GENERAL SCIENCE

Journeys Into Autumn

With the first tremors of autumn, billions of winged, hooved, flippered and shoed creatures prepare for their journey south to follow the warm sun.

By BARBARA TUFTY

➤ AS THE EARLY CHILLS of autumn blow across the northern lakes and forests, as sunlight grows dimmer and nights fall sooner, many creatures of the Northern Hemisphere gather together in groups or start off in splendid solitude for their annual journey southward.

Seventy-ton whales silently slip their bulk through cooling waters of the Arctic and head toward tropical destinations, still unmapped by man. Fragile butterflies, their wings quivering, gather in thick clusters on particular trees and shrubs until a signal sends them fluttering on an air journey for thousands of miles. In the misty Bering Sea, mother and baby seals slide off their treeless volcanic islands and head down the California coast.

Summer Quarters Vacated

A few species of bats spurn the dark moist caves where most of their kind spend the winter, and zig-zag into the night, heading south. Elk and caribou, sniffing the first tang of snow in the high mountain air, sedately gather under the trees and file down to the warmer valleys. Certain migrant human beings close their summer shacks and move down the mapped highways toward winter quarters.

The most famous travelers of all, however, are the birds, those bright-eyed angels whose rustling wings fill the sky with their autumn flight.

These are some of the world's periodic migrators — the seasonal wanderers that spend their summers in the cool woods, waters, marshes and beaches of the north or high places, then turn toward warmer regions to escape the approaching winter winds. In their yearly round trips, some travel thousands of miles through skyways, sea lanes or earth routes—others take only short cross-country hikes, or drop a few hundred feet to a valley at the foot of a mountain.

Long-Distance Travelers

Birds are some of the greatest travelers of all. The neat grey Arctic tern, with a saucy black cap and red bill, flies a total distance of about 22,000 miles each year. This winged champion nests in the arctic regions in North America, then late in summer crosses the Atlantic Ocean, skims along the western shores of Europe and Africa to the tip of South America, where it crosses over to the edge of the Antarctic.

Two other famous bird travelers are the plovers. As autumn arrives, the golden plovers leave their nests on the islands rimming north Canada and fly 2,400 miles across Newfoundland, down the Caribbean Sea to their summer stations in Argentina. The Pacific golden plover makes an annual journey from the northern part of Alaska past the Hawaiian Islands to the Marquesas Islands.

Most spectacular among European migrants is the beloved white stork which reaches its winter home in South Africa by a roller-coaster flight system of rising on warm air currents and gliding slowly down over the land.

In contrast to these mighty flights of certain birds is the tiny, but just as vital, journey of the Rocky Mountain chickadee—a verticle plunge of a few thousand feet to the sheltered valleys below.

In general, the shyer, smaller birds tend to travel by night and rest and feed by day—the flycatchers, orioles, vireos, thrushes, warblers, rails and bitterns. The day migrators include such birds as ducks, geese, loons, cranes, hawks, swallows, nighthawks, swifts, blackbirds, robins, waxwings, goldfinches—the lists of these blithe spirits read like poems.

Bird migrations are more pronounced in the Northern Hemisphere, where the much larger land masses become covered with snow and ice, and temperatures fluctuate more than they do south of the equator.

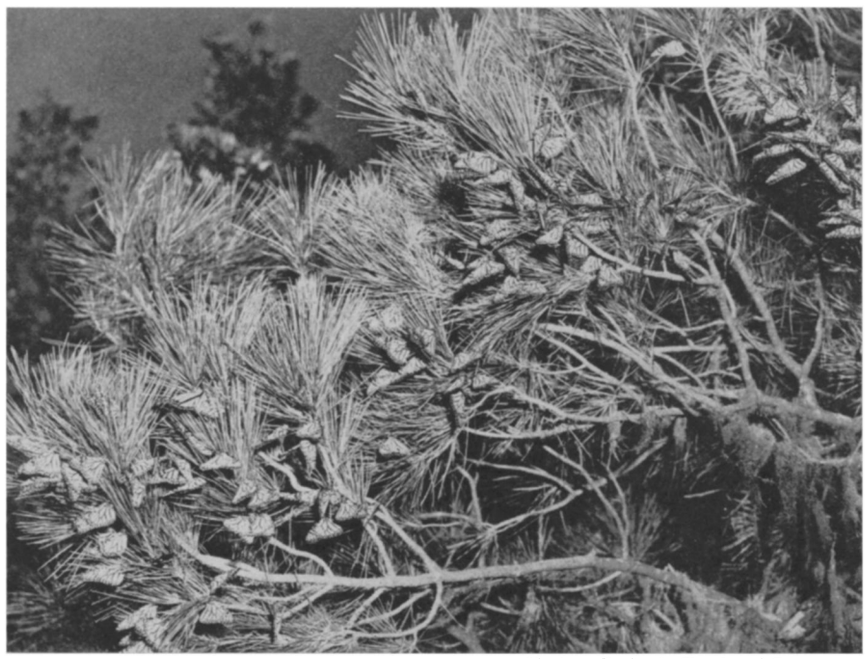
A considerable number of Eurasian and North American birds cross the equator and spend the winter deep in Africa or South America, but only a few land birds of the Southern Hemisphere reverse the process and spend part of the year north of the equator. The Wilson's petrel is one exception, leaving the Antarctic to spend its non-breeding season in Newfoundland.

Man has long gazed in wonder and curiosity at these marvelous feathered navigators whose unerring sense of direction speeds them year after year across vast stretches of trackless mountain ranges, praries, oceans and forests and guides them to a pin-point landing sometimes on the same nest, rock or branch they used the year before.

Mysterious Instinct

How do they find their incredible way? Many scientists now believe that birds orient themselves with the sun by day and the stars by night. Other ornithologists say they are guided by delicate inner "compasses" tuned to the earth's magnetic poles. Perhaps constant air currents help guide them, or the visual contours of the earth—the shore lines, riverways, curve of mountains and series of lakes.

Some men say birds are carrying out an ancient ingrained habit which began ages ago when glaciers flowed over the



Monterey Peninsula Chamber of Commerce

DAINTY BUTTERFLIES—Monarch butterflies come by the millions each fall to Pacific Grove on California's Monterey Bay. Some of the migrants are shown here clinging to a pine tree bough. As many as a thousand will often cluster on a three-foot branch.

Northern Hemisphere. According to this theory, birds moved south before the advancing walls of ice. During the summer, they edged slightly northward again as the glaciers retreated, then were forced south again with the cold winter. By the time the ice ages ended some 10,000 or more years ago, the yearly trips were a habit.

The forces that start birds on these journeys are other unsolved mysteries. Besides the reduction of insects, seeds, water and other food sources as winter freezes the land, scientists are finding other factors that launch birds on their southward journey. The shortening of daylight and reduction in temperatures may help trigger endocrine glands that in turn can increase body fat deposits for stored energy and bring about changes in reproductive organs.

Throughout the world today scientists are conducting endless experiments to understand more about these mysterious journeys of the birds.

Swarms of Monarchs

As the golden rays of the autumn sun begin to fall at more of a slant across the Northern Hemisphere, other animals start to move on voyages southward. One curious autumn migrant of the airways is the orange and black Monarch butterfly, with its seemingly fragile dusty wings which are tough and powerful enough to carry it thousands of miles, often across oceans.

Early in the fall, swarms of these butterflies in Canada begin gathering by the thousands, clinging quiveringly to bushes and trees. On just the right breeze, they rise and drift southward, often landing at dusk to rest on the same "butterfly trees" that their fore-parents used year after year.

Not all these dusty travelers get to their destinations in California, Florida, Mexico or along the Gulf Coast, but enough arrive to ensure the survival of the species until the following spring, when they begin to straggle north again, in a sort of relay journey carried out by a chain of generations producing offspring as they go. Each generation ventures a little farther north, then lays eggs to continue the curious trek.

Stones for Cold Storage

In the south of France, the solitary wasps wing up Mont Ventoux to an elevation of 6,000 feet and cluster for the winter under stones in a sort of cold-storage vault that keeps them inactive until the spring.

High in the Rocky Mountains of the United States, cold weather in the land below brings the bright red ladybugs upward to spend the winter in clumps covering certain rocks and logs.

Another winged creature, the bat, flies hundreds of miles south when autumn begins to tint the woods with gold and red. Three forms of tree bats in the Western Hemisphere flee southward before the frost—the red bat, the larger hoary bat and the silver-haired bat fly in small, straggling groups. All three species may mingle in the same flight, but each migrating group is usually made up of bats of the same sex.

From mid-August to November, the migration of bats takes place in leisurely style, with the strange visitors found as far south as the Bermuda islands—600 miles out to sea. Species of the hoary and red bats have been found on Hawaii. They are considered the only bats with wing stamina to carry them the 2,500 miles across the Pacific Ocean.

The tiny European bat, Pipistrelle, travels the 600 to 800 miles regularly between southeastern Europe and the central provinces of Russia.

Migrants of the Seas

In the seas, whales and seals are great travelers, voyaging thousands of miles each season. With their thick coats of blubber, whales are not affected by the changes of ocean temperatures as winter comes on, but their sources of food are.

During the summer months, many whales bask in the cool waters of the north polar regions where their food supply—those tiny animal and plant sea creatures called plankton—is plentiful. But as winter threatens, the whales turn to the tropical seas for breeding and calving.

Each year, many people gather along the California coast to watch the passage of the gray whales on their voyage from the north Pacific and Arctic Oceans to southern California.

Another long journey is made each year by that slow but steady traveler, the humpback whale, which sometimes swims as many as 4,000 miles from East Africa and Madagascar to the Antarctic Continent and back again.

Another sea migrant of autumn is the female Alaska fur seal which swims with her pups some 3,000 or more miles from the cool breeding grounds of the Pribilof Islands in the Bering Sea to south of California. Each November, the cows and newborn babes begin their southern migration, while the great battle-scarred bulls spend the winter near the Aleutian Islands or in the Gulf of Alaska. The families will not meet again until spring, when the bulls first arrive at Pribilof, claim an area of land and await the coming of the females.

Other sea creatures fluctuating with the change of seasons include the delicious tuna that travel from the waters of Iceland to Africa, and the smaller fish such as mackerel, sardines, anchovies, cod, whiting and haddock. Even the blue crab of the Chesapeake Bay moves a few miles up and down the placid inland waters each season.

Autumnal Winds Bring Changes

The soil of the earth has its seasonal migrants also, although not so spectacular as those of the more fluid sea and air. From the free windswept tundra of Canada, herds of caribou have already headed south along their regular routes, crossing turbulent streams, rocky ridges and other obstacles in their 400- to 500-mile trek for lichen and shrubs in the lower ranges of the land.

The heavily antlered North American elk straggle down from high mountain passes in small bands as the snow creeps down from white peaks.

In another part of the world, along the equator of East Africa, magnificent mixed herds of antelope move from lowlands to highlands on the slopes of Mount Kilimanjaro to keep up with the luxuriant green grass that follows the rains.

'Unscheduled' Migrations

Sometimes with autumnal winds come odd sporadic migrations of other land animals—the lemmings, those Norwegian rodents that cross streams, cliffs, forests and fields in their mindless rush to the sea where they drown.

Other migrations may be induced by overpopulation, by man, by lack of food or of water—the dreaded hordes of locusts or rats or rabbits. But these are not set by any season or regular time.

It is when the spinning of the planet earth around the sun brings an autumnal change of temperature and light to trigger the annual patter of feet, rush of wings, swish of fins stampeding south that man feels the deep harmonic rhythm of the earth and a constant source of wonder.

• Science News Letter, 86:187 Sept. 19, 1964

Nature Note

Lice

What are reddish when they have just eaten, gray a few hours later, and can be found on tramps, in numbers up to 16,000?

The answer—LICE.

These highly specialized blood-sucking insects are found wherever crowded unsanitary conditions abound, and are the sole carriers of the dreaded typhus fever. During the First World War, many thousands of soldiers died from this louse-borne disease.

Two types of lice are found on human beings. These are *Pediculus humanus,* one variety of which is found on the head and another on the rest of the body, and *Phthirius pubis,* the pubic or "crab" louse.

Lice range from 1/20 to 1/6 of an inch in length, and have flat bodies. They are equipped with claws on the ends of their legs, which they use to grip their host's hair or clothing. Lice are very strong for their size, and are almost impossible to dislodge by scratching.

Head and body lice thrive best in a temperature of 80 to 86 degrees Fahrenheit, and usually live in the hair on the body surface or in underclothing. Crab lice live on the body itself.

Average life-span for lice is seven or eight weeks, during the latter half of which the females lay about ten eggs ("nits") a day.

Lice can be killed by fumigation, heat, or by the application of insecticides such as DDT.

• Science News Letter, 86:187 Sept. 19, 1964