

December 14, 1919. Kafue to Sekania. Whole country is beautiful, Kafue-like country. Soil light reddish clay. Cuts down as do our badlands. The surface foot is dark. The roots are confined to the surface soil, 1-3 feet deep, depending on erosion and washing, and also on the amount of burning and to some extent upon the soil texture. In the arroya a perfect bad land, but most of the country covered with grass 3-5 feet high and low trees, park adjacent. Beautiful Brachystegia covering the hills. The recent rains ~~are~~ have brought on the grasses. Most of the trees are now in full leaf and the whole country is a rich green set off by the dead tops of grass which has escaped the fire and which gives a tinge of brown or yellow in places. The trees stand out above or almost behind the grasses, presenting an unusually beautiful landscape, but offering little for the camera. In places the differentiated surface soil all but disappears, due probably to fire and erosion, but this seems to have no effect on the vegetation; in fact, the soil may be said to have a uniform profile. As a rule the trees prefer rocky hills and more pervious soils, but will push out on to the flats as well.

There are a good many cattle here. Rather short-horn African type.

Chipongwe. Elevation 3642 feet. Soil more gravelly. The trees are a little closer together and seem more varied. We are now running on high land and can look out over a great landscape of hills and valleys, all open and beautifully wooded. The agriculture is hidden away on the anthills and in small patches. The road here winds about, going higher and higher, the soil becomes more rocky, grasses shorter, and the country more and more parklike. The cattle here are in fine condition. We passed the Farms Cooperative Society, where there are large fields of mealies. Tobacco is one of the chief crops. Cotton also has been tried. Here is an open grassland with scattered trees, usually small, but occasionally a large one.

Lilayi. Elevation 4253 feet. A deep uniform yellow soil. Then we passed off into thicker vegetation with many more trees.

Lusaka. Elevation 4198 feet. This is a relatively good little city. On a flat high upland we entered a decided change in vegetation. Here are sheds under which sacks of mealies are stacked. This must be the center of quite a community, judging from the amount of track and store houses.

We passed on with slight changes, but now almost level. A number of tall *Setarias* prominent along the track. *Cymbopogon* is occasionally in bloom. Anthills also occur occasionally. We passed some black, mucky, clay-like swamps called mopane flats, with no mopane on them.

Chikumbi.Halt. Elevation 3844 feet. There are some rather large trees here, but most of the country consists of some beautiful parks with scattered clumps of trees. The clumps are most often initiated by an anthill, and often the clump is limited entirely to the anthill. Anthills 50 feet across are not uncommon. At a little lower elevation the soil is heavier and acacias similar to *Acacia horrida*. Sometimes this reminds one at first of a young old-field pine growth of about 30 years of age, but this is a very superficial resemblance.

We then passed to open type with no trees and anthills every 200 yards. The trees grow on the anthills, but the hills are as high as the trees themselves. *Brachystegia* is an important tree here.

We then passed over an odd bit of swamp land, grassy glade with many anthills, each one of which was purple on top for about two feet and gray below. There is also here a feathery orange-colored flower and a snow-white *Scirpus*.

Karubwe. Elevation 3745. Red soil with no profile. A good growth of *Brachystegia*. The soil seems thinner beyond. Trees more more abundant and evenly distributed. *Mohobo* a prominent tree. The trees seem to thicken

up on the sandier soil. We then passed out on to sandier flat, which might look like Michigan lowland with low oak stumps, but instead of stumps they are termite hills. Here is a peat (?) grassland with anthills about 6 feet high.



s-7. Shows the grassland at the edge of one of the flats. The bottomland acacia comes in without changing the other effects, and we have that peculiarly weird appearance which looks like the invasion of pine trees on to a swamp land.

Chisamba. Elevation 3765 feet.



s-8. A grassland view. Trees in the back. This is almost pure grassland. A few huts are partially hidden in the background at the left. The soil here is very shallow, the thicker layer being 2-4 inches deep and uniform below this. On the surface the soil is marked off into rough patch work which probably only indicates very heavy compact soil. The anthills actually show a soil profile, the darker zone running throughout about 4 feet from the surface. This points very clearly to the great age of these anthills.

From here on the country is rather luxuriant with a great deal of mohobo. We then passed into a Brachystegia forest.



s-9. Photograph taken in rain. Shows Brachystegia, tall and open. Grass is here short and constitutes a good cover. Some of the leguminous trees are especially silvery and beautiful after the rain.

We now passed over a grassland in which Proteas are scattered. In places they have thrown out what seems to be laterite (bog iron ore). Trees not as thick and Proteas not as abundant, soil red loam to 10 inches and gravelly below. No lime. Another heavy rain. Country fresh and green. Trees are not more flat-topped than our hardwoods. There are no pointed tops sticking up, but the umbrella form is not so marked.

Nyama. Elevation 3777 feet. In a Brachystegia forest. The soil here light, the darker surface color runs over the anthills, but here often becomes a little deeper. On the anthills the soil above or in the dark zone is not as dark as you would expect.

Broken Hill. 3874 feet elevation. This is in a wonderfully good forest of Brachystegia with Combretum and a Pseudo-like Lachrystylis. Then we passed off rapidly into tree-grass country with large anthills. Deep ditch

here shows uniform red soil 2-4 feet.

Chibwe. Elevation 3792 feet. Rather dense low forest.

Note.-- It is rather remarkable that near Salisbury I saw many places that looked almost exactly like this. In fact, this dry forest is ^{the} one type from just above Bulawayo on up to this place. There is no true acacia-tall grass, trees being almost invariably little to dense. Mohobo and Protea seem often to be seen together. Grasses here are low.

December 15, 1919.

Sekania, Belgian Congo. This country shows general thickening up of the tree growth and greater luxuriance of the undergrowth. The forest top here stands at about 40 and consists largely of Brachystegia or Brachystegia-like trees. Floor of grasses and Pteridium. Soil a red clay. Does not wash away very rapidly. Heavier rains remove particles of loose soil.

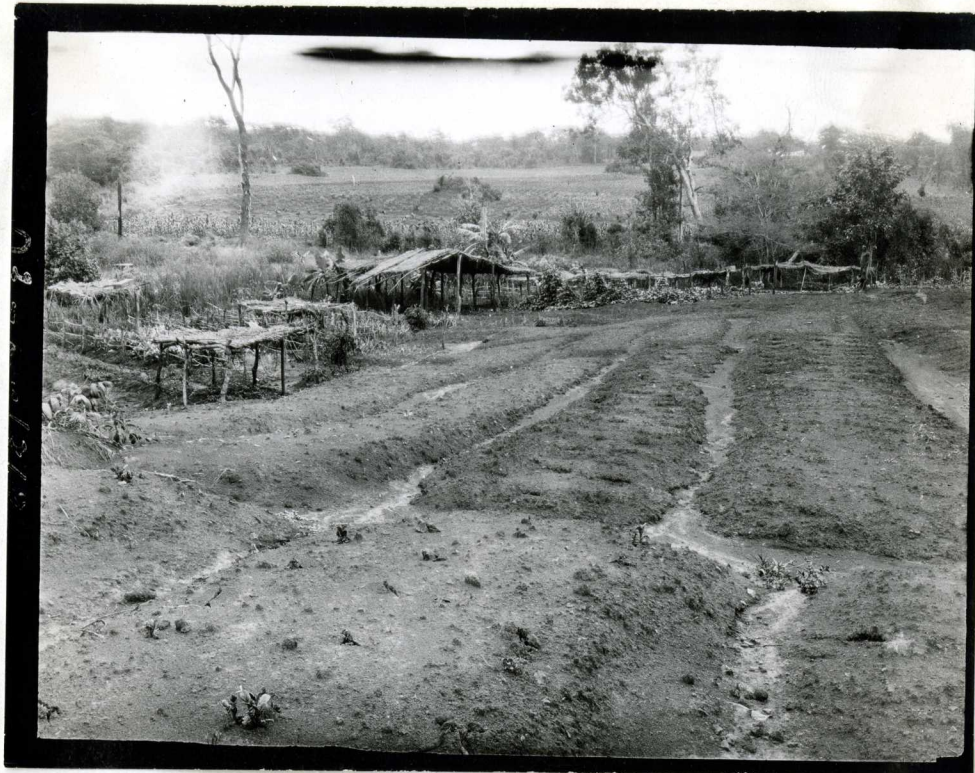
In the gardens banana, papaya and citrus are found, while on the low ground are gardens of banked up beds of lettuce, potato, tomato, spinach, beans and a flat-leaf onion (garlic), and celery. Corn in all stages of development at the same time, and under shade strawberries are grown. This is the intensive type of agriculture done by natives under Belgian direction.



D²-4. Is a general view of the herbaceous vegetation after trees have apparently been removed or thinned out. Grasses are prominent. Many of them have a bulbous base, *Allteropsis*. There are low grasses not over 3 feet high. Plant with habit similar to milkweed but with alternate trifoliate leaves and not milky, makes up about a third of the vegetation, while another third is *Pteridium*, which grows 3-4 feet high. Trees are shown in background.

D²-5. Is a general view of a path leading down the hill with natural grasses at the sides. Belgian farm is shown in the background. This is in corn with a few large ant-hills shown here and there. These in this field have not been cultivated.





D²-6. Shows a detail of elevated beds in the foreground, in which Irish potatoes are just coming up. Onions, lettuce, cabbage, spinach, celery, beans, tomatoes, etc., are shown in the background under the covered sheds.



D²-7. The same as D²-6.