

Everything is Somewhere



By Angus W. Stocking, LS

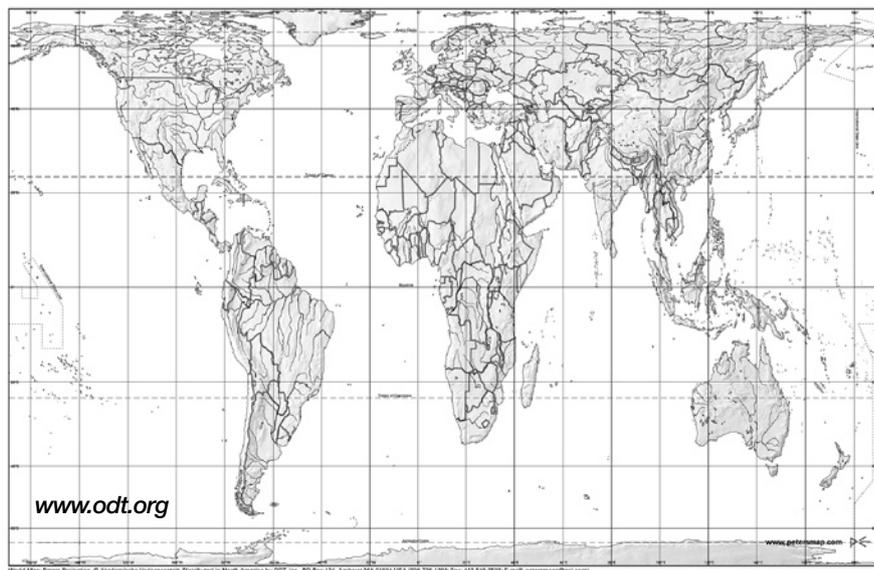
After a 17-year surveying career in several states, Angus Stocking now lives in Paonia, Colorado where he is establishing an organic farm and a freelance writing career. He remains actively involved in surveying.

Two Views of One Planet

When the Peters projection was announced by historian Arno Peters in a 1973 speech to the United Nations, the grandiose setting must have seemed a little over the top to serious workers in the rarefied world of cartographic projection. Nevertheless, Peters struck a nerve, and his self-titled projection became very popular indeed. Many groups actively lobbied for its use in schools and it was quickly adopted by several UN agencies and the National Council of Churches (NCC) for all uses. In 1983 the NCC even published Peters' book, *The New Cartography: A New View of the World*. Peters' map remains in vogue today, being prominently featured, for example, in an episode of television's *The West Wing*.

Why all the fuss? What was it about *this* projection that made it so popular? Well, Peters (who died in 2002) was a master at combining indisputably true points with a few that *were* disputable. He maintained that the Mercator projection, then commonly used for wall maps, badly distorted the relative areas of world land masses. Europe, for example, looks much bigger than it really is and Greenland appears to be roughly the same size as Africa when in fact Africa is about 14 times larger. Peters went even further by claiming that the Mercator projection was *inherently* racist, and unfit for *any* use. He based this on the positional and spatial prominence of developed countries as shown on the Mercator projection. He apparently believed that only *his* map, which accurately showed land mass areas, should be used.

Professional cartographers rolled their eyes at this. To begin with, the



The Peters Projection World Map was produced with the support of the United Nations Development Program.

Mercator's problems as a *wall* map were well known, but to say it had no use at all was crazy talk. It is still indispensable to navigators because straight lines drawn on the Mercator projection are *loxodromes*, lines that show true compass bearing between two locations. In fact, it is axiomatic among cartographers that *no* projection is suited for *all* uses—all have strengths and weaknesses.

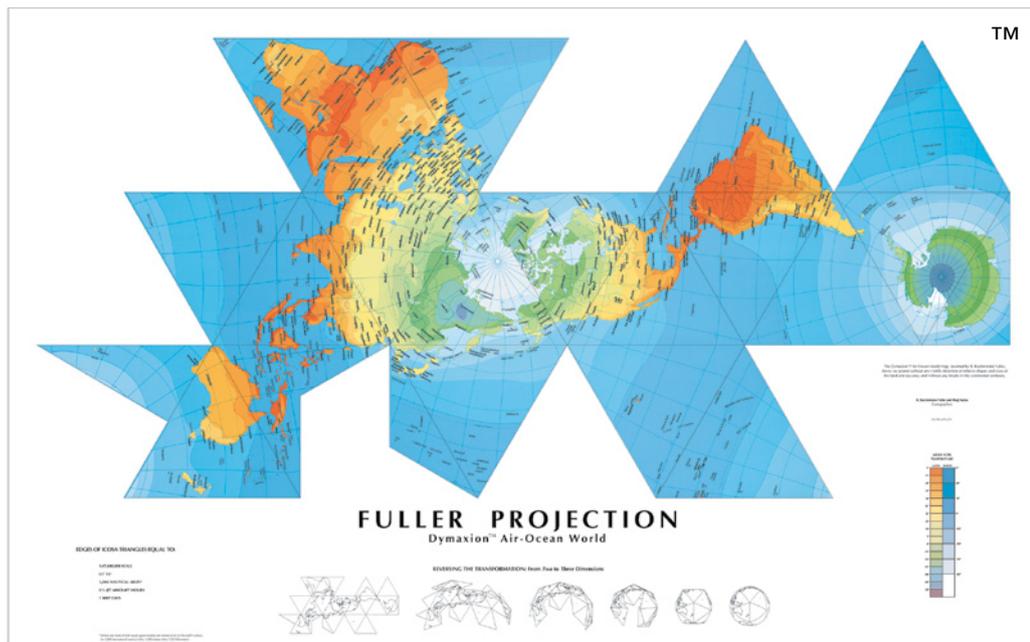
Moreover, Peters was attacking a straw man. Long before 1973 the Mercator's weaknesses as a wall map were well known and it was gradually being replaced by several projections, notably the 1963 Robinson projection, the invention of Arthur Robinson, probably the most eminent modern cartographer.

But *most* damning was Peters' claim to have *invented* the Peters projection. Cartographers recognized it as being, in fact, a special instance of the Gall

projection, published in 1885 by Scottish astronomer James Gall. At best, Peters may have independently re-invented it, and the projection is now more properly known as the Gall-Peters projection.

For all these reasons, Arno Peters was never going to be popular with cartographers, but aside from that tempest in a teapot, the Gall-Peters projection still has problems judged strictly on its merits. Though it does allot *area* accurately, it does so at the expense of *shape*. Toward the poles, land masses are distorted East–West but near the equator they are distorted North–South; in Robinson's scathing commentary, the resulting maps look like, "... wet, ragged long winter underwear hung out to dry on the Arctic Circle." Furthermore, other equal-area projections, such as the Albers Conic or the Lambert Azimuthal, have long been available and do a better job of managing unavoidable distortions.

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The most common method of laying out the Dymaxion map is with the North Pole more or less at the center. If you're like me, seeing Earth this way is a revelation. The separate continents appear to be not separate at all! Rather, they look like one large island, somewhat fragmented by water but still essentially one mass surrounded by ocean. It's a compelling view of the world and a startling contrast to *any* rectangular wall map.

Like Peters, Fuller was a tireless promoter of his many ideas and the Dymaxion map

held a special place because of its role in what he called the World Game. The game was (and is) played with the aid of a large map that dynamically displays multiple world variables. Fuller's hope was that the game would evolve into a method for global citizens to directly make responsible decisions about allocation of global resources. To that end, he even produced a basketball court sized version of the Dymaxion map, dubbed the "Big Map," and presented it to Congress! The World Game, alas, has so far failed to replace current methods of governance, but is still widely played.

Presently, Buckminster Fuller tends to be remembered for his invention of the geodetic dome and little else. One gets the impression that he was simply too prolific to be taken seriously. His ideas and philosophies are so numerous and so far outside the mainstream that it may take the rest of us a generation or two to catch up. But it's a shame that his unique map is not better known, and almost a crime that the relatively clumsy Gall-Peters projection seems to have displaced it as an educational tool and wall map. All of Peters' stated goals—fairness, equality, non-bias—are better achieved by Fuller's simple, elegant and brilliant creation.

Author's Note: For more information on topics in this article visit www.wikipedia.org. Further information on Buckminster Fuller can be found at www.bfi.org, and for Peters projection maps and a good biography of Peters visit www.odt.org

There is no doubt that Arno Peters was a sincere, idealistic man devoted to the cause of fairness and equality. His other major work, the *Synchroptic History of the World*, was an attempt to tell the story of all the world's peoples, giving equal weight to each and avoiding Eurocentrism. He was also keenly aware of the power of ideas and well-versed in the techniques of getting those ideas across; his 1945 PhD dissertation at the University of Berlin was titled *The Use of Film as a Propaganda Medium*. But he wasn't a cartographer and it may be that his genuine sense of mission and flair for promotion ended up obscuring better approaches to the worthy goal of fairly and accurately representing the world in two dimensions. Nevertheless, he deserves credit for popularizing the issue and for educating the public about the problems of conventional mapping in general and the Mercator projection in particular.

Arno Peters wasn't the only 20th century non-cartographer visionary who ended up inventing and popularizing his own map projection. Buckminster Fuller also gave it a try. Fuller (1895-1983) patented his Dymaxion projection in 1946, based on the simple, brilliant idea of projecting the surface of the globe onto a regular solid. The 1946 version used a cuboctahedron (8 triangular faces, 6 square faces), but by 1954 Fuller was using a slightly modified icosahedron (20 triangular faces) so that the resulting Dymaxion

map could present all the Earth's land masses without breaking them up. Dymaxion, incidentally, is a contraction of DYNAMIC MAXimum tensION and is little more than 'genius style' marketing language. Fuller applied the term to cars, houses and even to his preferred sleeping pattern.

As a mathematical feat, the Dymaxion projection is considerably more sophisticated than the Gall-Peters projection and consequently has a number of technical advantages. To begin with, distortion of shape and area is minimal and, more importantly, the distortion is evenly distributed. This compares favorably to most projections, which generally distort quite a bit in some parts of the globe but relatively little elsewhere. The Gall-Peters projection is one of the worst at this since it—somewhat ironically—distorts the shape of developed countries very little but badly deforms the undeveloped countries that Peters was trying to represent more fairly!

The Dymaxion projection can also be unfolded in different ways for different purposes—that is, the icosahedron can be laid flat with different countries at the center. This avoids much of the almost automatic emphasis that most maps give to Europe and North America, and also avoids the tendency to think of North as *up*, thus avoiding an unconscious cultural bias. In Fuller's view it was better to think in terms of *in* (toward the center of the earth) and *out* (toward the stars).