

REFLECTIONS

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REUNITE GONDWANALAND!

I live in the intensely political San Francisco Bay Area, where nearly everyone holds some passionate position about the condition of the world and wants you to know all about it (although around here nearly everybody does know it already, anyway, and probably agrees with you).

One of the most popular ways of making one's opinions known is to affix a bumper sticker to the rear bumper (and sometimes the front one, too) of one's car. Thus, as I drive around, I am urged by the driver in front of me to FREE TIBET!, something I have no serious way of doing, since it would involve launching a war of liberation against China, and that's too big a job for a civilian like me. Inasmuch as the Bay Area is heavily pacifist, too, I don't know who else in the neighborhood is going to launch that war, either. There's definitely some cognitive dissonance here. (Wars aren't favored in my area. It's common to see faded stickers demanding NO WAR ON IRAQ, which must go back to 2004 or so, or U.S. OUT OF AFGHANISTAN, and there may be some older model cars on the road whose stickers decry our involvement in the Spanish-American War. And yet—how else are we going to free Tibet?) Stickers advocating same-sex marriage are common here, too, though that is hardly a live issue in this area any more, and there's a lot of stuff opposing global warming, another case of cognitive dissonance, since the car to which that sticker is affixed is burning petroleum even as it delivers its little lecture about my car's carbon footprint. (My car, by the way, is a politically correct hybrid. But the lecture is aimed in my direction anyway.)

Whether or not I agree with the positions being advertised, these bumper stickers annoy me. It's hard enough getting around on our chaotic freeways without having the driver in front of me harangue me on this or that hot-button issue. Almost everybody here already shares the position being pushed, and the rest aren't going to be converted by a peremptory demand on the rear end of the car just ahead. But there's one bumper sticker that I find utterly charming, and it always gets a smile and a thumbs-up from me:

REUNITE GONDWANALAND!

Reuniting countries divided by the happenstances of war is usually something I approve of. It was good, I thought, to have the partition of Germany brought to an end by the absorption of the undemocratic German Democratic Republic into what used to be called West Germany. If troublesome North Korea were to be merged with South Korea, the world would instantly be a more peaceful place. As a Northern boy, I regarded the end of the Confederate Secession as a good thing for the United States. I'm not so sure that I support the reuniting of Gondwanaland, something that would drastically redraw the map of the globe and certainly create a considerable upheaval for my friends in Australia, among other places. But, living as I do in a place where all sorts of causes are stridently propounded via bumper stickers, this one is put forth with such good humor, such tongue-in-cheek cleverness, that I have to smile when I see it.

Gondwanaland? Where, you ask, is Gondwanaland?

Well, nowhere, actually, at least not these days. There hasn't been such a place for quite a long time—hundreds and hundreds of millions of years, in fact. That's why it is in need, its advocates say, of reuniting.

As early as the sixteenth century, explorers and mapmakers had noticed the startling similarities of contour in the eastern coast of South America and the western coast of Africa: if the two continents could somehow be slid toward each other, they would fit together like two pieces of a jigsaw puzzle. Later, biologists noting the presence of the ostrich in Africa and a related bird, the rhea, in South America, wondered how these large flightless creatures had migrated from one continent to the other. The discovery in even more distant Australia of yet another big bird of that sort, the emu, added to the mystery.

About 1858 the Austrian geologist Edward Suess offered a radical explanation for such puzzling phenomena as the curious similarity of the coasts of Africa and South America and the presence of related species like the ostrich, rhea, and emu in places separated by huge distances. The continents, he said, had been arrayed in a vastly different configuration half a billion years ago. He lumped the entire ancient southern hemisphere into one immense continent that he called "Gondwanaland," taking the name from that of Gondwana, a district in India where key geological evidence supporting his theory had been found. (Since "Gondwana" means "land of the Gonds," the inhabitants of that district, adding "land" to the name of Suess's supercontinent created a redundancy, but nothing can be done about that now.) Gondwanaland, said Suess, once stretched across half the globe, beginning with the southern part of India and continuing through the Malay Archipelago, New Zealand, and Australia to South America and finally Africa. North of this giant land mass lay a long, narrow body of water that he called the Tethys Sea, above which were the land masses that would become North America and Eurasia. The Atlantic and Indian Oceans did not exist; the Pacific ran from the coast of China to the western shores of the Americas, but in the southern hemisphere, between South America and New Zealand, all was dry land. Contractions of the Earth's skin had pulled Gondwanaland apart long ago, creating the present pattern of the continents. "The collapse of the world is what we are witnessing," Suess concluded.

Suess' contraction theory, which most scientists had trouble accepting, was supplanted in 1912 by the continental-drift hypothesis of the German meteorologist Alfred Wegener. He, too, sought to explain the way South America and Africa fit together, the similar fit of Madagascar into Africa's eastern coast, and the affinities of many geological formations and fossil animals in widely separated continents. Wegener supposed that the Earth is composed of three layers of material that can be distinguished by their weight. The large, heavy core is made up mostly of nickel and iron, a material he called *nife*, from "nickel" and "*ferrum*," the Latin word for iron. Surrounding the nife core is a fairly thick shell of what Wegener termed *sima*, from "silicon" and "magnesium." Floating atop the sima lies a relatively thin mass of what he called *sial*, from "silicon" and "aluminum." The sial layer does not make up a complete shell, but covers only about one quarter of the Earth's surface.

Originally, said Wegener, there was but a single block of sima, constituting all the globe's land in one giant continent. This great primordial mass broke up under the action of forces generated by the rotation of the Earth; the lower half became world-spanning Gondwanaland, and two chunks of sial to the north became the ancestors of North America and Eurasia. The continents then began to drift about on the underlying sima like icebergs floating in an ocean. Eventually the strains thus created split Gondwanaland apart into South America, Africa, India, Australia, New Zealand, and Antarctica, and sent the newly formed segments drifting toward their present locations.

Wegener's theory was an ingenious one, and useful insofar as it offered a plausible explanation for the problems that the geological, biological, and geographical evidence posed. But many scientists found his speculations hard to accept, ideas more

worthy of science fiction than of science—a pleasant fairy tale, no more substantial than the tales of the lost continents of Atlantis and Lemuria. As late as 1960 the concept of continental drift had little serious scientific support. But then new seismological data began to indicate that the continents were in fact capable of movement, leading to the emergence of the theory of *plate tectonics*, first proposed in 1953 and definitively established in a 1968 article by the geophysicist Jack Oliver.

We know now that the Earth's surface is broken up into seven or eight huge plates and many minor ones, which are driven by titanic forces to wander about above the world's deep mantle. When these forces bring the edge of one plate into collision with another, earthquakes result, mountains are pushed up, volcanoes are created, new land is pulled up out of the sea. In some parts of the world, plate movement is so slow as to be practically negligible. In others—such as California, where I happen to live—the movement of plate against plate is relatively swift, and, alas, often has violent consequences, as we here in earthquake country are only too well aware.

So the old Gondwanaland theory, as first proposed two hundred years ago by Edward Suess and modified half a century later by Alfred Wegener, turns out to have some scientific substance after all. There is no longer any serious doubt that in Cambrian times, half a billion years ago, a colossal land mass occupied the part of the world that runs from what are now India and Australia to South America and onward to the east coast of Africa. Immense forces, not yet fully understood—some combination of the movements of the sea floor and the tidal pulls of the Sun and the Moon, perhaps—broke this supercontinent into several huge segments, which have been drifting around ever since.

And so some jolly geologist, taking his lead from the profusion of politically driven bumper stickers urging this or that rearrangement of our troubled world's national configurations, dreamed up the REUNITE GONDWANALAND! sticker that I occasionally see and chuckle over as I drive around the San Francisco Bay Area. Should it happen—don't worry; putting Gondwanaland back together is even less likely than the separation of Tibet from China's governmental grasp—I suspect that my own life, out here on North America's western edge, would be little changed. We Californians would still have the San Andreas Fault and global warming to worry about. The beauties of Australia's Great Barrier Reef would be lost, though, along with the lovely beaches of Sydney and Rio de Janeiro and Bali, and much, much else. And imagine the new bumper stickers bearing protests from the anti-globalization crowd as we fumble our way back to One World. Brazil glued to Liberia? Australia stuck to Peru? Highways and pipelines and railway tracks spreading across what once had been the South Atlantic and the Indian Ocean?

It won't happen. Neither will most of the other stuff that the bumper-sticker advocates in my neighborhood are trying to sell the guy driving behind them on the freeway. The difference is that the really dedicated sticker-folk are deadly serious about the causes they support. The REUNITE GONDWANALAND! types are just having fun. May their tribe increase.

