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Notes on the Space We Take

FROM *Ninth Letter*

THE WOMB is the smallest space in which a human being may live.

Most human babies, when they are born, weigh from 7 to 8 pounds — about the same as a gallon of milk.

When I was born, I weighed 7 pounds, 8 ounces. When my mother was born, she weighed 4 pounds. She lost 2 pounds before she began growing again. When my mother's mother was born, it didn't cross anyone's mind to weigh her.

Little babies — under 5½ pounds — are said to be much more difficult to care for than big babies.

When I stand as tall as I can, I am 5 feet, 8¼ inches high. I most often weigh 142 pounds. Buster Keaton weighed that much, and so did a world-record-setting paddlefish caught in Montana in 1973. My weight is also the weight of a newborn giraffe, which stands 6½ feet tall the first time it takes to its feet, casting a much bigger shadow than I do.

Hermit crabs grow out of their shells — not into them.

Our little blue tent has 37 square feet of floor space — a little over 5 feet by 7 feet. It is a two-man tent. But we are one man and one woman. Still, it fits us snugly, with enough arch to stretch up an arm, and a taut wall for our toes to brush in sleep.

Hermit crabs drag their shells around a spring of fresh water on the bank of grass behind the palm trees, near our little blue tent. They hiss through the low tropical forest, among fallen fruits. They hiss onto the beach, shells scraping, making tracks crossing tracks crossing tracks.

The hermit crab, which is not a true crab, has a somewhat stiff exoskeleton but lacks a protective carapace. This leaves exposed his tender belly. To protect himself, the crab looks for snail shells, abandoned or soon to be abandoned. When he finds one he can back snugly into, he turns his small right-hand claw backward to grip the spiral inside his shell, hoisting the whole thing onto his back. He puts it down when he is resting or eating, and heaves it up again when he takes a walk. The hermit's left-hand claw is enormous. He uses it to gather food and fend off attackers. The hermit crab also uses his large claw as a front door, slamming it across the entrance to his shell when he wants to be alone.

Hermit crabs prefer a high volume-to-weight ratio when selecting a shell to live in. A light, roomy shell is ideal. A hermit crab will look for a new shell when his old one becomes dirty, broken, or otherwise unsuitable — or he will change shells for no apparent reason at all. When a hermit crab molts — sometimes more than once a year — he sheds his old skin. It peels off and slides over his head like a full-body disguise. The crab then experiences a few days of terrifying nakedness, when his new skin is soft and supple. Finally the new skin hardens. Only during his few days of soft-skinned vulnerability may a hermit crab grow. When he emerges from his molting hole in the sand — if other crabs haven't already found him and eaten him alive — he searches out a bigger shell for his newly bigger self.

Scientists and activists note a dire situation on the world's beaches: a shortage of snail shells for hermit crabs to move into. One way for a hard-up crab to find a new shell is to select one from someone else's back. "Shellfighting" ensues — one crab twisting the other out of his shell, and the evicted crab scrambling for cover. Scientists have observed that when a shiny, roomy new shell is placed on the beach, a crowd of hermit crabs will converge upon it. But instead of mayhem, a ritual of great civility follows. The crabs arrange themselves in order of size. The largest crab exits his shell and climbs into the shiny new one. The crab just below him in size takes his old shell, and so on down the line, until every crab, down to the teensiest, has a comfortable new home. It is clear to everyone involved that the teensiest crab is pleased with his take, and would be miserable in the largest shell — perhaps even unable to lift it. In his case, the ideal home sits right up against the belly with a smooth

plate of calcium carbonate, and has a doorway no larger than his own left hand.

Under duress of a snail shell shortage, hermit crabs have in recent years been sighted carrying plastic pill bottles and airplane liquor bottles on their backs. Elizabeth Demaray, a New Jersey artist, proposes a rescue operation: the distribution across American beaches of custom-molded plastic homes for hermit crabs. Since pollution and consumer excess are blamed for the decline of shoreline health and the resultant tumble in snail populations, the artist suggests that corporations be made to pay for the plastic hermit-crab homes (which have an irresistibly high volume-to-weight ratio). In honor of their support, these corporations would have their logos printed on the plastic.

More than 1 million Americans call a recreational vehicle their primary residence.

There are no reliable statistics for the number of Americans who live in cars and trucks. But people who live in cars and trucks by choice say they like the convenience of a cozy, warm place to read and then sleep, even if it's hard to host a party. People who live in cars and trucks by necessity are less often interviewed.

Cars, trailers, tents, yurts, gers, teepees, wickiups, wigwams, and benders are houses you can pack up and take with you. But sometimes houses move from place to place only in the mind. For some Inuit people, the work of building an igloo was a daily task, like building a fire. A new evening, a new landscape, a new house. These were houses not meant to be lived in more than once and certainly not by more than one family.

Some people find ways to bed down away from the land entirely. Some live in boats on water, some sleep in airplane cabins, and some astronauts subsist in weightless space.

For kids, NASA uses an apple metaphor.

"Pretend your apple is the planet Earth. It is round and beautiful. It is full of good things. See how its skin hugs and protects it? Cut your apple into four equal parts. Three of those parts are water on Earth. You may eat these three parts. The fourth that is left is dry land. Cut that dry land part in half. One part is land that is too hot

or too cold. Eat this part. Cut a little more than one half. Eat the smaller part. It is too rocky or too rainy. Food can't grow on this part. Peel the skin from this part. Eat the inside. Look at the little part that is left. This shows us all that we have to grow food for the world. Some of this little bit has houses, schools and malls on [it]."

Earth provides about 58 million square miles of land. Of that land, 23 million square miles is considered habitable by human beings — as long as food can be brought from elsewhere.

The average American home has 2,200 square feet of livable space — a little more than a singles tennis court. The average American family consists of 3.86 persons. The average home space an American inhabits is 570 square feet — the size of the two rectangles into which tennis players must serve.

Before we married, my husband and I lived in a house of 550 square feet. When we married, we moved into a house of 1,175 square feet. When we finished graduate school, we moved into the city, into a house of 1,800 square feet.

Unlike hermit crabs, my husband and I have given ourselves room to grow in our new house. If we don't fill it with the work of our brains and hands, we will create children to share our space with us, thereby decreasing the relatively high space-to-human ratio in our home.

Biltmore Estate, in Asheville, North Carolina, is America's largest home. It has 250 rooms, including 34 bedrooms and 43 bathrooms. It has almost as many fireplaces as bedrooms and bathrooms combined. Tycoon George Washington Vanderbilt finished building the Biltmore in 1865, when it had 4 acres of floor space — enough for three football fields.

In terms of Earth's geologic history, space was not a gift to life but vice versa.

Fed up with oversimplified guidelines for what size tank will fit aquarium fish, scientists G. J. Reclos, A. Iliopoulos, and M. K. Oliver offered new formulas in the June 2003 issue of *Freshwater and Marine Aquarium*. "The best known [rule] is the 'one liter of water per cm of body length' (or 'one gallon of water per inch of fish') rule which, in our opinion, is useless . . . The statement that shows the impracticability of this rule is 'Twenty neon tetras each measuring 1.5 cm may fit a 20 liter tank but one 30 cm fish will not.'"

In place of this shoddy guideline, the authors provide the following (along with easy formulas for tank height and width), where L=tank length and FL=maximum expected fish length:

Peaceful fish, peaceful tankmates:

$$L = FL \times 4$$

Mild temperament, cruise predators:

$$L = FL \times 5 \times 1.3$$

Aggressive fish, good swimmers:

$$L = FL \times 5 \times 1.2$$

Aggressive fish, poor swimmers, ambush predators:

$$L = FL \times 5$$

Aggressive fish, cruise predators:

$$L = FL \times 5 \times 1.5$$

Pair of aggressive fish, cruise predators:

$$L = FL \times 5 \times 1.5 \times 1.2$$

There is a range of literature on the proper way to design zoo enclosures. Some guidelines say that most mammals need an enclosure that allows them to explore changing landscapes, work for food, search for mates, get away from the viewing public, and simply investigate their territory. On the other hand, at least one scientist states that in designing zoo enclosures, keepers need only bear in mind that "animals will usually only move to find food, escape danger, or find mates."

I have seen six smooth belugas negotiating space in a single aquarium pool, raving polar bears pacing zoo pens, and caged birds wedging their beaks between bars.

Belugas are the only all-white whales, colored to blend with the edges of Arctic ice fields, where they dwell all year. Gray whales migrate much farther — up to 12,500 miles every year — but at home near the ice, belugas dive a thousand feet deep.

Polar bears move in enormous, private northern arcs. They wander thousands of miles every year on paths programmed inside their brains. At least one bear has been tracked pacing the ice 3,000 miles from Alaska to Greenland — then back.

The Arctic tern migrates between the North and South Poles, a journey of 10,000 miles twice a year, perhaps experiencing more sunlight in its lifetime than any other species on Earth.

Clipping a bird's wings, obviously, does nothing to diminish its impulse to fly.

The urge to migrate is deeply rooted in human ancestry.

I was born in Washington State and grew up 70 miles from my maternity ward. When I was three, my parents and I moved from a one-story house to a two-story house a mile away. When I graduated from high school, I moved across the state. When I graduated from college, I moved across the country. By this time I had discovered flight. I traveled to a new continent every year, and wore out many pairs of shoes.

For over 99 percent of human history, we moved as nomads: with the seasons, in small groups, to the places most likely to provide edible plants and game.

Travel writer Bruce Chatwin loved the idea of human migration. In 1970, he wrote the following in "It's a Nomad, *Nomad* World":

Some American brain specialists took encephalograph readings of travellers. They found that changes of scenery and awareness of the passage of seasons through the year stimulated the rhythms of the brain, contributing to a sense of well-being and an active purpose in life. Monotonous surroundings . . . produced fatigue, nervous disorders, apathy, self-disgust and violent reactions. Hardly surprising, then, that a generation cushioned from the cold by central heating, from the heat by air-conditioning, carted in aseptic transports from one identical house or hotel to another, should feel the need for journeys of the mind or body, for pep pills or tranquillisers, or for the cathartic journeys of sex, music, and dance.

Chatwin also said it simply. "The best thing is to walk."

My neighbor is a retired mail carrier. He takes a three-hour walk every morning, returning in time for lunch. Then he takes a three-hour walk every afternoon. He walks in all weather, under all manner of clothing. Puzzled by his daily miles, I asked if he misses delivering mail. No, he said. He misses movement.

People who seem small end up in small spaces.

The best way to shelter a child is against the body. But humans who do not enjoy wearing infants against their bodies, and who do not

want their infants to get away, often store their babies in small enclosures, such as baskets, plastic carriers, cradles, bassinets, playpens, and cribs.

Some people set up house in cardboard boxes. Sometimes they are children in trim backyards, and sometimes they are grownups on public property.

My grandmother has just moved from her two-story home overlooking Puget Sound into a room at Merrill Gardens at Mill Creek. She had to pass a test to qualify for lower monthly rent. She had to prove she wouldn't require too much assistance.

I keep telling my grandmother that her new home is going to be like college, or nursing school, all over again. Friendly faces in dorm rooms up and down the hallways. She seems only partly convinced, perhaps because dropping out means something different now.

Tiny people, huge people, hairy people, albino people, legless people, and two-headed people could all be viewed for the price of a coin in the U.S. between 1840 and 1940, when freak shows were wildly popular. Lots of times the freaks were displayed in cages or other small enclosures, but it seems they were released after the show.

Judges in many U.S. states have declared that a prison cell should allow no less than 60 square feet of space per prisoner, but this edict is rarely followed in U.S. prisons, which are endemically overcrowded. The American prison at Guantánamo Bay features prison cells of approximately 48 square feet — about 6 inches larger on all sides than our blue tent. Humans have been — or are — stored in much closer quarters: hulls of ships, forbidding camps, airless train cars lurching in the night.

It would take 3.4 billion Biltmore Estates to swallow Earth's livable space. It would take 294 billion average American homes, or 13 trillion Guantánamo cells. Earth's population ticks upward every second. At the time of this writing, the planet supported about 6.55 billion human lives.

Perhaps, then, it should be no surprise that humans commonly discuss the colonization of Mars, the moon, and other planets in the solar system.

Claustrophobia is the human fear of small or enclosed spaces.

Rose Hill Cemetery in Whittier, California, is the largest cemetery in the United States. It is the size of 106 football fields. Only a

handful of people with claims to fame are buried here — a few professional athletes, a few musicians — and there is space available for newcomers.

Less than half the size of Rose Hill Cemetery, Arlington National Cemetery is the second largest burial place in the United States. Former presidents, astronauts, and Supreme Court justices are buried there. Arlington has some space available, but to be buried there, one must have been a U.S. president, a prisoner of war or other unusual veteran, or their spouse or child.

When there is no more room for the dead, or when we try to hide the dead, humans bury bodies one atop another. When there is no more room for cemeteries, humans build homes and markets and parking lots upon them. In Alexandria, Egypt, for example, archaeologists were recently able to dig down into two-thousand-year-old Necropolis, a city of hundreds of tombs, only when a building was torn down to make room for a highway. After a whirlwind excavation, workers sealed the tombs over again.

Despite the inevitable tight fit, thousands of people every year purchase small plots of land for their bodies, or little lockers for their cremated remains.

Some traditions allow corpses to feel the freedom of space. They place their dead in trees, or slip them into rivers, lakes, and oceans.

My grandmother has asked us to check the "discard" box on the funeral parlor's form when she dies. She will not have a coffin or an urn.

In the summer of 1926, escape artist Harry Houdini bought a bronze coffin and first performed a new trick. Stepping inside, Houdini bade his assistants close the lid and lower him into a pool of water. Ninety minutes later, the assistants pulled up the coffin. The magician emerged, smiling. But Houdini was able to perform this trick only a few times. A stomach illness killed him that fall, and he was buried in the bronze coffin.

A standard coffin is 80 inches long and 23 inches wide. The largest regularly produced coffin available to U.S. funeral homes is 88 inches long and 36 inches wide. It is capable of respectfully accommodating a 500- to 600-pound corpse.

The tiniest coffin available is made for premature infant deaths. It is 10 inches long and 5 inches wide.