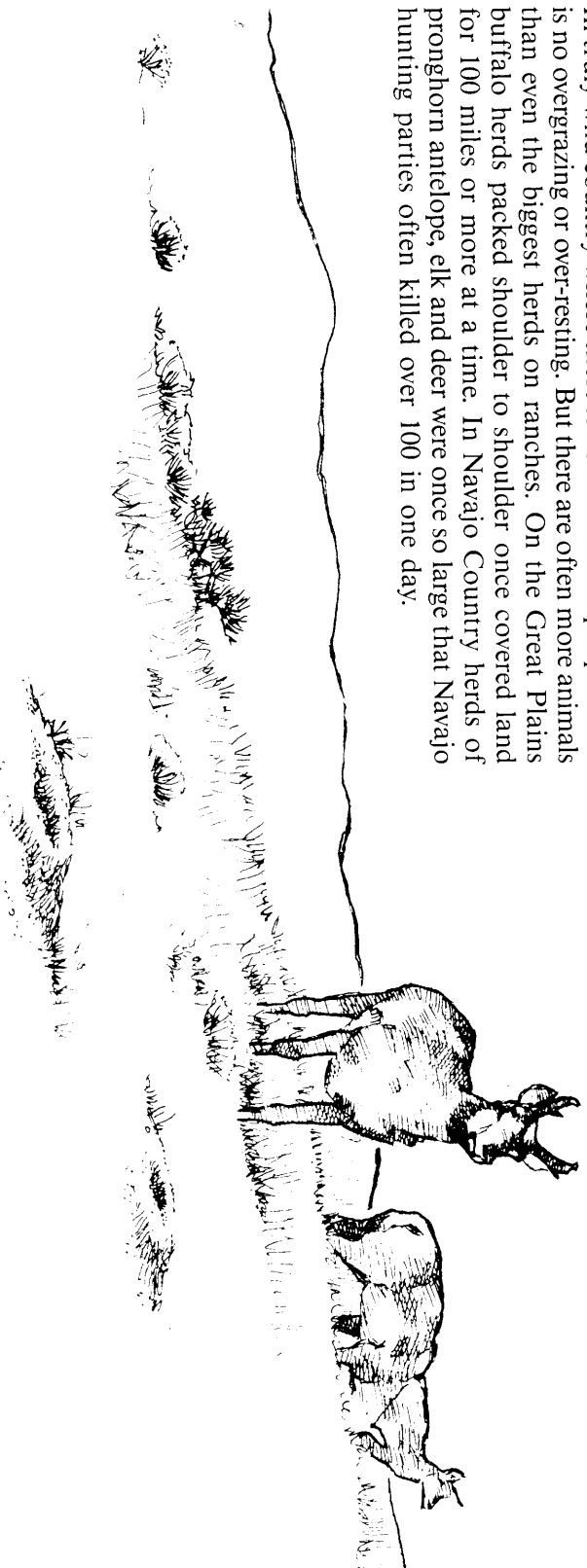


LIFE

In truly wild country where there is no livestock or people there is no overgrazing or over-resting. But there are often more animals than even the biggest herds on ranches. On the Great Plains buffalo herds packed shoulder to shoulder once covered land for 100 miles or more at a time. In Navajo Country herds of pronghorn antelope, elk and deer were once so large that Navajo hunting parties often killed over 100 in one day.

Large, grass-eating wild animals belong in country like ours. They once roamed all parts of the world where land and weather are like Navajo Country. Now people and their sheep, goats and cattle cover most of this land. In many places the grass has also disappeared, but other areas are as rich as ever, and the herds are large. In Navajo Country itself there have been large herds and good grass at the same time. This chapter will discuss the life of wild herds on wild land, because that is the knowledge that can bring back the grass on our land today.



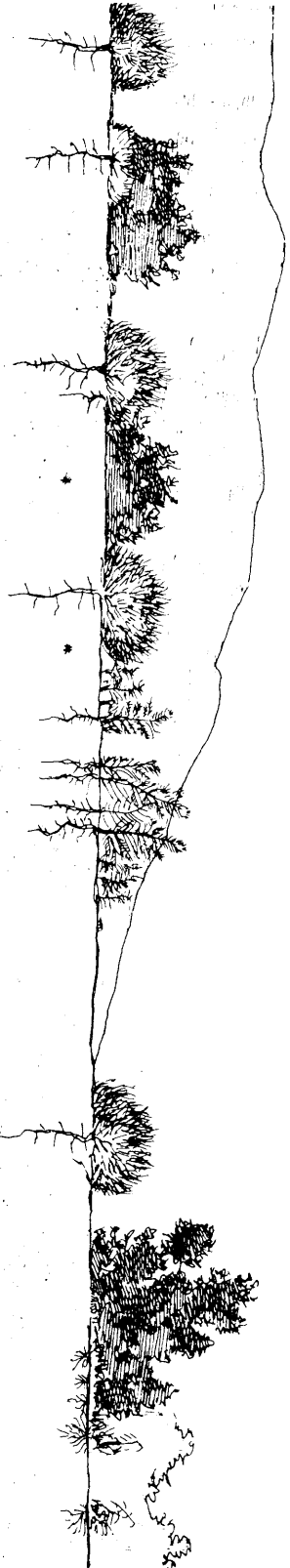
Succession

In English the word "succession" means "following". To people who study plants and animals "succession" means the way different kinds of plants and animals "follow" each other when something happens to the land. All living things including people are part of succession. Succession always tries to move forward, because all living things from the smallest to the largest are trying to grow, have children and make homes for themselves.

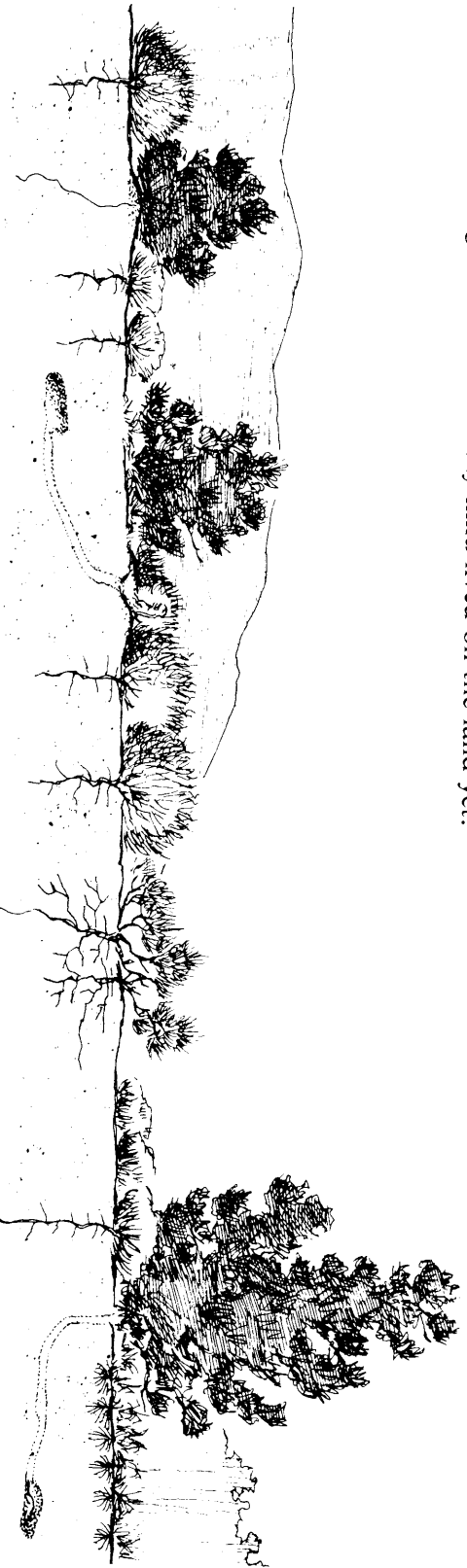
Example

A flood kills all the plants on a piece of land that is mostly grass, snakeweed, and rabbit bush. After 40 years people can hardly tell anymore where the flood happened, because most of the plants have grown

back. The same animals that used to live there have returned. *But*, the old plants and animals did not start living there right away. Others came first. Still others followed them. Finally, after a long "succession" the old plants and animals returned.



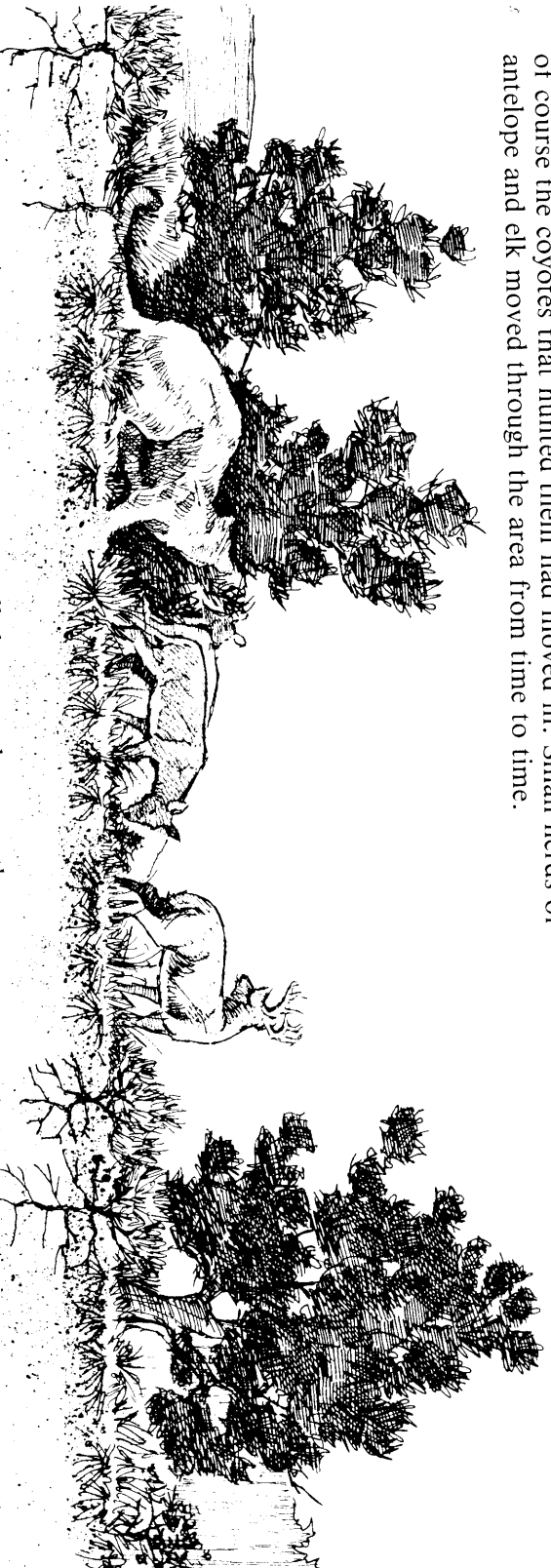
The very next year after the flood tumbleweed, mustard, and some quick-growing grasses started here and there. These are *annual* plants. (Annual plants don't last the winter and have to start from new seed every spring.) Only a few bugs or animals of any kind lived on the land yet.



After ten years some small bushes and stronger weeds had started to grow, but still most of the plants were short-living things like tumbleweed. Ants and stink bugs and a few small mice began to live there.



After 25 years the bushes were bigger, but between them more and more *perennial* grass was beginning to grow. (Perennial grass grows from its old roots every spring, so it can live through drier weather and provide more food than annual grass.) Rabbits, more ground squirrels and mice, and of course the coyotes that hunted them had moved in. Small herds of antelope and elk moved through the area from time to time.



After 40 years good grass covered almost all the space between the bushes. Many antelope and elk passed through now, and wolves hunted them.

On the very first step of succession are the lichens (dlaad) that grow on rocks. They are tiny light green or black plants without leaves or roots. They can also be seen growing on bare soil where nothing else can grow. In most areas of Navajo Country succession stops when grass and small bushes like sage brush cover the land. On the mountains, however, and other cooler, wetter places, trees and other plants also grow.

By the law of nature, succession always *tries* to go forward as far as the climate and the soil will allow. This is true for people as well as for plants and animals. People also are always trying to build, to grow, and prepare the way for their children. You can see succession in the way cities grow. Skyscrapers and super highways are not built until smaller houses, roads and trails have led the way.

But succession can also go backwards. That has happened in places where grass and other plants that used to grow have disappeared. Overgrazing and over-resting usually causes succession to go backwards down the same steps — from good grass to bushes and bad tasting plants to quick-growing plants like tumbleweed to bare ground and lichens.

Observation

Check several areas and try to tell which is ahead in succession. Then try to decide if succession is going forward or backward. Here are some questions to help you decide:

1. How much grass of any kind do you find?
Except in the thickest forest areas, little grass means low succession. High succession grassland in Navajo Country should have more grass than bare ground, and it should be *perennial* grass.
2. If you find grass, what kind of grass is it?
Some kinds of grass shows higher succession than others. Here are a few from lowest to highest:

- Annual grasses like cheat grass, foxtail and six weeks gramma grass.

- Perennial grasses

Spikey muhley and its relatives

Indian rice grass

Galleta grass, needle-and-thread, dropseed

Alkali sacaton, gramma grass

Western wheatgrass

3. If bushes and woody plants of any kind are the main plant, are they good for livestock or not tasty? Greasewood, salt bush, and sage brush are ahead of snakeweed and rabbit bush.

4. What kinds of animals live there? Ants and very small mice do well when succession is low. Cottontails and jack rabbits show higher succession.

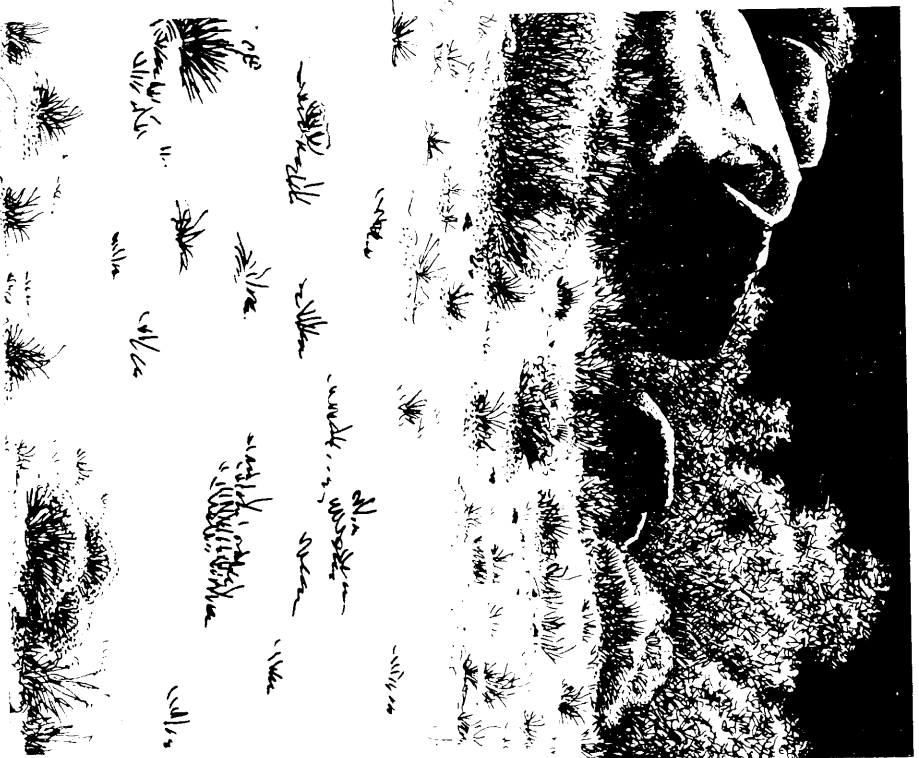
5. How long-living are the plants? Lots of tumbleweed, mustard, cheat grass and other plants that grow new from seed each year show lower succession.

6. How many different kinds of plants are there? Many different kinds show higher succession. The same kind of plant everywhere shows lower succession.

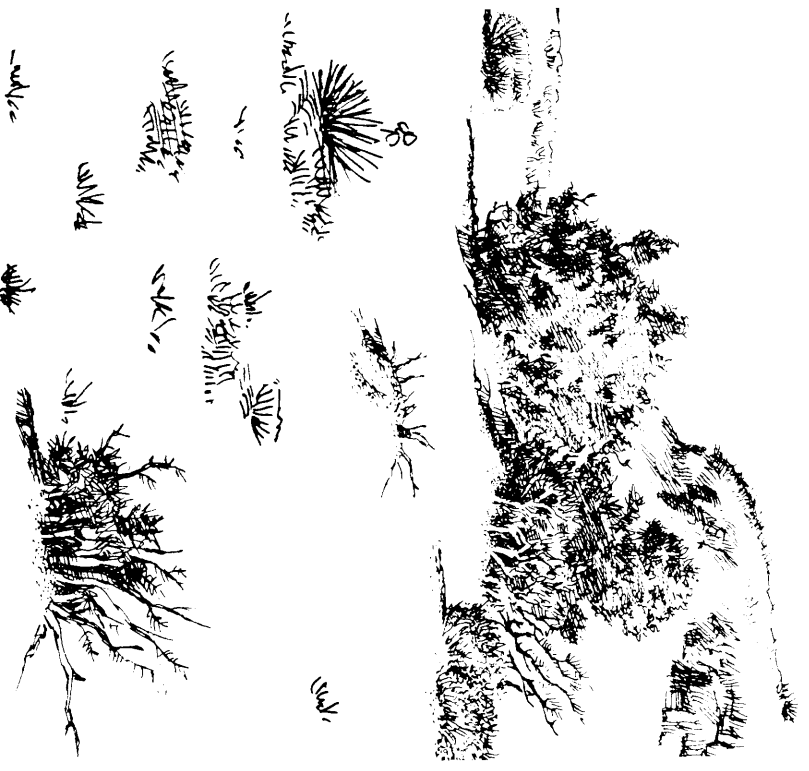
The steps of succession may be different in different places. The plants and animals that live on clay soil beside a wash will never be the same as those on the top of a sandy mesa, but some kind of succession is going on wherever you find living things.

How can you tell if succession is going forward or backward? The best way to find out, of course, is to ask someone who has known the area for a long time. They will tell you what used to grow there. However, there are other signs to look for:

Observation



Look for young plants. If young grass seedlings are growing on bare ground, succession is probably moving forward. If you only find them in the protection of other plants, it is probably going backwards.

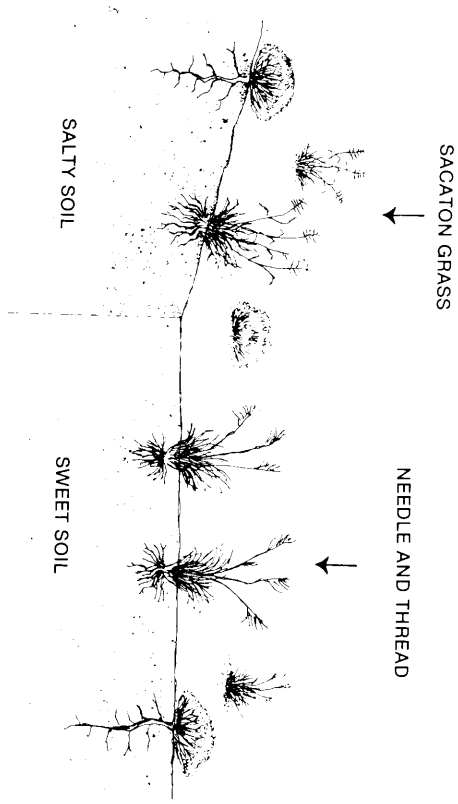


Look for old plants, especially bushes. When succession is going backwards you can often see where saltbush, greasewood or sage bushes used to grow but have now died.

At the end of summer, if succession is moving forward, you should be able to see how much bushes and grass have grown since spring. If succession is going backwards, it may be hard to tell.

Specialization

Succession happens because plants and animals are not all the same. All plants and animals have something special about them. That is why you find them living in one place instead of another. If that place changes for any reason the plants and animals living there may also change. New plants, *specialized* to live in the new conditions will move in.

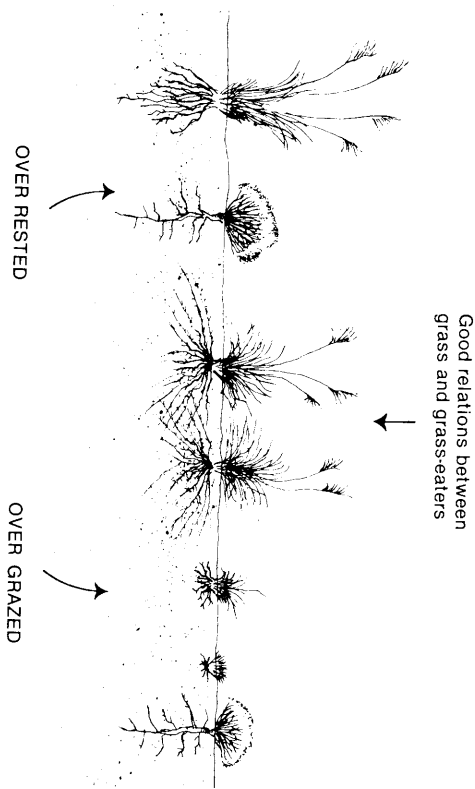


The roots of grass are *specialized* to suck up and use rain water very quickly after it falls. Healthy grass leaves only enough water for a few deep-rooted plants like snakeweed to grow. Soil also make a difference. Sacaton grass is specialized to use salty soil and will push out plants that don't like salt.

Interdependence

Succession also happens because plants and animals depend on each other. If some kinds of plants and animals belong together, all of them will change if one of them changes. That is *interdependence*.

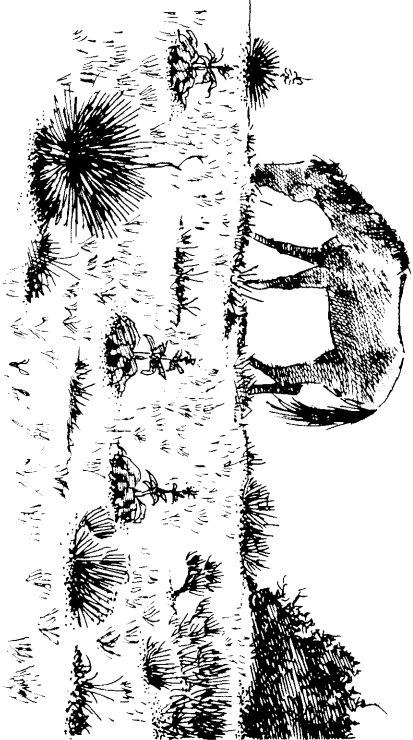
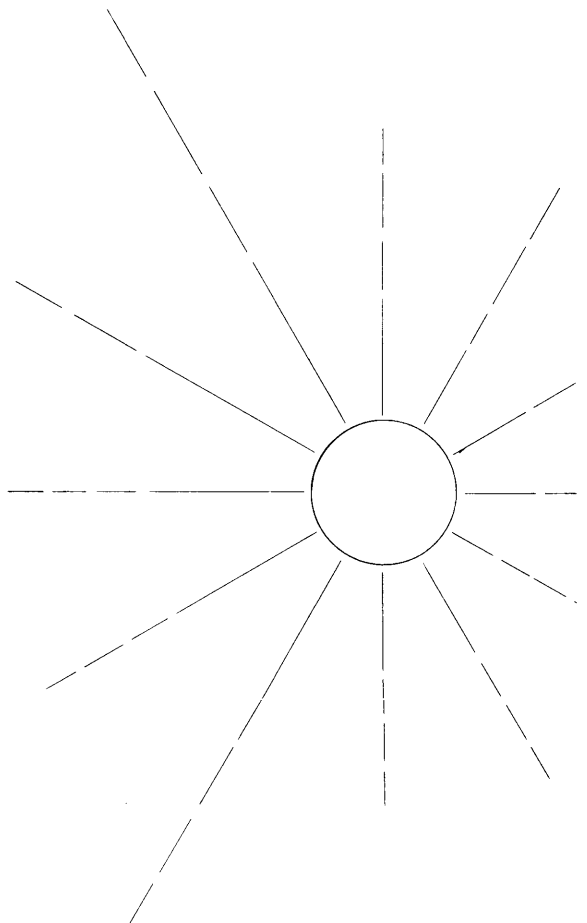
As the old people said, grass-eating animals and grass are interdependent. To grow thick and healthy leaves, grass needs to be eaten. If eaten too often it dies of over-grazing, but if no animals eat it, it becomes weak and dies from over-resting.



Observation
 Find a place where only one kind of plant is growing, and try to figure out how it is specialized to grow better there than any other plant. The area you choose may be very small.

Water, Plant Food, and Energy

When succession moves forward the plants and animals on the land use more and more of the water, plant food, and solar energy that is available. The path of the water from cloud to earth and back to the sky is called the *water cycle*. The path of food from earth to plants and animals and back to the earth is the *mineral cycle*. The path of the sun's power through living things is called *energy flow*.



Energy Flow

In areas of low succession most of the sun's power just heats up the bare ground and does no good for anything — a useless *energy flow*.

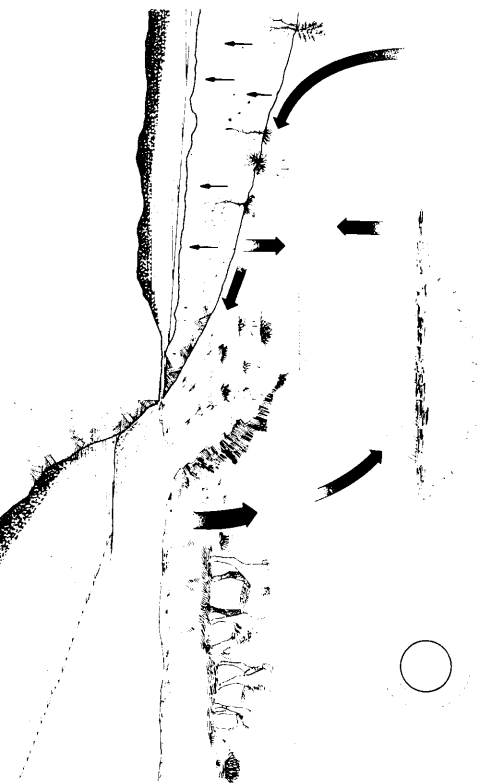
In areas of high succession there will be more plants and those plants will have bigger leaves. More and bigger green leaves put more sun power to work growing stronger plants and feeding bigger animals — a good *energy flow*.

Water Cycle

In areas of high succession water may be used several times by several plants and animals before it goes back to the sky. The *water cycle* is good.



In areas of low succession much water runs off the land or dries up and goes back to the sky without helping anything. The *water cycle* is bad.



Mineral Cycle

In areas of low succession plant food is used slowly and may stay for a long time deep under the ground or in the dead leaves of dry plants. The *mineral cycle* is bad.



In areas of high succession plants take food from the soil, are eaten and trampled, and the food goes quickly back to the soil where it is used again and again — a good *mineral cycle*.



Why Succession Moves Forward and Backward

Many things can change the succession of plants — wet weather, floods, wind storms, construction projects, roads, fire, and of course *animals*. All animals are part of succession, and in grassland areas like the Navajo Reservation, the plants cannot reach the highest steps of succession without the animals.

Large grazing animals can change succession in three ways:

- 1 By just being on the land, trampling the ground with their feet and leaving behind their urine and manure.



- 2 By biting off the plants.



- 3 By *not* being on the land and allowing plants to rest.



The feet, manure, and urine of large animals *move succession forward*. Manure and urine are good fertilizer. The feet plant seeds and open the ground so more water soaks into it. Good grass can stand a lot of trampling. A herd will break down many low succession plants like snakeweed.

Observation

In badly overgrazed areas you will usually find only low succession plants like tumbleweed, but often they will be greener than plants in over-rested areas because they get more water and fertilizer. There may also be more different kinds of plants, because more seeds are planted. Check this out on land you know well.

Look at land where no animals have been for a long time. Usually the soil has a crust on it like bread. Sometimes this crust is as hard as pottery. It keeps water from soaking in and new seeds from breaking through. Try sprinkling water on soil like this. Does it soak in as fast as water sprinkled on land where livestock have broken up the crust?

Biting off plants also can move succession forward. It hurts many low succession plants, but remember that grass *must* be bitten off from time to time or it becomes weak, tough, and can die of old age.

Over-resting of course moves succession backwards, but grass that animals have bitten off must have *enough* rest to grow back. A herder can decide how much rest his grass gets. *This is the main way a herder can change succession on his land!!*

Wild animals on wild land — buffalos, antelope, elk, deer, and wild sheep — decide for themselves what they will do to the land. *People* must decide these things for their livestock. If our stock is causing succession to move backwards, then we must try to see how it acts differently from wild herds.

Wild herds are often very large and, at least part of the year, move together in a tight bunch, so they give the ground a good trampling and cover it with their manure.

Wild herds are always moving and seldom spend more than a few days at a time in the same place, so they bite a little off the

best plants, but do not stay long enough to overgraze anything.

Wild herds often move long distances and often leave an area for months at a time in very dry weather, so the land gets rest when it needs rest.

The different kinds of wild herds of course are part of succession. In Navajo Country mule deer and elk rank near the top. The deer eat more from bushes and trees. The elk eat more grass. In former times large elk herds roamed far out onto the grass land away from the mountains, when the grass was tender and fresh, but now even the mountain meadows are not rich enough to feed them, and there are no more elk in Navajo Country.

Deer need the bushes and thickets of the pinon-juniper forests near the foot of the mountains.

Buffalo live best on thick, tough, grass that an antelope could scarcely eat. According to legend some buffalo once roamed Navajo Country east of the Chuska Mountains, and names like “Buffalo Pass” and “Buffalo Spring” near Lukachukai seem to say that a few even crossed the Chuskas, but Navajo Country has never had large buffalo herds like the plains east of the Rio Grande.

Pronghorn antelope are lower in succession than buffalo. They eat both grass and the tough bushes of the dry country such as snakeweed and rabbit brush. Enormous herds once roamed Navajo Country. They could probably still survive if they weren't such shy animals, and the land weren't so full of roads, people, guns, and noise.

Livestock and Succession

Horses, cattle, sheep, and goats are of course part of succession like all other animals. They are specialized to eat different plants, and to move in different ways. Where succession is changing, you will also find the *kind* of livestock will change as well as the number of animals.

Horses

Horses stand highest in succession among the different kinds of livestock. Their teeth are specialized to bite off very tough grass, and a lot of it. They can eat more in the same time than a cow, and they are such good runners that they can cover much more land to find the grass they like.



The horse's stomach is small.

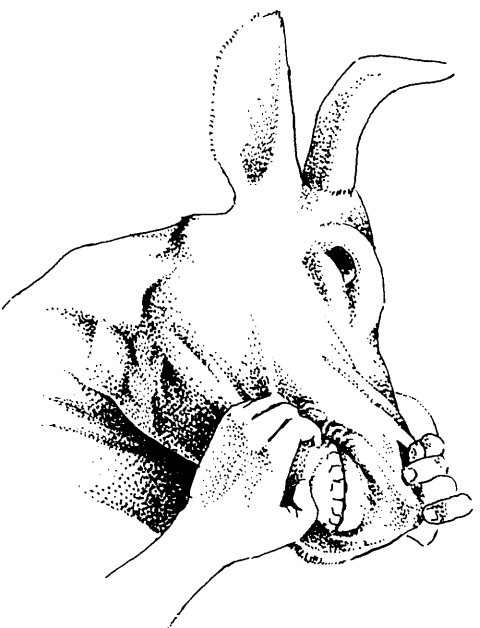


Grass is digested in a large part of the intestine called the "cecum".

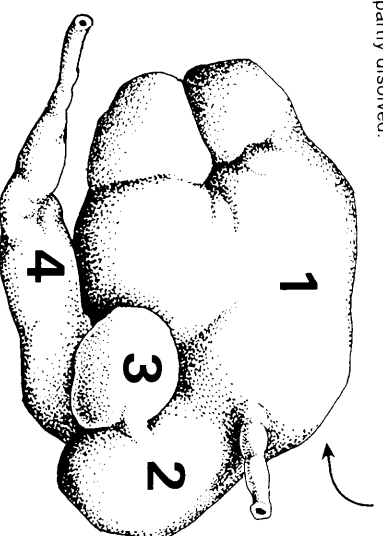
Horses have to find more and better grass than cattle, because a horse's stomach does not get as much food value out of the same grass. You can tell this by looking at horse and cow manure. You can see much more undigested grass in the horse manure. Also many plants, like loco weed, that don't bother cattle, will kill horses. This is why horses usually suffer most in dry years and long winters. Succession moves backwards, and they lose their place.

Cattle

Cattle come behind horses. Although cattle have no front teeth in their upper jaw they can take very heavy, tough grass, and their four stomachs allow them to get all the nutrition from the things they eat. Poison plants bother cattle less than horses.



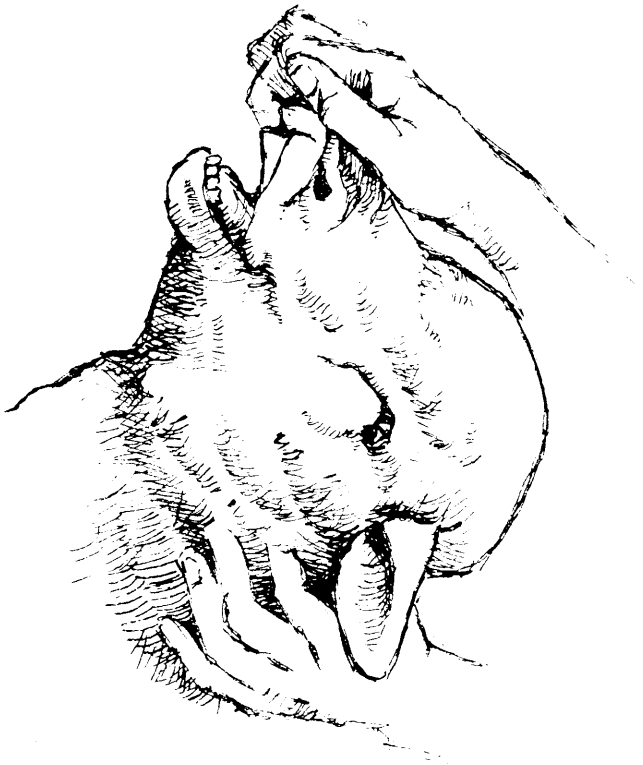
In the first stomach, the "rumen", rough food "rots", becomes soft and partly dissolved.



In stomach no. 2 "cuds" form and go back to the mouth for more chewing. Food swallowed the second time goes back to stomachs no. 3 and no. 4.

Sheep

Sheep, like cattle, have four stomachs and no upper front teeth, but they can eat even more plants without trouble, and their small mouths and dainty lips allow them to reach and nip off very small leaves that a clumsy cow could not touch.



Goats

Goats are similar to sheep, but they will stand on their hind legs, climb rocks and even trees to find food in places a sheep would never go. Even when grass is growing, goats will often eat bushes that sheep only nibble when they are hungry.



Observation

Follow different kinds of livestock around for a few hours, and notice what different plants they eat, and how much land they cover. If you follow a herd in several different areas, and keep score carefully, you will quickly discover the favorite plants of different kinds of livestock. That will help you understand the true value of your land.

Check the history of different kinds of livestock in your community.

Do older people remember years when horses died of starvation or other causes?

Look at herds of goats and sheep in your community and ask about their history. On good range, most people prefer sheep, because they are easier to herd, have more young ones, are better mothers, and grow much more meat. On poor range, however, goats survive better, and the mohair from goats is worth more than the wool and meat from skinny sheep that have few lambs. If herds have slowly changed from sheep to goats, it tells you that succession is going backwards.

Conclusions

Much of the best plant and animal life has disappeared from Navajo range land, *but* plants and animals will return if they have the chance. This natural rebuilding of life is called *succession*. Succession happens in steps. One set of plants and animals prepares the ways for the next. Our livestock affects succession in three ways:

1. By just being on the land.
2. By biting off the plants.
3. By *not* being on the land and letting it rest.

If people do not bother them in any way, wild animals will move and eat properly so that succession moves forward. Livestock, however, is also part of succession. The kind of animals we raise and the size of our herds must change as succession moves forward or backward. The next chapter will tell how a herder can make his livestock move succession forward the way wild herds used to.