BIOETHICS AND HISTORY AND PHILOSOPHY OF SCIENCE PAPER ABSTRACTS

PERIODIC TABLE OF DESIGN: ELEMENTS AND PRINCIPLES. *BRIAN LAHAIE*, UNIVERSITY OF GEORGIA. CLARK LUNDELL, AUBURN UNIVERSITY.

Most Scientists are familiar with the Periodic Table of Elements. Theoretically every material in the world is chemically derived from these 118 elements. The placement of these elements into a series of rows columns and related "groupings" gives the scientist further insight into the properties of these elements and their relationship to one another.

The applied design disciplines use a simpler, yet equally powerful collection of elements and principles to describe, evaluate and create our built environment. This paper will compare these theoretical constructs and emphasize the historical context in which these theories were developed. Examples of the application of design elements and principles across the fine and applied art disciplines will be highlighted.

CREATION. *CLARK LUNDELL*, AUBURN UNIVERSITY.

We exist in a challenging environment. The ability to adapt behavior to accommodate these challenges supports survival and procreation of our species. Culture is the collective accumulation of adaptations over time. What are the circumstances and processes by which we purposely create beyond the current accepted boundaries of our culture?

BIOTECHNOLOGY AND HUMANKIND'S NEED FOR LONG-RANGE GOALS. *JAMES T BRADLEY*, AUBURN UNIVERSITY.

Modern technologies including CRISPR, synthetic biology, robotics and artificial intelligence, germ-line genetic enhancement, embryo selection and neuroenhancement offer diverse, irrevocable trajectories for Homo sapiens and the biosphere. Whether humanity will choose to use reason, knowledge, and consensus to select some and reject other trajectories is an ethical issue. A half century ago, physicist and futurist, Gerald Feinberg, argued that humankind has an urgent need to search for and select long-range goals. Feinberg's argument was based on observed advances in molecular biology and computer science. He believed that developments in these fields presaged irretrievable changes to human nature itself. Feinberg called the search for and identification of long-range goals The Prometheus Project, also the title of his 1969 book (Doubleday & Company). Getting started on the Project was urgent in 1969 because its duration was estimated at 25-50 years. Today a Prometheus Project remains uninitiated and undiscussed. We are now on the cusp of immutable changes to life as warned of nearly 50 years ago. A global summit, a revamp of public education curricula, and promotion of a global ethics appropriate for thriving with 21st C biotechnologies are proposed as preludes to a Prometheus Project.

CHANGING THE DEFINITIONS FOR THE KILOGRAM AND THE CHEMICAL MOLE. *MICHAEL MOELLER*, UNIVERSITY OF NORTH ALABAMA.

Of the seven base units in the International System of Units (SI) that define physical quantities, the kilogram and, by extension, the mole are the only units still bound to a man-made physical object. Since 1879, the kilogram has been defined as the mass of a platinum-iridium alloy cylinder kept inside a hermetically sealed room in Paris. This definition leads to a host of problems, not the least of which is that in attempting to keep its mass constant, ‚ÄúLe Grand K‚Äù is only made available for comparison once every forty years. Ideally, the kilogram and the mole should have a universal basis stemming from fundamental, invariant, physical quantities found in nature, and able to be precisely reproduced by laboratories around the world. There are now two competing proposals for accomplishing this. The one proposal calls for making Avogadro's constant, NA, an exact number. An invariant mass, then, would be based upon the mass of one mole of C-12 atoms. An alternative proposal calls for making Plank's constant an exact number. Mass, then, would be rooted in measurements made with a highly precise but rather esoteric device known as a watt balance. The Bureau International de Poid et Mesures (BIPM) intends to have the issue settled and the new definitions in place by 2018.

PETER RABBIT MEETS THE DEADLY MYXOMATOSIS VIRUS WHICH HINTS AT THE RED QUEEN HYPOTHESIS. *KENNETH NUSBAUM*, AUBURN UNIVERSITY.

The first effective biologic control of an invasive species was Myxomatosis virus introduced into Australian rabbits, after 40 years of dithering, in the early 1950s. The declining kill rate of each release indicated, among other factors, that the virus rapidly "modified itself." Its modification demonstrated the "Red Queen" Hypothesis, to wit: Infectious agents must modify as their hosts become resistant or face extinction. Red Queen behavior explains antibiotic resistance in bacteria, changes in viral pathogenesis, and highly evolved host-parasite