

On the Origin of Tepees

Why Some Ideas Spread While Others Go Extinct

Jonnie Hughes



A Oneworld Book

First published in Great Britain and the Commonwealth
by Oneworld Publications 2012

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A CIP record for this title is available
from the British Library

ISBN: 978-1-85168-943-9
Ebook ISBN: 978-1-78074-110-9

Cover design by Dan Mogford
Designed by Ruth Lee-Mui
Printed and bound by TJ International,
Padstow, Cornwall, UK

Oneworld Publications
185 Banbury Road, Oxford, OX2 7AR, England

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The New World



The Great Indoors

Ads and I stand by, powerless, as Kenny G murders 'The Girl from Ipanema'. We're in a lift with two men, one woman, and a toddler. The vista flashes before us, alternating glimpses of a vast interior space glittering with delights and touched-up I beams at close quarters. The elevator is fast enough to make us all feel a little sick, and the woman next to us groans.

We're travelling within the bowels of the Mall of America (the MOA), the most visited enclosed shopping centre in the world. There are more than 230,000 square metres of retail space within these walls. Twelve thousand people work here. It has over five hundred shops. There can't

be much on Earth that you can't buy in this wondrous room. There is a shop here that sells just beads, and another that sells just slippers. There's a dedicated remote-control helicopter shop, a 'Wallet World', a beanbag furniture store that sells 'the security of a stuffed animal with the functionality of a pillow – It's a pillow and a pet. It's a Pillow Pet' – and a shop that sells only the things people would need if they wanted to give up smoking. You couldn't count the number of different things for sale in this building. The diversity, the tiny differences between each different item – it's mind-blowing. And if you don't want to buy stuff, the MOA boasts a comedy club, an eighteen-hole crazy golf course, a staged wedding each night that you can buy tickets to, a shark tank that you can swim in, and a theme park complete with roller-coasters and log flumes – all of it under one roof.

What sort of people would need such an overzealous interior? The answer: Minnesotans. Ads and I are standing inside an inside, inside Minnesota. And Minnesota is a place in which being inside matters. This state suffers five months of snow and temperatures of between -50°C in winter and 46°C in summer. If you want to live a full life in Minnesota (and Minnesotans do, I assure you), you have to build yourself a haven from the Great Outdoors. Your own little world. A Great Indoors.

The lift pings, the doors open, and the other people shuffle out. Ads and I follow them into towering cloisters lined with purchasing opportunities, and discover that even at 10:00 AM, the mall is full of people of every description, shuffling, gazing, buying.

The Mall of America must be the preferred habitat of my species. There are probably tens of thousands of us in this room. If an ecologist ever stumbled upon a species as large as we are, in such a swarm, they'd have to conclude that they had discovered the species' hotspot, its idealized niche: a patch of the planet that just happens to satisfy all the needs of that particular living thing, fully and completely. Home Sweet Home. And they'd be right. The MOA does satisfy all of our needs. It's warm and dry. It has a superabundance of food and water. There are no natural predators here, and it's largely disease-free. It's the perfect place for a rather weird naked ape from tropical East Africa.

In genetic terms, we are all (roughly) East African. Our species, *Homo sapiens*, evolved there ten thousand human lifetimes ago, and although there have been some minor tweakings and additions since then, our

gene pool, the totality of all our human genes, has remained (roughly) the same ever since. ‘Human evolution is over,’ says Professor Steven Jones, a leading geneticist at University College, London. After 5.8 million years of madcap, inexplicable evolution in which our brain inflated faster than an airbag in a head-on collision, our bout of natural selection seems to have come to an abrupt end with the advent of the ‘caveperson’ in East Africa two hundred thousand years ago. Which means that, in genetic terms, Ads and I, and all the Minnesotans in this mall, *are* cavepeople. We may feel thoroughly modern, but our bodies are out-of-date by two hundred thousand years. If a genuine antique cavewoman entered The Gap right now and had the wherewithal to start flipping through the jeans next to me, I wouldn’t bat an eyelid. She would look (roughly) the same as the other modern cavewomen in the shop. I could have children with that antique cavewoman, our DNA would be that similar. So what’s going on? Why do we cavepeople appear to be frozen in time?

Sandwich Selection

Ads and I gravitate towards the food court; we forgot to have breakfast this morning. I know, as Roseanne once said, ‘that’s a special kind of stupid,’ but hey, we just flew in from Heathrow yesterday, so our clocks are off. I stand there, identical to all the other cavepeople, looking up at the options. No hunting or gathering for us anymore; we can do the money-for-goods swap that cavepeople do nowadays, and walk away with a hot, steaming quesadilla. Or shall I go for the bagel? It’s healthier. (As if that’s ever really mattered to this caveman: two hundred thousand years on, my Stone Age desires for protein, salt, and sugar still rule.)

Natural selection may no longer be happening to us, but it is happening to the sandwiches in the food court.* Every time one of us makes a choice, the sale is made, the stock runs low, and the manager makes a mental note to order more next time. The popular choices – those ‘selected for’ – will be reordered (will *reproduce*) and grow in number over time. The dried-up specials that the manager thought were ‘worth a try’ – those ‘selected against’ – will not be reordered (will fail to reproduce) and will eventually become locally, if not globally, extinct. Over

*Because human choice is involved, this is technically known as artificial selection, but bear with me.

the weeks and months, people's selections dictate the sandwich 'species' composition of the food court community.

But as well as selecting *between* species, food court natural selection works *within* species. Sift through the pile of supposedly identical tuna melt panini and you'll find some that are slightly older: The tuna looks a bit too brown. There are some with a huge piece of raw onion sticking out; not good for the breath. One has clearly been dropped and hastily reassembled. These individuals are 'less fit' than the younger, onion-meek, tidy ones. If tuna panini are sufficiently abundant – if there are more tuna panini than tuna panini choosers – the 'selection pressure' will be sufficient to ensure that the less fit individuals remain in the fridge. A good manager will spot the problem and complain to the supplier: 'Don't give me brown tuna, easy on the onion, and don't repack a sandwich unless you do it carefully.' Over time, the population of tuna melt panini will adapt. Their 'average fitness' will increase. In the human world, we call this process 'quality control', but outdoors, in the wild, it is natural selection.

So how come our quality is no longer controlled? How is it that our two-hundred-thousand-year-old cavepeople bodies are never selected against, no matter how much metaphorical onion is hanging out of our metaphorical panini? How did we absent ourselves from biological evolution?

Remember the naked mole rat? It also managed to sidestep natural selection. How? It tucked itself away in a world of its own making, a perfect little 'indoors' with a constant temperature and humidity year round. A safe place where cruel nature can't get at it, where there is no 'survival of the fittest' to worry about. Well, we do that, too. We live indoors, only we go one step further: we take our *indoors* into the *outdoors*.

We don't huddle in the dark in a never-changing bunker. We venture out across the globe to deserts and mountain ranges and islands and Minnesota. We go to these extremely dissimilar places – places in which a naked tropical ape has no place being – and do something magical: instead of adapting to suit the local environment, we *adapt the local environment to suit us*. No matter where we are on Earth, we can fashion *Home Sweet Home*. The Mall of America is just the start of it. Outside here there are tens of thousands of farms and shops and public buildings and homes supplying everything we need: warmth, water, food, shelter, a lack of

predators, the near-absence of disease. It's like we're forever living in an idealized East Africa, an East Africa that only ever means us well. And because we're always living in the best of all possible East Africas, our antique caveperson bodies never have any quality-control issues. Our 'manager' never has cause to complain.

It all seems too good to be true, and if you're like me, a skyhook sceptic, the natural response is that it must be. I don't believe in magic. This 'miraculous' power must be a conjuring trick. So what are we doing when we build Home Sweet Home in Minnesota? What's the trick?

Little Lars on the Prairie

This time, Ads and I use the stairs that border the enormous atrium in the middle of the mall, the home of the Nickelodeon Universe. I try to relax and enjoy the spectacle of an indoor Spongebob Squarepants roller-coaster, but I'm cross because I've been in the States for less than twenty-four hours and I've already ruined one pair of trousers. I knew I shouldn't have gone for that tuna panini.

A Barnes and Noble sucks us off the lower cloister; bookshops have a tractor beam effect on me. Inside, near the Local History section, a couple starts talking to their children in a strange language, and this takes me totally by surprise. Ads and I had the distinct impression that we would be seeing only Americans in Minnesota. Yet here are people, deep in the mall, speaking an exotic tongue. The language is guttural but not unpleasant. A melody loops around the words, and as the mother speaks, I join her children and patiently watch her lips move, entranced. When I realize that they are all now staring at me, I glance back at the shelves, notice the numerous books on Scandinavian immigrants, and the whole thing comes together. They must be speaking Swedish or Norwegian. They *are* Americans – *Scandinavian* Americans.

Over a quarter of the people in this mall will have Scandinavian ancestry. Norwegians, Swedes, Icelanders, Finns, and Danes began coming to Minnesota as early as 1825, three decades before it was officially a state. They left Europe because it had become a place of political unrest, bad harvests, and religious intolerance. Upon landfall in the busy East, grabbing land in the Far West seemed the only option. Naturally enough,

these people from the North of Europe gravitated towards the North of the US. At that time, Minnesota was the most *northern* and *western* you could get: a cold, forested wilderness sparsely populated by French fur trappers, woodland Indians, and the results of their occasional union, the *Métis*. Fur was big business back then, and the young United States resented Britain, because it had a tight control on the trade: a grasping hand that came down from the North, stole the pelts from the backs of American animals, and retreated again to get rich. As an act of intent, the US government built a castle, Fort Snelling, where the Minnesota River meets the Mississippi River, only eight miles from where I am now. The immigrant Scandinavians hurriedly gathered around this northwest outpost.

Minnesota was much less habitable in the early nineteenth century, before there were nice, warm interiors to hide in. Starting from scratch in a place like this was tough. However, there were some advantages to the location: the falls just above the fort were a superb source of power for timber mills, and the wide river just below the fort marked the highest navigable point on the Mississippi. Within a few years, a milling industry had been set up on the falls to process the trees as they were taken down, and a river port had budded on the banks downstream. By the middle of the century, the mills had given birth to the town of Minneapolis, and the port had become St Paul, together the Twin Cities of Minnesota.

As the woodland fell, the Scandinavians set up farms on the prairies. As the mills turned from timber to flour, the settlers fed them with grain. To their great fortune, they had happened upon a young, rich soil that had been laid down only as the glaciers retreated, ten thousand years before. It was as productive as any in North America. The good soil began to burst with wheat, and Minneapolis became the world's largest flour milling plant. Its prosperity drew successive Scandinavians from their homelands, especially Norway. In the century after 1825, one third of Norway emigrated to the US. With the exception of Ireland, no single country ever emptied a larger percentage of its population into America. Minnesota filled up with Vikings, people perfectly equipped to conquer a wild land that spends up to five months of the year below freezing.

But in what way were they perfectly equipped? True, they had very pale faces, which would have helped them make enough vitamin D

under the dull Minnesota sky,* but other than that, their genes hadn't given them any special tools for their new life in America. Instead, it was their fourteen-thousand-year history in a land of snow and lakes and cold plains and trees that made the Scandinavians fit for Minnesota. Nineteenth-century Scandinavians were born lumberjacks, because they had always been surrounded by forests. They were expert carpenters. They were world leaders in vernacular architecture – the craft of making beautiful, functional buildings out of local materials – because their small, dispersed population in Scandinavia had ensured that the region never fell into the riot of feudalism and the desire for the stone fortresses and flamboyant palaces so characteristic of the rest of medieval Europe. For six thousand years they had been farming lands with a short growing season. They already knew how to raise crops quickly in a poor summer. They unthinkingly built big barns to house their livestock in the winter. They automatically collected the winter manure and added it to their soils. During the cold, dark months, they didn't waste their time; they had a nagging feeling that they ought to be making clothes and tools. Their Viking days had given them long traditions of furriery, leather, and metalwork. To top it all, these new Americans were psychologically and socially buttressed by a deep Lutheran tradition that denied extravagancies and frivolities and promoted hard, simple work; good, solid craft; and a strong, supportive community. They were preconditioned for life in Minnesota. Succeeding in this climate was already routine for the Scandinavians: they'd spent millennia learning how to survive in a place like this.

So it didn't matter that, underneath, they were just naked tropical apes. Within a few decades of arriving in Minnesota, the Scandinavians were safe and warm in this wild, cold place. Just like the naked mole rats, they had succeeded in constructing Home Sweet Home, a perfect little world of their own, an 'indoors' where nature couldn't get at them. But unlike that of the naked mole rats, this shelter was not fashioned from the hard desert soil. It was built out of something, on the face of it, far more fragile: their memories of the things their parents and grandparents had always done.

*Vitamin D is made by the skin with solar power. The light skin of Northern Europeans and northern Asians evolved to compensate for the dullness of their homelands: it let more sunlight through than the original brown skin did.

And there's the magic, right there, hidden in the brains of us humans: a capacity to memorize another human's solution to a problem. This is, to put it mildly, an uncommon talent, and it sets us far apart from all other living things. To demonstrate exactly how, here's a quick survey of Life's approaches to problem solving. (Don't worry. It won't take long. In the 3.5 billion years that Life has been evolving, it has come up with only four of these approaches.) My framework for this venture is the classic playground question 'Why did the chicken cross the road?' Only, here, the question is not 'why' but 'how,' and we'll have to start with something much dumber than a chicken.

The Road to the Ultimate Problem Solver

Scenario: On one side of a road are four creatures: a jellyfish, a sea slug, a chicken, and a human. Each of them will try to solve the problem of crossing the road. I don't know *why* they do it, but I do know *how*:

HOW DID THE JELLYFISH CROSS THE ROAD?

(THE 'DARWINIAN' CREATURES)

A jellyfish, one of the world's simplest creatures, is a good example of the first type of living thing that arrived on the Earth, the *Darwinian creature*.* These creatures have only one solution to any one problem: the solution that is hardwired in their coordination systems. Like most animals, the jellyfish is coordinated by nerve cells, or 'neurons', laid out in networks, just like a railway system, so that each piece of track almost touches the next piece of track. When a stimulus is perceived, a nerve impulse, an electrical spark, is triggered at an origin 'station'. It travels down the track at an impressive speed and, upon reaching its terminus, initiates a response that can be only one of two things: the contraction of a muscle (to move the creature) or the release of a hormone (to alter the 'settings' of the creature). When you boil it down, all animals, including us, are restricted to this modest choice of two, which means that all animal coordination is just a question of when to twitch muscles and when to squirt hormones. The key to getting more complex creatures is to give them not more response options but more complex railway systems.

*Plants, fungi, and all those microscopic living things that we can't satisfactorily classify also fall into this first category of creature.

The railway system of Darwinian creatures is basic: a series of simple routes that are laid down before they are born (which is what ‘hardwired’ means). There is no track building allowed during their lifetimes: they are stuck with what nature gave them, at the mercy of their innate ‘reflexes.’ If their network is poorly built, then they are destined to give the wrong response and possibly end up dead. The saviour of Darwinian creatures is that each species will have many members, and each member will have a slightly different railway system and, therefore, a slightly different response to any one situation. This variation *within the species* is the key to the survival of the Darwinian creature. Among them, because they vary, there should be at least a few that can respond well to any one situation. And, by the rules of natural selection, it will be these fit individuals who survive to create the next generation. Perfect should the situation arise again. Not so great if a completely novel situation should come along. Such as crossing a road.

There stands our jellyfish on one side of the road. (Okay, we’ll have to partially submerge the road in seawater so it can move.) It’s joined by a dozen others of the same species. They look just like our jellyfish, but each is wired up slightly differently. When the gun goes off, one of them shoots across the road, numb to the inevitable tremors of the oncoming cars. It doesn’t last long. Others move off more slowly, and one or two get squished before we begin to see that some are hardwired to freeze when they feel the vibrations. If they are not in the line of the tyres, then that’s a good reflex. If they are in the line of the tyres, then it’s not. As it happens, the traffic on my road is quite heavy, so none of these eager jellyfish makes it.

(Our jellyfish still treads water on the edge. What is it waiting for?)

More jellyfish set off. One was born with a peculiar zigzag swimming pattern, which might have worked if it was swimming *towards* the vehicles, but moving perpendicular to them, it soon gets splattered. One continually head-butts the road surface – clearly it’s preprogrammed to take to deeper waters, but none is available here, so . . . *squelch*. Now only two are left, our jellyfish and another, still wafting in a stable position at the starting line. For hours they wait by the side of the road, until nightfall. Jellyfish can detect the presence or absence of sunlight. These two individuals are hardwired to move only when the sun is switched off. It’s just a fluke, but it will help them in this situation, because the traffic dies down after dark. Off they go. Lady Luck still has to play her part,

but, sheltered by the increasing darkness, they both finally make it to the other side. Lone survivors of the road problem, these two individuals will be solely responsible for making the next generation of jellyfish. The population they found on the other side of the road will, more than likely, tread water all day and swim only at night, an 'adaptation' that may be entirely pointless in their new environment. But that's Life.

The important thing is that no jellyfish ever gets to *make a decision* about what it will do next. It only ever acts in the one way that it can act: by playing out the behaviours that its equally oblivious parents once did in the same situation. Since they survived long enough to become parents, it's a good bet their hardwired behaviours will work again. This is why they are called Darwinian creatures, because natural selection is directly responsible for crafting their coordination systems. They will be forever dumb, because there is no cause to be anything else.

Now, don't be smug; there is more than a touch of the jellyfish in you. Ultimately, we stem from Darwinian creatures, and the proof can be found everywhere in our railway networks. Our eyes blink, our saliva gushes, our bladders fill and empty with or without our permission. We don't get to decide to have these responses. They are hardwired, innate reflexes straight out of a jellyfish, and perfect for the things that you don't need to think about.

So the answer to the question 'How did the jellyfish cross the road?' is *by being lucky enough to have good reflexes.*

HOW DID THE SEA SLUG CROSS THE ROAD?

(THE 'SKINNERIAN' CREATURES)

Burrhus Frederic Skinner, the American psychologist, discovered this kind of creature. Skinner experimented on pigeons, but we now know that even simple things such as sea slugs can work in this way. In fact, most living things fall into this category of creature. They differ from their ancestral Darwinian creatures in one important respect: they can learn.

When faced with a new problem, a sea slug will have not one but a number of different behaviours at its disposal. They pick one at random; no 'thought' is involved. But if their behaviour leads to a reward (in this case, not getting killed), the sea slug will be *more likely* to do that behaviour should the same situation arise again. If they suffer as a result of carrying out a behaviour (perhaps, in this case, experiencing a near

miss), then they will be *less likely* to carry out the same behaviour next time. In other words, sea slugs learn from their triumphs and disasters. They don't think about it beforehand, but they have a memory that can remember what happened afterward. To extend the railway network example, for every origin station, a sea slug offers a series of termini. Faced with a stimulus, it will send a spark down one of its routes *at random*. If the result is favourable, it will promote that route from a branch line to a main line. If not, it will close the line completely and try another route (assuming it survives the first attempt). Hence the railway network of a Skinnerian creature is able to respond to experiences: it has a certain degree of 'plasticity', and plasticity is at the heart of all learning.

This simple type of learning is casually referred to as 'trial and error'. It's the foundation of most forms of animal training, and we humans routinely use it, too, when faced with new situations.

How did the sea slug cross the road? *Also by being lucky . . . but next time it won't need luck.*

HOW DID THE CHICKEN CROSS THE ROAD?

(THE 'POPPERIAN' CREATURES)

Being a Skinnerian creature – being able to learn from your mistakes and triumphs – is extremely useful, but there's always the danger that you might choose the wrong opening gambit and get yourself killed. Far better would be a system in which you somehow carried out the trial-and-error process *in your head* beforehand. In other words, think about the problem and solve it before you do any behaving at all. These are the Popperian creatures, since it was the great philosopher of science, Sir Karl Popper, who said that foresight permits 'our hypotheses to die in our stead'. Popperian creatures are a subset of Skinnerian creatures, which are, in turn, a subset of Darwinian creatures. If you are a Popperian, you are both Skinnerian- and Darwinian-enabled. One example is a chicken.

In railway terms, a chicken faced with the daunting and novel prospect of crossing a road first 'imagines' what would happen if it sent sparks down each of the available tracks. To do this, it must have *a model of the universe* in its head – a model that is realistic enough to generate useful predictions. This model will be a complete hodgepodge, constructed from the chicken's memories of all sorts of different learning experiences. It's probably not very good – the result of some confused and

imprecise track laying – but if it enables the chicken to make a better-than-chance selection of what to do next, then it serves its purpose, and skill, not luck, decides the outcome.

Popperian creatures vary tremendously in quality, because putting together a good model of the universe is a difficult task. You have to remember experiences accurately, you have to remember the correct ‘causative’ components of each experience, and you have to slot these useful experiences with great skill into your model of the universe. We humans are supremely talented at doing all of these things, orders of magnitude better than a chicken. We have big brains bulging with memory cells. We are exceptionally proficient at deducing the causes of effects that we experience. And we construct exquisite, intricate models of the universe inside our heads as no other creature can. But it’s not completely effortless. Every time you stop to ponder something, you can feel your brain working on it, can’t you? Finding a good route on a map, considering your next move in chess, trying to pack the car – all involve referring to the model of the universe inside your head so that you can make a better-than-chance first move. It takes effort and care. And it’s not foolproof; people get run over every day.

How did the chicken cross the road? *By coming up with a plan.*

HOW DID THE HUMAN CROSS THE ROAD?

(THE ‘DENNETTIAN’ CREATURES)

Fortunately, on many occasions, we humans don’t even have to come up with a plan, because we are Dennettian creatures, named after Daniel Dennett, the American philosopher to whom I owe this entire section; it’s based, up to this point, on his Tower of Generate and Test, a model that describes the ways different brains react to the problems they encounter. Dennettian creatures can do something far more impressive still than Popperians. We can solve the problem of how to cross the road safely without ever having experienced that situation in our lives before, and we can do it without taking any time to think about it. ‘How?’ you ask. Simple: someone tells us how. Dennettian creatures are able to ‘borrow’ the lived experiences of other members of their species. They can either watch or listen to or read about the experiences of fellow Dennettian creatures and then make use of *their* solutions to Life’s problems. In short: Dennettian creatures cheat; they swap thoughts!

While all those jellyfish are chancing that their immediate ancestors

have survived similar situations, and the sea slug is crossing its proverbial fingers and plumbing for one of the few behaviours it can muster, and the chicken is standing there thinking about what to do next, we, the *crème de la crème* of Dennettians, can just shout across the road to someone who has already solved the problem and *get their thoughts* on the best way to do it. 'I should go to the top of the hill if I were you. The cars slow down as they climb; you'll be able to see them for miles, and there are far fewer jellyfish.'

Future-proof

Imagine how a group of such creatures will conquer a new environment. Moving into the new space, they will come across two types of problems: problems they have encountered before, and problems they have never encountered before. If they come across a novel problem, because they are Dennettian creatures, a subset of Popperian creatures (and hence a subset of Skinnerian creatures, and hence a subset of Darwinian creatures), they have at their disposal the three traditional methods of solving novel problems. Perhaps an instinctive reaction (*à la jellyfish*) will reap dividends; or maybe a spot of random trial and error (*à la sea slug*) will get somewhere; or possibly a quiet moment to think the problem through (*à la chicken*) will save the day. Obviously, we like to imagine that, in the case of us humans, a sophisticated Popperian approach is the default option. But let's not deny it: we frequently drop to the methods of our sea slug and jellyfish cousins. Just stand by and watch someone attempt to build Ikea furniture.

Regardless of the method by which each novel problem is solved, once it is solved, the solution instantly belongs not just to that individual Dennettian creature, but to the whole group (as long as the individual is prepared to share their thoughts). It is stored along with all the other learned solutions in what some would call a 'collective memory', a repository of answers to Life's problems that all members of the group have access to.

Now imagine that repository. Over time, triumphant individuals will add *new* solutions; disappointed individuals will cast away *out-of-date* solutions that no longer work; and every individual will participate in the project of *improving* solutions. Each time the memory of a solution is put to work, a flash of on-the-job inspiration may make it work even better, or a hardwired quirk or a random accident may prove to yield a lucky

addendum. All this change and revision in the body of solutions results in something profoundly significant: *the repository itself adapts to fit the environment*. While the Dennettian creatures feast on the spoils of their problem-solving genius, their collective memory takes on the job of interacting with the Great Outdoors. And because, as a body of thoughts, that collective memory becomes greater than any one of its hosts can handle, it starts to take on a superphysical existence; it begins to operate beyond the individual creatures that rely upon it. In short: the collective memory takes on a Life of its own. A Life that evolves.

This is our species' conjuring trick. We, as supremely able Popperian creatures, with outstanding models of the world in our heads, have managed to solve all the immediate problems that the outside world has thrown at us, problems that would have prevented us from surviving and reproducing. And because we are also the *crème de la crème* of Dennettian creatures, we have been able to share these solutions freely among our kind, so that the entire species is released from the hassles of natural selection. The result is that the human genome no longer has to deal directly with Mother Nature. These days, it works through an agent, an agent that negotiates on its behalf. I've referred to this agent as a collective memory, a repository of solutions, but there's a more common term for it. We call it culture.

It was the genius of the Scandinavians' culture that kept them warm and safe and well fed in wild Minnesota. It was their culture that evolved so that their naked tropical ape bodies wouldn't have to.

It may have taken 3.5 billion years of research and development, but eventually Mother Nature did it: she came up with the ultimate problem solver, the human being, a creature that solves problems not in the conventional sense, by adapting its biology, but in an unconventional sense, by adapting its culture. In so doing, Mother Nature achieved a design first, the goal of any technical engineer: she created a future-proof product, a product with 'hardware' so sophisticated that it required no further work. All it would ever need to take on the future was upgraded 'software'.

A World of Our Own

How weird are we! By ensuring that the stuff in our heads is bang up-to-date, we've been able to keep hold of our cavepeople bodies, bodies that

are two hundred thousand years out-of-date! These days the only parts of us that are engaged in a kind of evolution are the changing thoughts that fill our minds. We have (accidentally) swapped one type of evolution for another: biological for cultural. It's evolution, Jim, but not as we know it.

How do we put this into context? Where can we weirdoes, with our strange, perhaps unique evolution, place ourselves in the universe? Doesn't everything have its place?

Undoubtedly we belong to the part of the universe known as Earth, but we need more than that, because Earth is in fact a planet of many worlds. It has a world of gases, the 'atmosphere' – the sum of all its gassy molecules, whether floating high above Everest, trapped in the lungs of a plunging sperm whale, or harbouring in your rectum. It has a world of rock, the 'lithosphere' – the global whole of all its natural solids, whether molten in a volcano, crushed way beneath Greenland, or sitting as pebbles on a beach. It has a world of water, the 'hydrosphere' – the totality of all water molecules, whether frozen in the Ross Ice Shelf, pouring down from the skies over Wales, or rising in the steam of your latte. These worlds are not entirely separate from one another, they're not 'closed systems', but they do largely keep themselves to themselves, and each has its own particular suite of characteristics. We don't belong to any of these.

The world that we belong to wasn't even noticed until relatively recently. (They may be all around us, but the Earth's 'worlds' are easily missed; you have to stand well back before you can get a good look at something as big as a world. Sometimes you have to squint.) It was only when Darwin published *On the Origin of Species* that our world, the biosphere, popped into view.

The biosphere is the world of Life: the sum of all genes, the global whole of Earth's ecosystems, the totality of all living things. It's a big, buzzing place. Mother Nature runs it, and she uses natural selection to quality-control the things that live in it, even the really weird ones. The hammerheaded fruit bats, the oarfish, and the elephants are all subject to its rules. Even the naked mole rats, if they ever dared to come and join the *real* world, would have to play the game. In fact, every last living thing appears to tow the line – except us. As I've said before, we're a bit of a conundrum.

There's no doubt that we are beings of the biosphere, too. Our physical selves, our bodies, are 'biospherical'. That's why we have aches and

pains, teenage spots, bursting bladders, hunger, sex drives, childbirth, wrinkles, gases in our rectum. All of these are evidence of our membership in the biosphere. But aren't we more than just a collection of bodily functions? Aren't we more than our biology? We're certainly beyond at least part of the world of Life, beyond its natural selection. So how do we fit into the biosphere?

Well, that's the crux of the matter: we don't *exactly*. Uniquely among living things, while we are certainly a part of the biosphere, the biosphere is only a part of us. We alone appear to span *two* worlds. There's the old world, the biosphere, which sometimes we'd rather not admit to be in, and then there's another, *new world*, a world of our own.

This new world also lay hidden, right there in front of our noses, until 1926, when a little-known Russian geochemist from the early Communist era named Vladimir Vernadsky caught sight of it. And what he saw was this: 'the world of human thought', the sum of all our memories, the global whole of our cultures, the totality of all known things. It was a superphysical world, manifest in all our artifacts – from pots to clothes to novels to cathedrals – but existing in truth beyond that, only as the continuing tiny firework displays in the collective of human minds. He had caught sight of something that was incredibly hard to see because this place was, well, otherworldly, literally *all in the mind*, or, more accurately, in all of our minds. This is the place in which our 'human' selves meet, up above the feasting, farting, frigging biosphere. It was a big deal, so he came up with a name for it. He called it the 'noosphere'.

It's not a great name – it's from the forgotten Greek word for mind, *nous* – and that, along with the fact that he was writing in Russian at a time when Russia *was* a closed system, may account for its obscurity. For our discussion, however, the noosphere is a vital concept. In one word, Vernadsky was trying to conceptualize the grand repository of our entire species – all those solutions to all those problems – the world that opened up the moment we became Dennettian creatures and began swapping thoughts and building cultures. It must have started out very small, housed only in the uniquely bright minds of our ultimate ancestors in Africa ten thousand or more human lifetimes ago. But because of the way culture works, it would have grown exponentially and soon become too big for any one mind to handle. It would have taken on a Life of its own. Now it is a bona fide '-sphere', a whole new world. It covers the

planet, because we cover the planet, because the cultures it enabled us to develop allowed us to cover the planet.

Into the New World

Deep in the out-of-date, old culture of the Scandinavian Americans – among the recipes for lutefisk and rutabaga, the sowing patterns for the bunad, and the best way to craft sled blades from antlers – are faint half-recollections of old stories, stories that had a precarious journey through the centuries and across continents: parcelled by lips, delivered to ears in old tongues, captured on sheepskin parchment in a tangle of poetry and prose, then left to become decrepit on the oak shelves of royal libraries. These stories tell of a great hall, Valhalla, ‘the hall of the slain’, a heaven run by a god for the martyrs of Viking battles so that, in death, they would receive everything they desired in life. Within its walls, Valhalla satisfied the needs of all its heroes, fully and completely. The feasting, the drinking, the entertainment, the indulgence – it never stopped. It was a 24/7 endless divine interior space. A room crammed with the happy immortal souls of once-mortal bodies.

It’s tempting to conclude that, in the Mall of America, these Scandinavians drinking, entertaining themselves, indulging all around me now have their Valhalla, their heavenly hall – perhaps ‘Mal-halla’, a 230,000-square-metre testament to the genius of their culture, parked on the spot where, less than two hundred years ago, they huddled as refugees on the edge of a new nation. But as Vernadsky discovered, the true Valhalla, the ‘great indoors’, is larger than the MOA, than Minnesota, and than the whole US. It’s the heavenly hall of all human thought, the Big Repository to which we all have a key. While our mortal bodies are destined to plod on in the neighbouring biosphere, released from the pressures of evolution yet still burdened with ill health, yearnings, and annoyances, our minds have made it to the noosphere, a place in which they can achieve immortality (if they ever manage to come up with something worth remembering).

My suspicion is that the weirdness of our species can be explained if we can understand this new world better, and here’s my reasoning: If you knew nothing of water, how could you explain a goldfish? What would you deduce its fins, gills, and streamlined body were all for? If you were ignorant of the world in which a goldfish lived, everything about it

would seem odd. So it could be with us. Perhaps we are having trouble explaining ourselves because we still can't see the bowl that surrounds us and the stuff we're swimming in. The bowl is the noosphere, and the stuff we're swimming in is culture.

So how do we get to discover the stuff we're swimming in? Why, by using goggles, of course.

There you go! You've caught up with me. Your eyes have adjusted, you've pulled focus, and the new world has come into view. But these new goggles should be able to do more than that; this is just the beginning. The claim is that we can use them to explore this new world and, in doing so, solve our species' unique mysteries. That's step two.

I can't wait to get started, and to that end, I'm standing at the gates of Mal-halla tap-tapping my heels, waiting for my brother, Ads, who's nipped to the toilet to empty his biological self of excess urea. Looking down, I find that I've (accidentally) bought an *Encyclopaedia of Native American Tribes*. Adam has gone for a book on shamanism. He emerges. We take one last look at this heavenly hall, then head into the great outdoors.