# Speculative Sandstone, or, Towards Form Both Found and Made

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Speculative Sandstone is an investigation into how architectural order can be reoriented to the forces that act both in and on it—the many agencies, human and nonhuman, animate and inanimate, from which it is assembled. Through such a reorientation, architecture might learn to tap into a surprising generative potential—selectively ceding certain aspects of authorial control to gain in return both an extended reach and a lightened touch.

Taking the form of a speculative geo-story spanning a wide range of scales, the project pairs material investigation—experimental, ad-hoc methods for printing microbially-cemented bio-sandstone—with territorial extrapolation, testing these emergent material techniques against the climate-change-wracked landscapes of the future Great Plains. Warming due to climate change, the dunes of the Nebraska Sandhills will soon lose their protective layer of grass and go mobile, ceaselessly whipped into new forms by the intense winds of the region. The many ranchers, scientists, ecotourists, cattle, and rare species that depend on the stability of the region will be violently uprooted, with any form of static dwelling made nearly impossible by the shifting dunes. However, rather than try to stop the dunes, the project finds ways to work within the logics of the moving dune field—harnessing them to allow inhabitation where none could otherwise exist.

Manipulating the materials abundant in the region—sand, urea distilled from cow urine, and bacteria—a fleet of bio-sandstone printing devices are deployed to architecturally shelter and enlarge the oasis-like lowland marshes that temporarily exist in the lee of large barchan dunes. As blowing sand builds up against pods with sand fences stretched between them, adapted pivot-irrigation mechanisms disperse the urea-water-bacteria slurry to inoculate the sand, building it up and compacting it in layers—essentially 3d-printing a deep, structural buttress against the shifting dunes. The form, while seemingly quite willful, results directly from a series of simple interactions—the placement of pods, blowing of sand, bulging of sand-fences, and radii of pivot-printers. Its form is both found and made.

Having successfully shunted the dune aside, the bio-sandstone printers are able to roam onward to stabilize new grassland oases. The sandstone walls they leave behind continue to both shelter the oases and host new populations of devices and units, in time coming to support a robust agro- and eco-tourism system. Amidst the shifting landscape, metastable islands flourish for a time, then fade—their human- and non-human inhabitants moving on, tracking opportunity, transforming their context as they roam.

In one sense, the project is a call for material exploration to always parallel a focus on development with one on deployment. For architects, such a shift in focus opens new potentials for ethical engagement in that it directs attention to the collectives that any technology or project draws together—the messy and chaotic collection of people, animals, machines, climatic patterns, cultural beliefs, and more from which new forms of life are constructed. Such a shift calls on architects to learn to act amid, rather than atop, a lively field of subjects—in return promising a more deft and nimble touch.

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