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COMPREHENSIVE DESIGN STRATEGY

by: R. Buckminster Fuller

World Resources Inventory
Southern Illinois University
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Phase I, (1965) Document 3: Comprehensive Thinking
by R. Buckminster Fuller

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CONTENTS

	Page
Man With a Chronofile	1
Introduction to Design Strategy	9
Design Strategy	15
Addendum to Design	51
Vision 65 Keynote Address	61
Vision 65 Summary Address	74
World Game – How to Make the World Work	87

APPENDICES

"A" – Three Student Project Documentation Briefs with Photos Illustrations	91
"B" – R. Buckminster Fuller Booklist	127

CHANGES IN CURRICULUM INTENDED TO PREPARE THE INDIVIDUAL
TO TAKE THE DESIGN INITIATIVE IN ECONOMIC SCIENTIFIC AND
INDUSTRIAL TECHNOLOGY MATTERS

by Buckminster Fuller

Taking the initiative means that the design scientist--like the medical scientist – will no longer operate on a basis of having to be retained by a client to carry out the client's prime design concepts.

The curriculum will prepare the design science graduate to undertake fundamental invention, self-underwriting, development and experimental proof of invention as demonstrated for instance by the Wright Brothers wherein the design science professional will be equipped with all of the economic, legal and technological knowledge necessary for reducing such inventions to going industrial practice.

To realize such "breakthrough magnitude" inventions--commercially, militarily, or even socially--involves the individuals preparing himself for the competent taking of the initiative in a whole new industry and its progressive development, testing, prototyping, tooling marketing, servicing, maintaining, operating and phasing-in of progressive evolutionary components within the totally new industrial system together with designed phasing-out of the obsolete equipment and functions made obsolete by the new industry. This, in turn, releases metals, and other materials, time and energy re-sources for reinvestment in the newest phase of the evolutionarily emerging system. (See "Letter to Dean X") (See "Universal Requirements") Ref. – Buckminster Fuller book list, See Appendix "B".

1. For instance, the design scientist would not be concerned exclusively with the seat of a tractor but with the whole concept of production and distribution of food, which might possibly lead to developing a whole new industry of hydroponic factories for automated growing, canning, and packing the food within large 3/4 sphere, geodesic greenhouses, within which are circularly operating, planting, cultivating, pruning and harvesting mechanisms, in a tree-like arrangement. He would initiate a total industry.

In short, it is assumed by the curriculum and professional initiative which I propose that the design scientist will not wait to be retained before tackling problems and will not be concerned exclusively with carrying out the local detailing of a part of a component product within a general industrial venture system which has already been primarily designed by the industrial client.

2. Encourage the design science school students to organize themselves to study whole industries and the relationship of total industry to general society needs, e. g. what component disciplines such as chemistry, economics, etc., they must master will become self-evident and will be made available to them within the universities on the students' own scheduling. (See my 'Designing a New Industry", 1946).

For instance, one of the design science schools might undertake to have all of its students spend all of their college years studying every aspect of the air-transport industry.

This study could start with the new ecology of world and space man. (See Vision 65 Summary Address page 73). The students might under-take to redesign the whole industry of transportation service in such a way as to employ credit cards, computerized ticketing and automated follow-through of the whole transportation process – with all its economic and technical ramifications--whereby a traveler could go to a vending machine in the nearest downtown office, or possibly to any hotel lobby or corner store. Possibly over his two-way TV facsimile, cable or radio-beam closed circuit system operating 'from any spot from which he may wish to initiate his travel. He would insert his credit card into the transmitter and press buttons showing the time that he would like to leave from one point and arrive at such and such another geographical point--anywhere around the Earth, in the shortest possible time, and in the most economical way including terminal helicopter flights, automobile rentals, stop-over hotel accommodation, et al – and out would come from the vending machine, a ticket printed with his routing and booked passage with the amount automatically charged to his credit card for officially automated accounting within his whole continually--processed annual income and outgo along with the economic accounting of his whole social security, medicare, education, travel, and new wealth generating credit accounts.

Whenever necessary the traveler could cancel his ticket by putting his credit card back in any travel-vending machine and pushing the canceling button for the same routing, plus the transaction number which has been imprinted on the vending ticket when he received the machine's commitment to carry him.

Such booking-billing, clear-route seeking, alternate-travel-plan-ascertaining computer systems would interlink the total information storage of all the airlines and their feeder systems anywhere around the world. The travel-vending machine, thus, would be able to print out commitments in split seconds, or effect their cancellation in another split second. The printed out ticket would be all that is necessary for the individual to take with him as his automatic key-of-entry at the most convenient downtown embarkation point.

At his downtown airlines contact point he would enter his private traveling quarters and be transported therein to the point of major flight embarkation. His private traveling quarters would be within an angular segment of what I call a "fuselage cartridge". Each fuselage cartridge would be a circular section like a banana slice or like a Lifesaver mint candy, as one of many such circular units packed in parallel as a circular section of a cylinder cut perpendicularly to the cylinder's axis. The long, tubular assembly of these cartridge sections would fit together to form a complete cylindrical cartridge fitting neatly into the tubular-shaped fuselage of the air transport. There could be hundreds or more of these circular cartridge sections. Within any angular segment of one of these cartridge sections, the traveling quarters would provide the maximum sitting space without one human physically touching another human being. The integrity of each individual's privacy would be physically insured by adequate space and omni-directional design science considerations. The planning would be omni-directional and not just a planar expansion of the

seat row count. The sitting devices would convert to a full length, horizontally reclining bed. The bed could move in space within the cartridge section by mechanical means.

The passenger's luggage will be stored within the same circular cartridge section in which he travels. The same circular cartridge section will hold several people and their luggage, can take a whole family, and can be curtained off for chamber privacy. All the people in any one cartridge section will be going to the same destination. A number of these circular cartridges with their passengers, and their luggage, will be joined together making an increasingly long cylinder through which runs a continuous walking passage-way, or corridor, made up of the cartridge sections locked continuously together.

All of these separate destination routed, circular, sectioned compartments, within each of which the individual may change his position of sitting to stretch out and in which whole families can be given private enclosures, each section having its separate toilet compartment, will be routed by helicopter lift from "downtown" to the dispatching airports. At the airports, the cartridge cross-sections will be loaded into the next transport bound for their particular destination, or series of destinations – the cartridges being loaded in proper sequence for detachment on jigs at their respective destinations. The combined cartridge sections, recombined at each airport, will be loaded through the open tail of the tubular fuselage as are cargo loadings made through the open tail of cargo planes.

Each of the cartridge sections will have circumferential trackage gears for smooth ball-bearing shunting into and out of the tubular fuselage or local marshalling racks on its own three annular roller bracings. Guided by the fuselage or marshalling racks circularly arrayed three trails. The cartridges will slide into longitudinal aisle alignments and lock together, or be detached for local routing to downtown disembarkations. The cart-ridges, with corridors running through them, can be sandwiched together with freight and mail cartridge sections so that both passenger, cargo and freight will be automatically dealt in or out of the various destination fuselages to be replaced by each airport's outbound cartridge group. This marshalling or separating-out and re-combining of cartridge sections can be accomplished at each airport with computerized switching equipment.

The cargo sections can be swiftly let out or in at each marshalling point by gatewayed cartridge-holding tracks, which will at each point sort the cartridges anew for most economical flight aggregation, as continually processed evolvingly by the world traffic computers to most effectively integrate the unexpected new peaks and valleys of frequency and magnitude variations. Based on ever accumulating past performance the computers will calculate probability at all time correcting as they go to the newest patterns of evolutionary changes. At destination airport, the passenger cartridge sections will be helicopter lifted or vacuum tube sucked to the nearest downtown disembarkation points. The same world travel and freight traffic commuterization will not only take care of all hotelling and dwelling accommodation at "way" or destination ports but will clearly provide the guide lines for the future living facilities industry's production and distribution requirements. Such an overall living and travel accommoda-

tion service industry may most probably be evolved through design science by a merging together of such present service industry management corporations as the International Bell Telephone System, hotel system, etc.

Such general concepts can be worked on by a given design science school over a period of time as a continuing research in a given art. The students involved, and their faculty, will be continually confronted with an awareness of all the disciplines essential to the individual in order to enable his most effective attack upon such comprehensive designing.

What will the student have to know to make it possible for him and his colleagues to reduce design science research to effective practice, superior – in order to provoke use by humanity – to that already in operation?

What will those taking the design initiative need to do to eliminate frustrating contiguous industrial factors and social indifferences?

What will the students have to know, not only to make the most effective solution, but to be able to make effectively known the results of their work to all industrial and governmental agencies as well as to the segments of the public concerned with use of their unique and comprehensive design science innovations?

3. To undertake comprehensive, generalized system theory research in a systematic manner by which the individual design science schools will each tackle an individual industry while correlating all their efforts one with the other on a world basis.

It will then be appropriate for the professional Design Science Society of the world and its various continental sub-societies, as spokesman for the profession, to coordinate the world-around design science school curricula and to notify each and all the industries concerned of their undertakings and to make recommendations to the various industries regarding the progressive availability of the individual professional graduates most competent to carry out the finalizing phases of the new services to be provided.

This taking of the initiative and assumption of prime responsibility--vacated a third of a century ago by the "great world pirates" and left ignorantly by society to their political representatives to discharge – all seems very new to the professional world of architecture, engineering, and all of the sciences other than the medical sciences. However, this is exactly the initiative and responsibility the medical sciences are already now shouldering in respect to man's internal organisms.

I propose that, in due course, design science--as the objective--applied – discipline accomplished by combined industrial design, engineering, architecture, and all the sciences – shall be so organized as to provide effective anticipatory strategies for formulating and managing the evolution of mankind's external, metabolic regeneration of the industrial self-organisms in the same anticipatory service manner that the medical profession has anticipatorily dealt with individual man's interior, organic processes of metabolic regeneration.

I propose that the comprehensive design initiative be officially seized by the professions. If it isn't done on the North American scene, it will be done elsewhere – possibly in Japan, China, or Russia – possibly in newly developing countries such as Africa, or Australia. It will be done! And, I am confident, in the very near future.

The professions now have the opportunity to "roll on" and "recover", and make a touchdown with the football fumbled a third of a century ago by the great pirates and ever since ineptly booted around by the world politicians in general – albeit each has "booted" the ball with his own degree of practical benevolence, according to the behavioral conditioning automatically manifest by the biases of the booters respective environmental circumstances. Nobody has done anything wrong. We had to have almost overwhelming experience with failures to learn that we could be successful.

But from now on I think we must all assume that Malthus was wrong and this it is normal for man to be a physical and economic success--that it is abnormal for any to be a failure – that man's preoccupation must be with his exquisite anti-entropic functioning in universe at-large and at-small--that by producing machines and tools that will produce more with less than was ever produced before, man must continually demonstrate the mastery of the physical by the metaphysical faculties with which he is endowed.