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G E O D E S I C S, I N C.
3013 Hillsboro Street
Raleigh, N. C.

December 6, 1954

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LIBRARY
BOSTON ARCHITECTURAL CENTER

Dear Don:

Bucky has asked me to forward this information to you in regard to Mr. Ratsoy's information, given to Jim Fitzgibbon at Raleigh last week . . . that one of his employees named Blanchard has a patent on an outwardly tensed and supported tent, which information Jim passed along to you.

Bucky says that his first experience with outwardly tensed hyperbolic parabola (short axis involute, long axis evolute) tensed fabric structures supported inwardly, radially, from a surrounding rigid frame system was when, as a boy, he admired the woven diamond mesh, white-painted rope netting guard fabrics stretched and bulging inwardly around and between upper and lower curved railings mounted from deck canopy stanchions surrounding the curved stern decks of New England coastwise passenger steamships.

Bucky also, in his early youth, greatly admired Japanese lanterns with their complete horizontal bamboo compression rings and accordioned tubular paper skins which, when opened, tensed the heat shrunk paper skin into inwardly bellying hyperbolic parabola, compounded curvature, 360° saddles of vertical concavities and horizontal convexities of surface. He also admired the hyperbolic involute vertical panels of the umbrella's outwardly tensed tent dome as most fundamental and efficient shelters.

In his Navy days he rigged many an hyperbolic parabola fabric stretched skin weatherbreak around look-out booths, mounted on ships' masts as two-man circular platforms edged with circularly bent galvanized steel tubing to which the weatherbreak skins were outwardly laced.

In 1927, when he designed the first Dymaxion house and ten-deck buildings, he adopted the circumferentially corded, horizontal structural rings tensionally supported from and around a central mast, within which he tensionally supported both horizontal decks and vertical skin enclosures of the occupiable building areas. This exterior rigid support for the outwardly stretched inner enclosed system skins, alternately consisting of sheet metals, sheet plastics, and fibrous fabrics was accomplished through a tensed rigging network of hyperbolic parabola conformation. His 1927, 1928 and 1929 model structures of this design group have been published hundreds of times throughout the interim years, beginning with the year 1928. (For references, see Dymaxion Index, New York Public Library.)

In December, 1930, Bucky designed for Ely Jacques Kahn, New York architect, an outwardly tensed, ovaloid shaped, hyperbolic parabola, faceted, tension (tent) fabric room for installation in Grand Central Palace at a proposed Architectural Show for a sculptors' exhibit room, - lighting for the room and its sculptural exhibits to diffuse inwardly through the comprehensive, translucent, tensed white fabric "walling", from lights exterior to the structure. The ovaloid hyperbolic faceted, tensed, non-fluttering structure was designed to be supported by tension lanyards, or "stops", sewn into its patterned seams attached at their outer ends to bent tubular pipe frames, surrounding the fabric structure, both horizontally and vertically at frequent intervals, which comprehensive pipe framing was, in turn, to be tensilely supported in horizontal azimuth and upwardly by fastening to the main columns and beams of the open Grand Central Palace exhibit space's primary steel and concrete structure. The proposed tent structure was neither installed nor even built, as the depression caused its cancellation. Milton Rosenthal, Architect, was Bucky's draftsman and made colored renderings, as well.

Blueprints of the proposed structure were given to Mr. Kahn, and the blueprints and original renderings were given, in 1940, to Miss Goodhue, then publisher of the Architectural Forum. Bucky has some of the original tracings as yet in his possession.

In November 1932, Bucky published in Shelter Magazine, of which he was then publisher and editor, a drawing and full page description of a tent-room suitable for any loft building space subdivision by outwardly tensed hyperbolic parabola, effecting methods similar to those already described above, - in this particular instance, suitable for a large conference chamber, its fabric skins outwardly supported by the main structuring of the conventional office building within which it was to be installed. The many virtues, accoustical, optical, and otherwise, of such outwardly tensed tent chambers were discussed in detail in the Shelter Magazine pages.

It is interesting that this 1930 and 1932 idea of Bucky's has become a new interior decorating and architectural vogue, as noted in the spring, 1954 columns of the New York Times, Home Editor, Betty Popis. This new vogue may have developed independently, but the time span is so great as to render it impossible to trace its later re-inspiration. However, architectural department librarians point out that this particular issue of Shelter Magazine is still in live reference.

When Bucky developed the modified grain bin deployment units with Butler Manufacturing Company in 1940, the excessive man hours experienced in lining the grain bin with fiberglass-bat insulation held to the walls by interior paper-board skins, bolts and runners, lead Bucky to design once more an interior, double-skin, insulation padded and quilted, tent outwardly stretched to the corrugated sheet metal walls and domical roof of the grain bin. He circulated his drawings for

these padded, outwardly tensed, hyperbolic parabola faceted tents throughout the parachute manufacturing industry and among a number of tent manufacturers in the New York and Detroit areas in order to receive bids on such tents for their subsequent inclusion in the corrugated steel deployment units for bids to the U. S. Signal Corps, for whom he was then furnishing gradually increasing numbers of such deployment units. He has the working drawings and the industry distributed prints in his storage files in Cambridge.

In 1944, 1945 and 1946, he designed and installed similar outwardly stretched interior waterproof tent liners in the Beech Aircraft fabricated Fuller House at Wichita, Kansas. The latter consisted of World War II materials, i.e., woven fiberglass cloth impregnated and coated with aluminized Neoprene. The bags for the Wichita House were both sewn together and glued together, the glued type having the greater strength. They were outwardly stretched to the stainless steel and aluminum framework, so as to be nonflutter-proof, non-wrinkling, - in this case the stretching being accomplished by grommetted flanges glued or sewn to the outer seams of the tent in such a manner as to be invisible from within and with Nylon cording led through the grommet holes and laced progressively outwardly around the main structural tube frames, the lacing being triangularly patterned.

In 1949 he designed both an outwardly stretched Vinyl skin tent for his necklace type Geodesic structure for showing in the U. S. Pentagon Garden, Washington, D. C., February 1949, but did not fabricate this tent. Instead, he enclosed this necklace structure with pneumatic double-Vinyl skin supported outwardly around the framing as a unitary pneumatically quilted bathing cap. This was widely published in 1946 and thereafter.

In 1950 he instructed Jeffrey Lindsay, Montreal, Canada, on how to fabricate such outwardly stretched hyperbolic parabola skin tenting, which instruction Lindsay and his mother followed and fabricated a tent which they supported outwardly with rubber lanyards cut from swatches of automobile inner tubes, with the local, focal fabric stresses distributed at Fuller's suggestion by sewn-in paint can heads through the center of which the lanyard fastenings were mounted. This latter was widely published in 1951 and thereafter.

In 1953, Bucky designed an interior outwardly stretched Orlon tent for the Ford Motor Company for proposed installation within their Dearborn, Michigan, Rotunda's Fuller designed Geodesic 93-foot diameter dome. Though this dome liner was not fabricated, the Ford Motor Company bought the fabric for its production and circulated the tent and awning manufacturing trade with its well engineered design and production drawings to receive bids. These production drawings were also sent to a number of sail makers' lofts, and Bucky thinks he recalls that these production drawings were sent, at his request, as well, to Ratsey and Laphorn, because he had then recalled having discussed this outwardly tensed tenting scheme with Ratsey and Laphorn's foreman when Bucky was having sails fabricated for his boat at Ratsey's

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City Island loft in 1934, thinking they might be interested in landed and off-season application of their sea-going and seasonal skills.

Bucky can conceive of no way in which patents granted to Blanchard could anticipate this chain of experience generated inspiration and teleological evolution of design events.

Faithfully yours,

John Dixon,
Assisting
R. Buckminster Fuller,
President