, trees small and low, much of the country burned over. Grass seems to be more abundant on the deep red soils and brush on the light soils, which are probably shallow.

Maritzani. Elevation 4375 feet. Brush on the shallow soil, grass on the deep red soil. The bulbs are just pushing their spikes out of the ground at this time. Here there are alternations from grass to acacia and to acacia and brush land. The shallow soil is 1/4 feet deep. Has dwarf shrub vegetation. As soon as you reach the deep soil good acacia grass land is found. The grass is similar to our wire grass or bunch grass. It seems likely that the red soil here is aeolian. It is very deep but of no structure and could not have been formed in place except by gradual addition of material from above. The water penetration could not be sufficient to make this profile as uniform as it is. It is a wonderful soil. The plant roots extend down to about 3-5 feet. On the shallow soil the penetration is occasionally only 1 foot, but the trees here have a very wide root spread.



j-5. General view. Shows acacia grassland. The highlands are red. The low lands and southwest slopes either shallow or darker.

Arrived at Mafeking about 1:30 p.m. Elevation 4194 feet.

(Note on the Kalahari, from information obtained from Mr. A. Renard: From Mafeking west to the Kuruman berg, is an excellent grazing country, a country of farm land similar to Mafeking. This country is shown by the villages to be among the best cattle country about here. Kuruman is far superior to Kimberly. He confirms the idea that the Kalahari is only uninhabitable because of the lack of surface (drinking water). It is a very productive grassland. Mr. Renard is a ^{commercial} /salesman and had just returned from a four-months' trip through that section by ox team.

There is a large native stad at Mafeking, situated

about one mile out, containing a population of about 3,000. The white population is about 2297. The country is rich grassland with scattered trees of Acacia giraffae and Acacia _____ Herb. 223. Zizyphus and a number of other trees are prominent. The grasses are mostly short, 1-2 feet, or occasionally 3 feet in height. The principal grasses collected at this time are under Herb. numbers 233-39, as follows:

Aristida rangii,
Capriola _____,
Hyparrheinia _____,
" _____,
Eragrostis _____,
Themeda quadrivalvis.

These grasses are shown in the following photographs:



Y-10. Grassland with a few scattered acacias. This has probably been cleared of its tree vegetation, since this area is very close to the city of Mafeking.



Y-11. A burned grassland. Shows the appearance of the veld after a fire. The larger bunches seem to be Themeda.



Y-12. A general view of the grassland at Mafeking.



Z-1. Shows burnt and unburnt grassland at Mafeking. This grassland being near the city is somewhat overgrazed.



Z-2. Similar to Z-1, but shows more of the acacias in the background. Also brings out clearly the bunched nature of the grassland in the foreground. The trees in the back are eucalyptus and acacia.

Of the grasses, several seem to be especially sought out

by cattle. One of these is the solid-stemmed grass which spreads over the surface of the soil to some extent. It was impossible to secure seeds of this grass at this time.

Mafeking to Johannesburg. Left Mafeking 9:5 a.m. en route to Johannesburg. There is little change of country for several miles out of Mafeking., when we entered a more rocky country where the grass is not as good, and where the trees and bushes are more abundant. This type continues on to Ottoshoop.

Ottoshoop. elevation 4686. Beyond Ottoshoop the soil is a little deeper and redder and the grasses better. The first three to six inches is a red loam soil, below which the soil is more gravelly to four feet.

Windheuvel. Elevation 4126 feet. The country is more hilly. An occasional farm here. The hills are more rocky and are covered with acacia.

Buffelshoek. Elevation 4601. Hill country and soil very rocky. There are occasional fields, but on the whole the country is too rocky for agriculture. Trees are much more varied than before, but acacias predominate. Irrigated fields of barley or wheat and orange orchards occur near here.

Zeerust. Elevation 3869 feet. The hills are are covered with acacia but cultivated crops do well. Beyond there are many acacias and other trees. Many of them are a mass of white flowers. The Rhus collected at Mafeking are also important here. Hill country with excellent grass. The escarpment on the south has a good deal of timber. It lies about 1 mile south of the track. This country is now acacia tall grass, with orange

orchards, white oats and barley. A deep red soil. Much of the country is burned over.



J-6. A general view.

We are now passing into a broken country where acacia and relatively short grass occur. The region south is the tall grass region, and the region north acacia tall grass or low veld.

Rondavel. Hills north and south covered with trees. Mostly grassy. Much of the area burned over. The grass now burns like tinder and many fires have been lighted by this train. Although fire blackens the trunks of the trees it apparently does not kill them.

Chidima. Elevation 5096 feet. A great grass country. Have left the low veld behind. Typical high veld. It looks exactly like the western part of our western tall grass area.

There is very little agriculture,-a few small eucalyptus plantings. A little further on corn fields and new breaking. The breaking is very rough. The cattle seem in good condition, although much of the grass is burned off. Here there are many low red ant hills. The soil is very dark, almost a purplish red. There are occasional ranch houses. The general appearance of the country aside from the vegetation is that of our high plains,-- wire fences, roadways, leading directly from one point to another, houses far apart and apparently no roadways which run north and south or east and west.

Koster. Elevation 5209 feet. The center of the high veld. Tall grass. Very little change as we pass beyond. There are huge piles of corn in sacks at the towns. We had lunch at Koster.



j-7. Shows plow in the foreground. At this place much of the country is under cultivation. Corn seems to be the chief crop. Soil is chocolate or reddish and appears dark in the photograph as compared with the grassland/

Dessing. Elevation 5311 feet. Most of the grassland has been burnt off and shows a green bloom. It is rather interesting that in all of this country even the grasses start into growth before the rains actually occur, although of course this growth is very limited. Here there were gray ant hills. The general view shows farms about one mile apart, about half the land burned off and the ant hills red for the most part.

Derby. Elevation 5195 feet. Plantings of acacia and eucalyptus with scattered farms. Very attractive place. The roofs of the dwellings are usually thatched or corrugated iron. The flood-water reservoirs and wind mills are abundant, also sheep, cattle and horses. Can see hills on the south which are covered with brush acacia.

Vlakdrift. Elevation 5211 feet. As before, soil very red. The fields here look a little more weedy. There are only a few deep red perennials or bulbs which show flower at this time. Practically nothing green to be seen. The roadways here show as depressions just as on our high plains. A rolling country. The lowlands seem to be preferred for cultivation.

Watershed. The farms have a few trees about the buildings as a rule. The fences are barbed or smooth wire. Posts are iron, since it would be impossible to protect fence posts from the termite. Young eucalyptus groves are common and windbreaks are formed of larger trees, also pines, and there are occasionally young orchards. We now descend rapidly to

Magaliesberg at an elevation of 4632 feet. There is little change, more hilly and probably more trees. From here on

into

Johannesburg, at 8:30 p.m. Elevation 5,740 feet. Population 260,000, 141,000 of which are whites.

Johannesburg is the principal gold-mining center of South Africa; almost one half of the world's supply of gold comes from this section. The country is known as the rand, because of the in which most the mining is carried on. The city is well supplied with hotels, clubs of all kinds, public libraries, churches and several educational institutions, including the South African school of mines and the normal college and trade school.

The outstanding things in my mind in Johannesburg are the mine dumps, which are of pure white quartz sand and these have weathered away in the rain to form most interesting badlands effects.

The city itself seems thoroughly up to date and is undoubtedly the most nearly American city of any in Africa. There are here a great many Americans, Jews and English. The natives are mostly Kafirs and probably a few Zulus.

The average rainfall is about 30 inches.

Situated a short distance south of Johannesburg is the government capitol, Pretoria.

General notes on Johannesburg:

Kikuyi grass "has found great favor with farmers and stock raisers and bids fair to become one of the stable pastures of the country." See bulletin local series No. 45, H.B.A.Melle.

Fiber plants: Hibiscus cannabinus, known as ombari or Deccan hemp, or India as bimbipatum jute; is used for bags and sacks. For paper making, Johnson grass and deck grass,--Andropogon pirtus, A.hirtiflorus semiherbis. Grasses used for thatching are, tambookie grass,--A. dregeanus, A. acutis.

Dye plants: Indigofera arrecta.

Medical plants: Cucumis myriocarpa.

Citrus canker is occupying most of the time of the meteorological department.

An important fiber plant is Panicum maxicum. See papers by Pobe-Evans, South African fiber plants, and Mexican marigold or khaki.

There is a most interesting lot of men at Johannesburg. These congregate about the Rand club, which is to Johannesburg what the Cosmos Club is to Washington, although it also includes the business men of the city as well. Dr. W. E. Caldicott of the Consolidated Gold Fields of South Africa is a mining man, but very much alive to the value of agricultural development. He gave me an immense amount of information, especially relative to Delagoa Bay and other sections of the country. He has made an extensive analysis of soils and has done some survey work in the region of Delagoa Bay. He recommends seeing the following men: at Pretoria, Triblet, Chief of the Division of Horticulture; at Beira, Thomas Honey, Director of Agriculture at Mozambique; at Rustenburg, Playford, a lawyer who^s is interested in a giant mushroom; at Petermaritzburg, T.R. Sim; at Johannesburg, R.A. Davis, of the African Realty Trust (and a California fruitgrower). At Johannesburg I also met P. Greathead, whose address is Corner House, Johannesburg, manager of the Transvaal Consolidated Lands, 3,000,000 acres, of which 1,000,000 are settled.

Black labor for the farms can be secured for 1/3 (1 shilling, 3 pence), with an allowance of 3 pence for food each day. In the mines they are paid 1/8 to 2/6 per day.

Mr. O. P. Powell is a very interesting man, with an unusual interest in plants. (Mrs. Powell gave me a dish of icecream, the only time I had icecream in Africa).

Mr. O. E. Bester, Box 3044, Johannesburg, foreman of the Realty Trust, is interested in the big plantations at Zabadilla, which is about one night's ride north of Johannesburg.

Johannesburg is usually referred to as Joburg.

I. W. Schlesinger is the managing director of the African Film Company, African Trust, Colonial Bank, African Bank and Industry, African Realty Trust, and African Life Insurance Co. Schlesinger is the financial head in South Africa. His New York address is 44 Beaver Street. He is much interested in the development of American trade in South Africa.

At Pretoria I was told to see Leppan, a wheat breeder; at Salisbury, Taylor,--tobacco and cotton; and Dr. Eric Knobs, director of agriculture.

The following plants seem to be important: Paspalum dilatatum, in Natal and Transvaal; morlua, or the mango of the natives, which produces a heavy crop of fruit and a valuable oil; Indigofera punctata, a forage plant; Sesambia (?) punctata, a legume from Rhodesia which may be found near Victoria Falls; Rapoko = Pennisetum; Mafurra = Trichilia emetica(?), a tree with oil nuts.

Secure the following books: Journal of Industries; Juritz' South African Soils; J.C.Juta & Co., Capetown,--Advertising Atlas for South Africa; General Staff maps from Government Survey Office at Pretoria; Royal Geographical Society,--Hints to Travelers; P. de Sorney,--Green Manures and Manuring in the Tropics, London, 1916, publishing by J. Bale & Sons and Donnelson; Lyne,--Agriculture in Mozambique.

At Delagoa Bay see Almeida, the Portuguese director, and look for the mafurra, the oil nut, Trichilia emetica, which grows from Mozambique to Angola; also a gourd with almond-like nuts, and Kafir beans of many

different strains.

At Moambo Station, 45 miles west of Lorenzo Marques, there is a fine tropical forest 3 miles west on the banks of the Komati river and extending as far as the Matingatinga river. At Komati Poort on the edge of the Transvaal, stationmaster Brown can give you directions as follows: Where to see the hippotami, which are abundant in the river; the fever tree, one of the most beautiful acacias(which should be suitable for our south), growing in swampy places.

Engel of the Rand Club was recommended as being able to repair the anemometer.

Consult Brown"On the South African Frontier". ~~It is necessary in~~

It is necessary in South Africa to have letters of introduction and I was supplied with a quantity by Mr. Caldicott and Pole-Evans.

Other men whom I met at Johannesburg were Edward L. Bateman of the Corner House, J. W. Kirkland, managing director of the South African General Electric.

Consult"Hints to South African Farmers" -J.G. McDonald, 3d edition, Bulowayo, 1913.

In Johannesburg, the mines, although independent, are more or less consolidated; in fact, all the enterprise in South Africa are consolidated and controlled largely by the diamond mines, the gold mines and Schlesinger trusts. These are known as the Big Three.

Mr. Caldicott gave me samples of a plant, Herb._____, which is being exploited for rubber. It grows in the west and southwest, especially in the southwest protectorate. It is a shrub and is thought to be a source of rubber.

The best place to secure Cape bulbs is Stuber, Rondebosh, Ayers, St. George St., Capetown. Trees and shrubs can be secured of H. E. V. Pickstone,