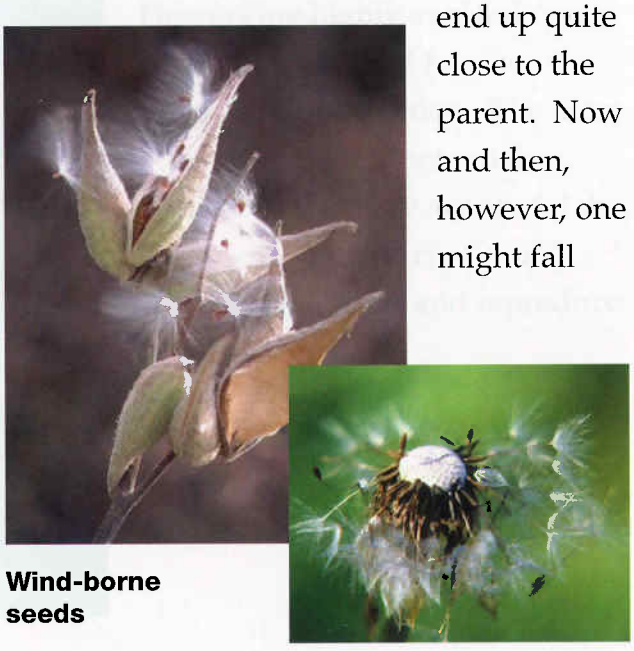
Plants are everywhere around us. Often the types of plants that you see in an area help define a location, such as the majestic redwoods of California, the brilliant foliage of the hardwoods of New England, and the giant saguaro cacti of Arizona. Where did these plants come from?

Once a plant puts down roots, it is anchored for good. It can't move closer to a water source or seek a place with more direct access to sunlight. In the earliest phase of its life, however, a plant *can* move. Most plants grow from seeds, and because seeds are small and self-contained, they easily move from one place to another. During the seed phase of their lives plants expand their range and colonize new territory.

But there is one problem with this plan—seeds don't have legs, fins, or wings. They can't move by themselves. If they are going to establish themselves in a new place, they need an agent to move them.

The process of spreading out from a starting place is called **dispersal.** Young plants often benefit from being some distance from the parent plant because they don't have to compete with the larger, well-established plant for resources. The methods used by plants to disperse their seeds are called **seed-dispersal strategies,** and the structures on the seeds that allow them to move are **seed-dispersal mechanisms.**

One strategy for seed dispersal is to produce a lot of seeds. Chances are, if a plant produces 10,000 seeds, a few of them will end up some distance from the parent. For instance, the Asian poppy produces immense numbers of small, smooth, round seeds. Most of them fall out of the pod and end up quite close to the parent. Now and then, however, one might fall



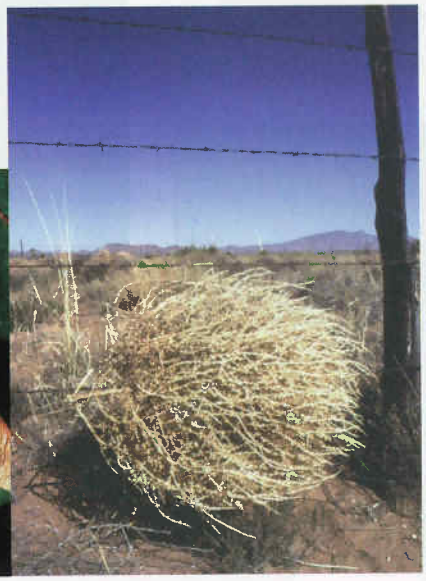
Wind-borne seeds

onto something sticky, like a little drop of sap. If a person, dog, or rodent happened to step on the seed, it might stick to a foot for a while and be carried a considerable distance before it fell off. If the new location is suitable for poppies, the plant has succeeded in expanding its range. A 1 in 10,000 chance of survival is not very good odds, but in the long run it works.

Wind

Some plants use a wind-borne strategy to disperse seeds. The seeds are usually very light and frequently have some kind of wind-catching mechanism, such as a sail, tuft, puffball, or parachute. Wind-borne seeds travel until the wind stops, they snag on an obstacle, or they get soaked by rain or dew. Dandelion and milkweed plants produce tufted seeds that can travel for many kilometers before landing. Silver maple seeds come in pairs and look like wings. When a gust of wind shakes them loose from the tree, they fly along on wind currents like a hang glider.

The tumbleweed plant of the southwest United States uses a variation on the wind theme. After producing seeds, the tumbleweed dies and breaks off from its roots. The dead plant is a light, nearly spherical, compact mass of branches and twigs, covered with thousands of seeds. When the wind really starts to blow, the tumbleweed goes bounding and tumbling across the desert or prairie. And, of course, it leaves a trail of seeds in its wake. Seeds that fall in favorable areas can grow and develop into next year's tumbleweed crop.



Water

Plants that grow in or near the water often use floating as their seed-dispersal strategy. Floaters are usually pretty light, with a covering or fruit that is less dense than water. A waxy coating that keeps the fruit watertight often covers them. The coconut palm is the champion when it comes to long-distance dispersal using water. Coconut palms are adapted to grow right on beaches.

The trees may even grow out over the water and drop the fruit directly into the tide. More often the fruits drop on the beach, where they may be washed into the sea later by high tides or storms.

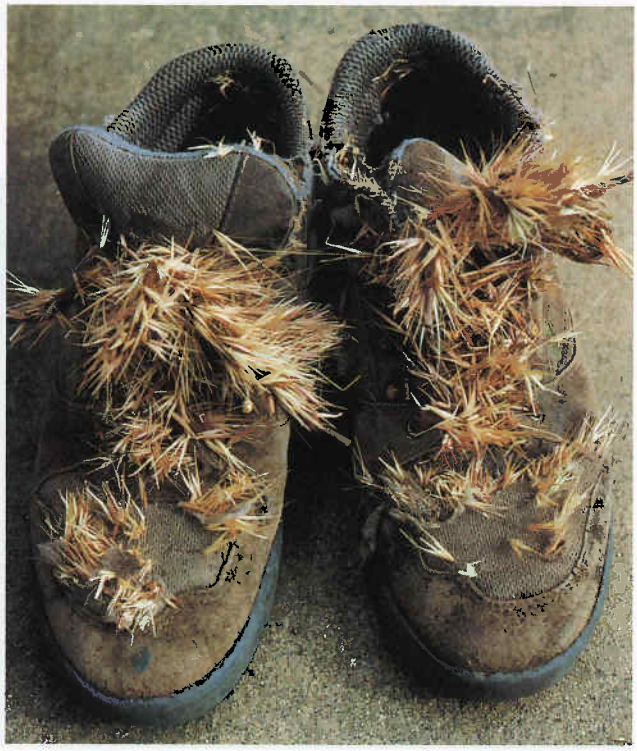
What you see in the grocery store is the coconut seed. It is huge—one of the largest in the world. The fruit of the coconut is even larger and is made of a very low-density fibrous material. A coconut can float on ocean currents for weeks before salt water penetrates the seed and ruins it. If it happens to wash up on a beach before it goes bad, it may germinate.

Many of the plants found on tropical islands were transported this way, and a stroll along the beach will yield a wide variety of floating seeds.

Animals

Animals participate in seed dispersal in many ways. Some plants use the piggyback strategy. Hooks, barbs, coils, and sticky stuff can stick a seed to the fur, feathers, or feet of an animal that chances by. Once attached to an animal, the seed might travel a few meters or a number of kilometers before it falls off or is scratched free by the carrier. Hitchhikers are usually fairly small and light, and may be sticky like glue (saguaro cactus) or covered with any of a variety of hooks and spikes, such as bur clover, cockleburs, foxtails, and bull thorns.

Want to find out what kind of plants in your neighborhood use this strategy for dispersing seeds? Take an old pair of worn-out wool socks, pull them on over your shoes, and take a short walk through a dry field. Check out the socks after a while. Try to remove the seeds, and you will see how effective some of the dispersal mechanisms are for holding onto a host animal. You might go one step further and plant the old socks under a couple of centimeters of soil, water them, and see what comes up.



Another way seeds are dispersed is by animals eating the fruit that contain them. Some seeds pass completely through an animal's digestive tract unharmed. Such seeds have very durable seed coats, such as the black cherry. A magpie might swallow a cherry, fly to the next county while digesting the fruit from around the pit, and rid itself of the seed in a dropping several

kilometers away. Birds and fruit bats have carried seeds between many of the small islands in the tropics in exactly this way.

A third way that animals aid in seed dispersal is by gathering and storing seeds for food. Squirrels are famous for burying acorns, peanuts, and other nuts in many places in preparation for winter. They are equally famous for forgetting where they buried them. These lost or forgotten seeds may sprout and grow when spring arrives. Ants also gather seeds for food and store them underground for later use. These seeds may also grow if not eaten.

Ejection

Some plants use the heave-ho method for dispersing their seeds. As bean pods dry on the parent plant, the pods twist and become brittle. When completely dry, they suddenly burst, and the beans are thrown away from the parent. The wisteria plant is a champion in this technique, propelling seeds 20 meters (65 feet) or more with a loud crack as the pods release their stored energy. Mistletoe is a parasitic plant that attaches to a tree limb and draws water from the host. When the seedpods mature, they burst and eject the soft, sticky seed up to 15 meters away. If the seed hits another tree, it will stick and grow into a new mistletoe plant.

Combination

Some plants disperse seeds in more than one way. Beach grass is an example. About

half of the seeds will be released to be blown by the wind or carried away by water. The remaining seeds stay on the parent plant. At the end of the growing season, the parent plant dies and is quickly buried in the shifting beach sands. If conditions remain favorable there, the buried seeds will sprout where the parent plant grew the season before. If conditions have changed for the worse, the dispersed seeds may have ended up in a more favorable location for growth.

Back to the opening question...where did all the plants come from? They came from all over. They flew in, some were launched in, others rode in on the backs of animals, some were dropped as the leftovers from someone's supper, and a few might have floated in. Each plant is growing where it is because the plant had some form of seed-dispersal mechanism that worked.

With the successful dispersal of the seed, the new plant thrives, and the life cycle continues.

Think Questions

1. *Think about the seeds you found in your school neighborhood. What seed-dispersal strategy was the most common one you observed?*
2. *Describe the dispersal mechanisms you found on two different seeds. What conditions would have to occur in the area for these mechanisms to result in seed dispersal?*