

# DOWN TO EARTH

BY ALAN DEVOE

## *Frozen Sleep Among the Animals*

NOT many creatures of earth are visible now in the frozen woods and fields. A walker there can see only the few thick-furred gray squirrels and hares and deer that are pelted for cold weather, and can hear no livelier bird-music than the small call-notes of hardy nuthatches and chickadees. In mid-winter the populace of wild things has a meager look. But could a man see underneath the surface of the frozen earth and below the icy mud of brook-beds, he would be aware of the presence of a tremendous number of beasts. Only a very few of the denizens of outdoors removed to other climates when the autumn cold came. Some of the summer birds departed, to be sure, and some of the insects died. But innumerable animals only retired to hidden places and went to sleep. By thousands, when the first frosts were felt, they subsided into that lethargy called hibernation.

Indians spoke of hibernation as the Long Sleep, but it is rather more than that. It is a profound

oblivion midway between sleep and death. It is an unknowing and unfeeling more deep and lasting than can be induced in man by the most powerful drugs, a suspension of life processes more thorough and protracted than even the "frozen slumber" which doctors have lately devised as a palliative of cancer. It is a phenomenon unique in nature, and though we are wiser about it than we were in those cradle-days of biology when Dr. Johnson thought that swallows passed the winter asleep in the mud at the bottom of the Thames, it remains a riddle still.

The season of hibernating begins quite early for some of the creatures of outdoors. It is not alone the cold which causes it; there are a multiplicity of other factors — diminishing food supply; increased darkness as the fall days shorten; silence — frequently decisive. Any or all of these may be the signal for entrance into the Long Sleep, depending upon the habits and make-up of the particular creature. Among the skunks, it is usually the

coming of the cold that sends them, torpid, to their root-lined underground burrows; but many other mammals (for instance, ground squirrels) begin to grow drowsy when the fall sun is still warm on their furry backs and the food supply is not at all diminished. This ground-squirrel kind of hibernating, independent of the weather and the food supply, may be an old race habit, an instinctual behavior pattern like the unaccountable migrations of certain birds. Weather, food, inheritance, darkness — all these obscurely play their parts in bringing on the annual subsidence into what one biologist has called "the little death." Investigation of the causes will need a good many years before they can be understood, for in captivity, where observation is more easy than in the wild, the hibernators often do not sleep at all.

The preparations for hibernation begin in early fall, and they are various. The insects — such as survive the winters in adult form — make ready by a drastic dehydration. Their bodies lose the moisture which they have in summer, and which would make them liable to fatal freezing, and become dessicated and brittle. Their reactions to the stimulus of light become, in most cases, the reverse of normal:

beetles ordinarily attracted toward the light are violently repelled by it after dehydration. They creep to dark places. Some of them, like the May beetles, repair to deep sub-frostline tunnels in the earth; some of them seek out crannies under the loose bark of trees and interstices in stumps. With all their body tissues radically dried, and all their responses to stimuli slowed and dulled, they lapse into immobility. Their bodies are stiff and straight, wings and legs held parallel. They are ready to remain unmoving and foodless until the Spring thaws come. They are ready to undergo the experience, common enough among the surface-hibernating insects, of being chilled to well below 32 degrees, Fahrenheit, without suffering injury.

The frogs, in making ready, betake themselves to the deep, soft mud of the brook-bottoms and the shelter of flat underwater stones. The toads, their soft bodies equipped with curious many-fingered lumps of fat to serve as food supply, burrow on cool September days into sandy garden soil or into the banks of their breeding streams, and with arched backs and indrawn legs grow motionless. The snails cease feeding, bury themselves among the moss and leaves, and secrete a covering over the open-

ings of their shells. The trout swim leisurely upstream and grow quiet and unhungry; the spiders that have not perished in the first cold weather withdraw into burrows or spin themselves cocoons.

## II

Most striking is the Long Sleep of the mammals. Raccoons, chipmunks, bats, bears, woodchucks — all these make ready in the autumn for a greater or lesser period of dormancy. They are all animals with imprecisely regulated body temperatures, these mammalian hibernators; during normal summer-time activity their temperatures often fluctuate by ten or fifteen degrees. They do not have a wholly static temperature, independent of the warmth of the outer air, as does a man or a wood mouse or a winter-active deer. They can survive the months of northern cold and snow only by lapsing into a quiescence hardly distinguishable from death. Some of them sleep more deeply than others, some for the whole winter and some for only a part of it. The commonest of them, the woodchuck, serves as a fair exemplar.

The woodchuck's hibernation usually starts about the middle of September. For weeks he has been

foraging with increased appetite among the clover blossoms and has grown heavy and slow-moving. Now, with the coming of mid-September, apples and corn and yarrow-tops have become less plentiful, and the nights are cool. The woodchuck moves with slower gait, and emerges less and less frequently for feeding-trips. Layers of fat have accumulated around his chest and shoulders, and there is thick fat in the axils of his legs. He has extended his summer burrow to a length of nearly thirty feet, and has fashioned a deep nest-chamber at the end of it, far below the level of the frost. He has carried in, usually, a little hay. He is ready for the Long Sleep.

When the temperature of the September days falls below fifty degrees or so, the woodchuck becomes too drowsy to come forth from his burrow in the chilly dusk and forage. He remains in the deep nest-chamber, lethargic, hardly moving. Gradually, with the passing of hours or days, his coarse-furred body curls into a semi-circle, like a foetus, nose-tip touching tail. The small legs are tucked in, the hand-like clawed forefeet folded. The woodchuck has become a compact ball. Presently the temperature of his body begins to fall.

In normal life the woodchuck's

temperature, though fluctuant, averages about 97 degrees. Now, as he lies tight-curved in a ball with the winter sleep stealing over him, this body heat drops ten degrees, twenty degrees, thirty. Finally, by the time the snow is on the ground and the woodchuck's winter dormancy has become complete, his temperature is only 38 or 40. With the falling of the body heat there is a slowing of his heartbeat and his respiration. In normal life he breathes thirty or forty times each minute; when he is excited, as many as a hundred times. Now he breathes slower and slower — ten times a minute, five times a minute, once a minute, and at last only ten or twelve times in an hour. His heartbeat is a twentieth of normal. He has entered fully into the oblivion of hibernation.

The Long Sleep lasts, on an average, about six months. For half a year the woodchuck remains unmoving, hardly breathing. His pituitary gland is inactive; his blood is so sluggishly circulated that there is an unequal distribu-

tion in the chilled body; his sensory awareness has wholly ceased. It is almost true to say that he has altered from a warm-blooded to a cold-blooded animal.

And then, in the middle of March, he wakes. The waking is not a slow and gradual thing, as was the drifting into sleep, but takes place quickly, often in an hour. The body temperature ascends to normal, or rather higher for a while; glandular functions instantly resume; the respiration quickens and steadies at a normal rate. The woodchuck has become himself again, save only that he is a little thinner, and is ready at once to fare forth into the pale spring sunlight and look for grass and berries.

Such is the performance each fall and winter, with varying detail, of bats and chickarees and worms and bears and a hundred other kinds of creature. It is a marvel less spectacular than the migration flight of hummingbirds or the flash of shooting stars, but it is not much less remarkable.





## POETRY

### THE COMSTOCK LODGE: *An American Ballad*

BY MATTHEW BILLER

THE Comstock tale is a tale of silver,  
Of men who gambled and drank their fill,  
Of Immigrant's Pass and the Carson River,  
And cemeteries under the hill;

Of men who duelled at twenty paces,  
And the warm wet knife of Old Sam Brown,  
Of Piute Indians with hungry faces  
And the christening of Virginia Town.

Of Pony Bob and Wells and Fargo,  
Of Judge Freebaum and Dad Furzee,  
Of camel trains and their desert cargo,  
Of William Stewart and Molly Magee.

The boys came over the high Sierras,  
They pounded the passes to trails and roads,  
They beat the drifted snow in furrows  
To stake their claims on the queen of lodes.

The boys climbed high on Finger Peak  
Till they struck their heads against the clouds;  
Till a man wore a star on either cheek  
And his pocket carried the cheer of crowds.

When Millicent Blair heard of the rush  
She kissed her lovers in Placerville,  
She gathered her laces, silk, and plush,  
And lent her charm to the silver mill: