

DESIGN FOR THE REAL WORLD
by VICTOR PAPANEK

Human Ecology and Social Change

With an introduction by
R. BUCKMINSTER FULLER

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This volume is dedicated to my students,
for what they have taught me.

DESIGN FOR THE REAL WORLD

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probing questions were asked about the young Puerto Ricans and Blacks in the neighborhood who might wish to study music but who could never afford to buy instruments. . . .

And where are there permanent design collections? Besides the Museum of Modern Art in New York, there are vestigial collections in Minneapolis, San Francisco, Boston, and Buffalo, N.Y. The rest of the country may sometimes see a traveling "good design" exhibition, but their exposure to well-designed objects ends with that.

And for that matter, even the most prestigious exhibitions of "good design" can be disappointments. In New York the Museum of Modern Art recently held an exhibition of "well-designed" objects that elevated the ugly, in fact *the consciously ugly*, to a new level. Thus we could see a small, high-intensity lamp that has been designed to look precarious and unstable no matter at what angle it is put down. An unruly gush of plastic, colored precisely the shade of frozen diarrhea, doubles as an easy chair. In short, in a society in which the "machine perfect" or even the "fashionably pleasing" can be obtained with a minimum of effort, grossness and the ugly have become imbued with value to the untrained and under-equipped spectator or consumer. Other such exhibitions of objects are discussed in Chapter Six.

If design is a problem-solving activity, this kowtowing to the lowest common denominator has no reason for existence. It is only when the designer abrogates his responsibilities to himself and others and operates as a pimp for the sales department that he finds this creation of warmed-over "soul food" palatable at all.

Much has been said about the decadence of Rome when the barbarians were outside the gate. There are no barbarians outside ours: we have become our own barbarians, and barbarism has become a do-it-yourself kit.

4 DO-IT-YOURSELF MURDER:

The Social and Moral Responsibilities of the Designer

The truth is that engineers are not asked to design for safety. Further inaction will be criminal—for it will be with full knowledge that our action can make a difference, that auto deaths can be cut down, that the slaughter on our highways is needless waste . . . it is time to act.

—ROBERT F. KENNEDY

One of my first jobs after leaving school was to design a table radio. This was shroud design: the design of the external covering of the mechanical and electrical guts. It was my first, and I hope my last, encounter with appearance design, styling, or design "cosmetics." The radio was to be one of the first small and inexpensive table radios to compete on the post-war market. Still attending school part-time, I naturally felt insecure and frightened by the enormity of the job, especially since my radio was to be the only object manufactured by a new corporation. One evening Mr. G., my client, took me out on the balcony of his apartment overlooking Central Park.

He asked me if I realized the kind of responsibility I had in designing a radio for him.

With the glib ease of the chronically insecure, I launched into a spirited discussion of "beauty" at the market level and "consumer satisfaction." I was interrupted. "Yes, of course, there is all that," he conceded, "but your responsibility goes far deeper than

that." With this he began a lengthy and cliché-ridden discussion of his own (and by extension his designer's) responsibility to his stockholders and especially his workers.

Just think what making your radio entails in terms of our workers. In order to get it produced, we're building a plant in Long Island City. We're hiring about 600 new men. Now what does that mean? It means that workers from many states, Georgia, Kentucky, Alabama, Indiana, are going to be uprooted. They'll sell their homes and buy new ones here. They'll form a whole new community of their own. Their kids will be jerked out of school and go to different schools. In their new subdivision supermarkets, drugstores, and service stations will open up, just to fill their needs. And now, just suppose the radio doesn't sell. In a year we'll have to lay them all off. They'll be stuck for their monthly payments on homes and cars. Some of the stores and service stations will go bankrupt when the money stops rolling in. Their homes will go into sacrifice sales. Their kids, unless daddy finds a new job, will have to change schools. There will be a lot of heartaches all around, and that's not even thinking of my stockholders. And all this because you have made a design mistake. *That's* where your responsibility really lies, and I bet that they never taught you this at school!

I was very young and, frankly, impressed. Within the closed system of Mr. G.'s narrow market dialectics, it all made sense. Looking back at the scene from a vantage point of a good number of years, I must agree that the designer bears a responsibility for the way the products he designs are received at the market place. But this is still a narrow and parochial view. The designer's responsibility must go far beyond these considerations. His social and moral judgment must be brought into play long *before* he begins to design, since he has to make a judgment, an *a priori* judgment at that, as to whether the products he is asked to

design or redesign merit his attention at all. In other words, will his design be on the side of the social good or not.

Food, shelter, and clothing: that is the way we have always described mankind's basic needs; with increasing sophistication we have added: tools and machines. But man has more basic needs than food, shelter, and clothing. We have taken clean air and pure water for granted for the first ten million years or so, but now this picture has changed drastically. While the reasons for our poisoned air and polluted streams and lakes are fairly complex, it must be admitted that the industrial designer and industry in general are certainly co-responsible with others for this appalling state of affairs.

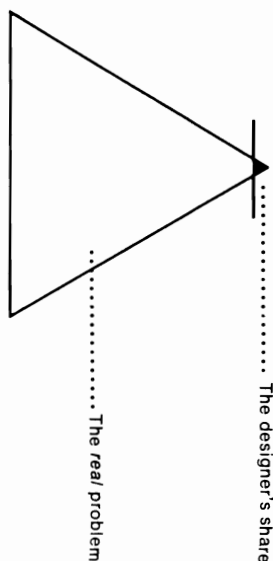
In the mid-thirties the American image abroad was frequently created by the movies. The make-believe, fairyland, Cinderella-world of "Andy Hardy Goes To College" and "Scarface" communicated something which moved our foreign viewers more, directly and subliminally, than either plot or stars. It was the communication of an idealized environment, an environment upholstered and fitted out with all the latest gadgets available.

Today we export the products and gadgets themselves. And with the increasing cultural and technological Coca-colonization of that part of the world we are pleased to think of as "free," we are also in the business of exporting environments and "life styles" of the prevalent white, middle-class, middle-income society abroad and into ghettos, poverty pockets, Indian reservations, etc., at home.

The designer-planner is responsible for nearly all of our products and tools and nearly all of our environmental mistakes. He is responsible either through bad design or by default: by having thrown away his responsible creative abilities, by "not getting involved," or by "muddling through."

Three diagrams will explain the lack of social en-

Diagram 1: THE DESIGN PROBLEM



gagement in design. If (in Diagram 1) we equate the triangle with a *design problem*, we really see that industry and its designers are conceived only with the tiny top portion, without addressing themselves to the real needs.

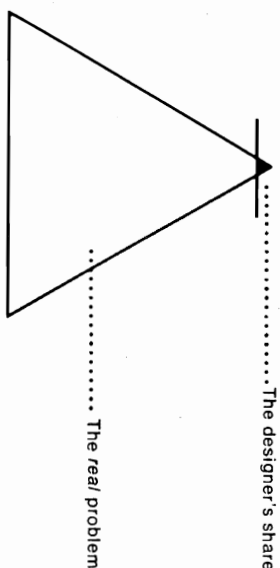
Let's take a rural mailbox for example. As it is now, it is usually large enough to hold letters and several magazines for a number of days. The structure is sheet metal and vaguely breadbox-shaped so that snow, ice, and rain will easily slide off. It also carries a small signal flag to be raised when the mail is delivered. It is inexpensive and sturdy.

Quite recently a West Coast design office redesigned rural mailboxes for a national manufacturer. The result: a series of French Provincial, Japanese, colonial, or spaceship-inspired extravaganzas which are costly and which clutter up the visual landscape. They are "high-style" enough to be forced into obsolescence every few years and, incidentally, snow no longer slides off them. They will probably sell well in suburbia and exurbia and will take on some of the symbolic values of new status objects. The manufacturers are to be congratulated: many more mailboxes will be sold and, more importantly, many more can be pushed upon the public every few years as even fashion in mailboxes is manipulated.

What is the designer's evaluation? There is little

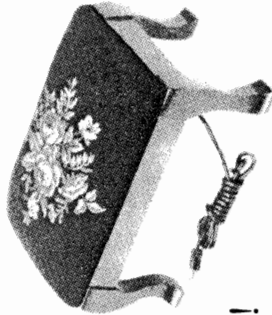
wrong with the rural mailbox as it stands, apart from its cluttering the landscape. But if redesign is called for, then the real problems of rural mail delivery, in other words the huge bottom area of our diagrammatic triangle, must be re-examined. To what extent can mailboxes be made to recede (or even disappear) into the landscape? Can new materials, tools, and processes reduce costs and, more importantly, reduce material waste? Can these containers be made tamper-proof and vandal-proof? With heavier mail does the old size still hold true? Can redesign help delivery? (With the incredibly antiquated mail delivery system in the United States there is little doubt that electronic data-scanning procedures will result in a more nearly normal delivery schedule: until quite recently in England, for instance, city mail was delivered eight times daily, rural mail four times.) Should the consumer in fact be required to buy mailboxes at all or should a minimal Federal standard be written which eases delivery procedures and guards privacy? Should local newspapers be permitted to add their own tubular "mailboxes," using them as shrill billboards which further befoul the edge of the road? These are only a few of the questions which a committed designer would ask himself; at last, most of the triangle (top and bottom) would be explored.

Diagram 2: A COUNTRY



This idiot gadget is made and successfully sold in one part of the world . . .

Go ahead
...put
your
feet up!



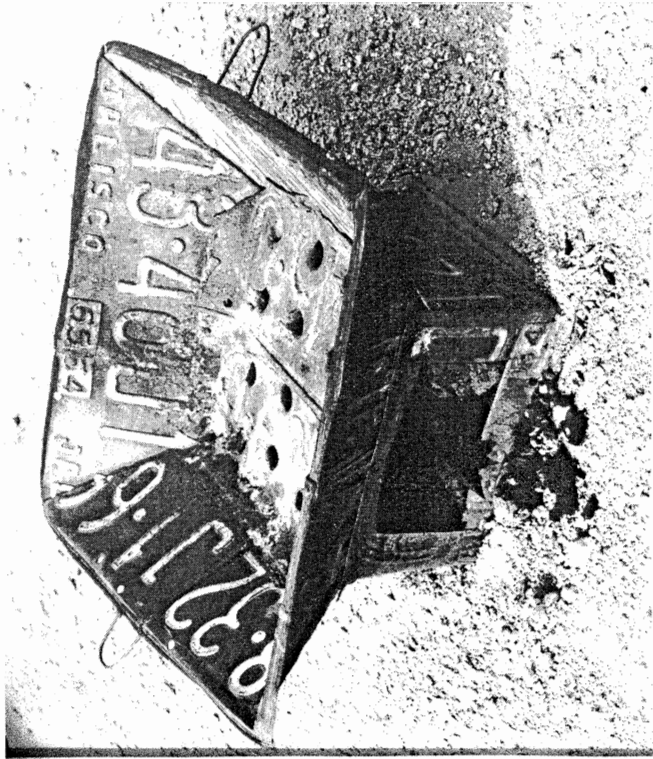
... just plug it in... put your feet up and relax! This charming Queen Anne style footstool does the rest with soothing warmth. Covered with a traditional petit point tapestry... multicolor floral print pattern on black. Handcrafted of fine mahogany... beautifully hand polished. Looks well in room. So give your feet a treat... makes an unusual and thoughtful gift, too! Satisfaction guaranteed. Only \$16.95 plus 50¢ for delivery.



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... while in another, this is a family's sole means of cooking. Mexican can stove from Jalisco, made of used license plates and sold for about 8 cents. It is used as a charcoal brazier. When the soldering finally pops after some ten or fifteen years of use, it is repaired, if possible, or else the family has to invest another 8 cents for a "new" stove. (Anonymous design, collected by John Frost, author's collection. Photo: Roger Conrad.)

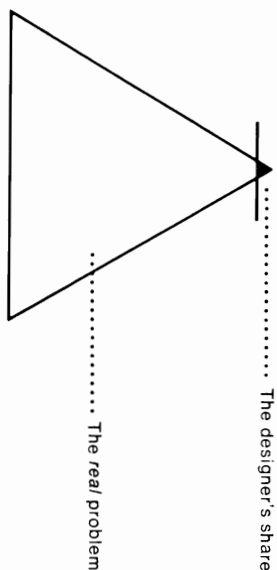
Diagram 2 is, of course, identical to Diagram 1. Only the labels have changed. For "Design Problem" we have substituted "Country." In a way, the justice of this becomes immediately apparent when talking about some far-off, exotic place. If we let the entire triangle stand for nearly any South or Central American nation we can see its telescopic aptness. Nearly all of these countries exist with wealth concentrated in the hands of a small group of "absentee landlords." Many of these people have never seen the South American country which they so efficiently "administer" and exploit. Design is a luxury enjoyed by a small clique who form the technological, moneyed, and cultural "elite" of each nation. The 90 per cent native Indian population which lives "up-country" has neither tools nor beds nor shelter nor schools nor hospitals that have ever been within breathing distance of designer's



board or workbench. It is this huge population of the needy and the dispossessed who are represented by the bottom area of our triangle. If I suggest that this holds equally true of most of Africa, Southeast Asia, and the Middle East, there will be little disagreement.

Unfortunately, this diagram applies just as easily to our own country. The rural poor, the black and white citizens of our inner cities, the educational tools we use in over 90 per cent of our school systems, our hospitals, doctors' offices, diagnostic devices, farm tools, etc., suffer design neglect. New designs may sporadically occur in these areas, but usually only as a result of market pressures, rather than as a result of either research breakthrough or a genuine response to a real need. Here at home we too must assign those served by the designer to the minuscule upper part of the triangle.

Diagram 3: THE WORLD



As the reader will have discovered by now, the third diagram is identical to the first and the second. But again we have changed labels. For now we call it "The World." Can there be substantial doubt that the peoples of this world are not served by designers?

Where has our spirit of innovation gone? This is not an attempt to "take all the fun out of life." After all, it is only right and proper that "toys for adults" should be available to those willing to pay for them, and after all, as has been pointed out all too often, we live in an abundant society. But only a small part of our responsibility lies in the area of aesthetics. Sometimes one is tempted to ask why not *one* American table radio, for example, is well designed, whereas Sony, Hitachi, Panasonic, and Aiwa carry lines of some 84 highly specialized table radios, each one designed for a specific use area. (This record could easily be duplicated with tape recorders, TV sets, or, say, cameras.) After all, many book publishers, while pushing incredible trash onto best-seller lists, manage to bring out a few worthwhile volumes each year.

I am not necessarily pleading for extraordinary, innovative design for radios, alarm clocks, high-intensity lamps, refrigerators, or whatever; I am just hoping for product statements aesthetically acceptable enough not to conjure up visions of a breadbox raped by a

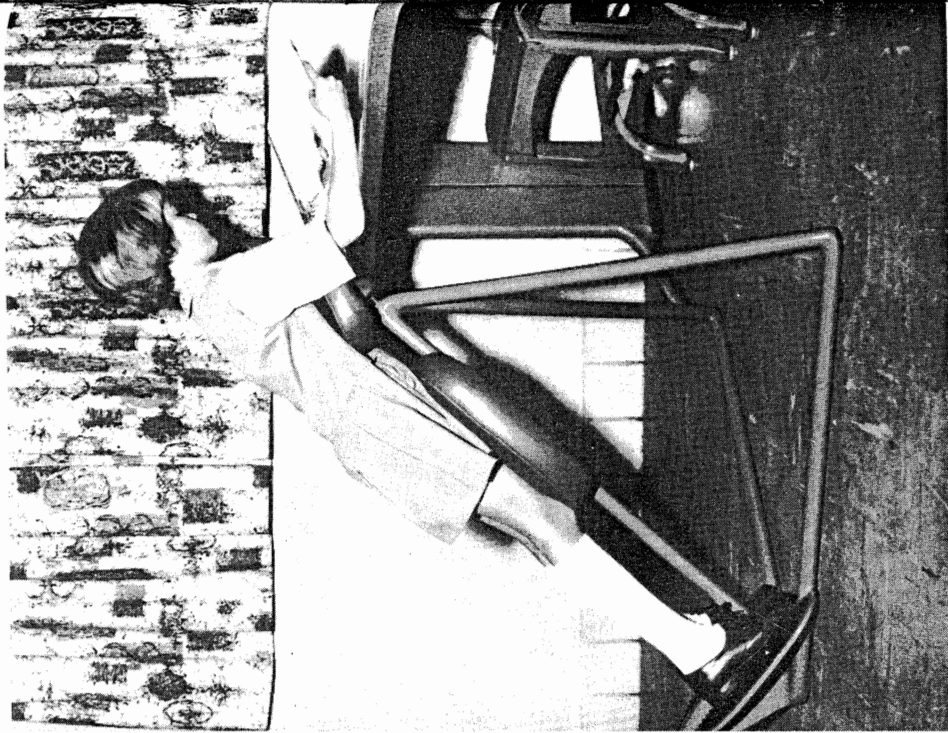
Cadillac in heat. Isn't it too bad that so little design, so few products are really relevant to the needs of mankind? Watching the children of Biafra dying in living color while sipping a frost-beaded martini can be kicks for lots of people, but only until *their* town starts burning down. To an engaged designer, this way of life, this lack of design, is not acceptable.

All too often designers who try to operate within the entire triangle (problem country or world) find themselves accused of "designing for the minority." Apart from being foolish, this charge is completely false and reflects the misconception and misperception under which the design field operates. The nature of this faulty perception must be examined and cleared up.

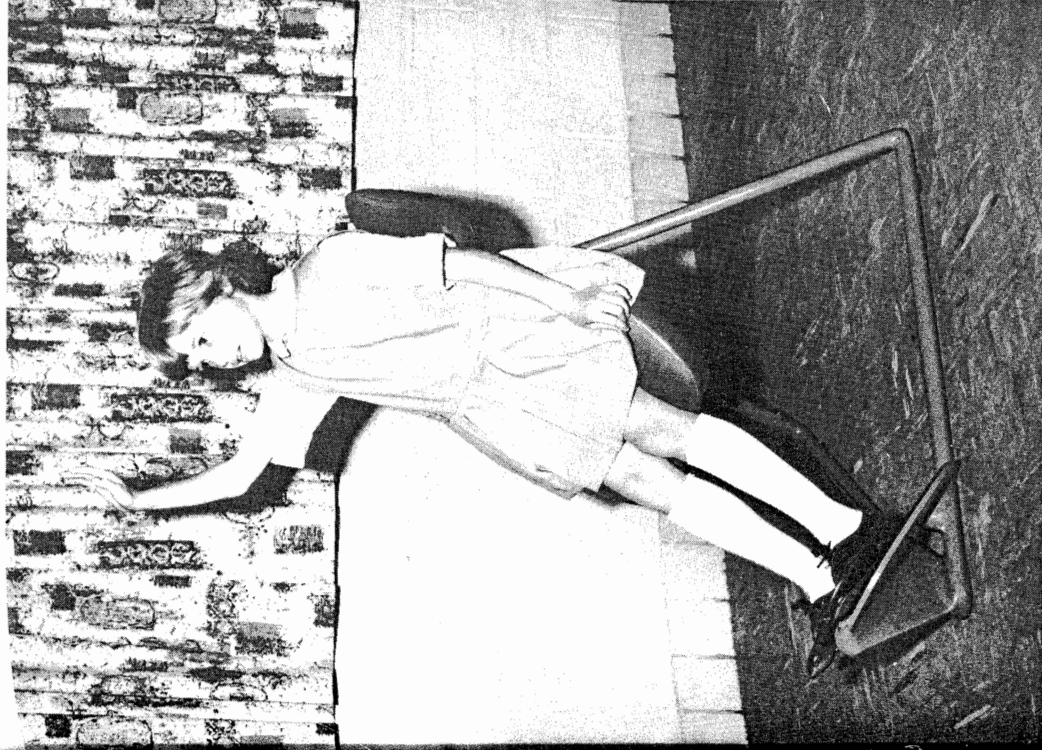
Let us suppose that an industrial designer or an entire design office were to "specialize" exclusively within the areas of human needs outlined in this and other chapters. What would the work load consist of? There would be the design of teaching aids: teaching aids to be used in pre-nursery-school settings, nursery schools, kindergartens, primary and secondary schools, junior colleges, colleges and universities, graduate and post-doctoral research and study. There would be teaching aids and devices for such specialized fields as adult education, the teaching of both knowledge and skills to the retarded, the disadvantaged, and the handicapped; as well as special language studies, vocational re-education, the rehabilitation of prisoners, and mental defeatives. Add to this the education in totally new skills for people about to undergo radical transformation in their habitats: from slum, ghetto, or rural poverty pocket to the city; from the milieu of, say, a central Australian aborigine to life in a technocratic society; from Earth to space or Mars; from the tranquility of the English countryside to life in the Minidanao Deep or the Arctic.

The design work done by our mythical office would include the design, invention, and development of medical diagnostic devices, hospital equipment, dental

Perch or reclining structure to be used in classrooms in addition to regular chairs. This provides eight more positions for restless children. Designed by Steven Lynch, as a student at Purdue University.



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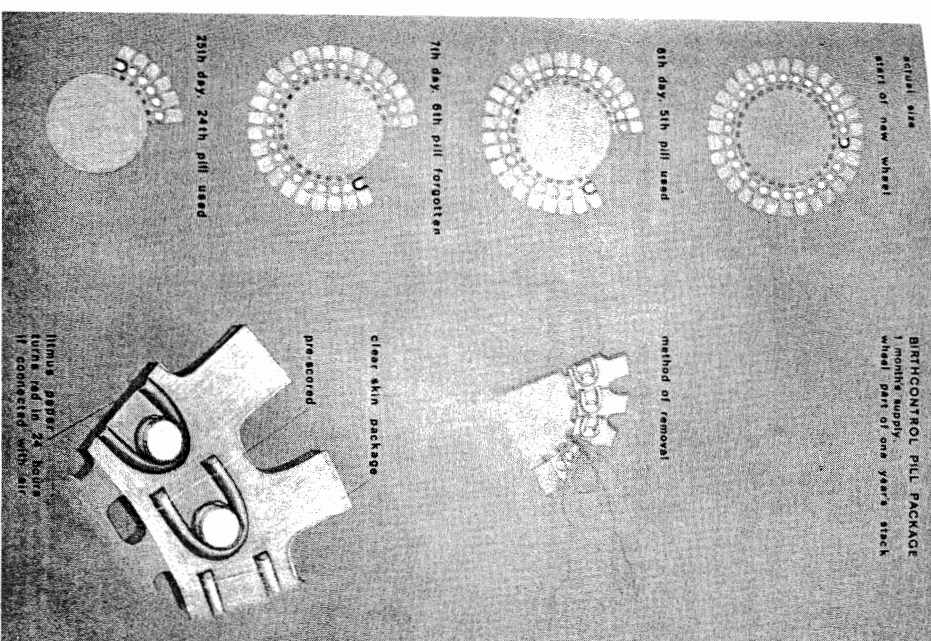
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equipment, surgical tools and devices, equipment and furnishings for mental hospitals, obstetrician's equipment, diagnostic and training devices for ophthalmologists, etc. The range of things would go all the way from a better readout of a fever thermometer at home to such exotic devices as heart-lung machines, heart pacers, artificial organs, and cyborgian implants, and back again to humble visor-like eyeglasses, reading mechanisms for the blind, improved stethoscopes and urinalysis devices, hearing aids and improved calender dispensers for "the pill," etc.

The office would concern itself with safety devices for home, industry, transportation, and many other areas; and with pollution, both chemical and thermal, of rivers, streams, lakes, and oceans as well as air. The nearly 75 per cent of the world's people who live in poverty, starvation, and need would certainly occupy still more time in the already busy schedule of our theoretical office. But not only the underdeveloped and emergent countries of the world have special needs. These special needs abound at home as well. "Black lung" disease among the miners of Kentucky and West Virginia is just one of a myriad of occupational ills, many of which can be abolished through relevant redesign of equipment and or processes.

Middle and upper managerial ranks (if male and between ages of thirty-five and sixty) are a prime health-hazard group. The incidence of death from cardiovascular arrests by stroke or heart attack is frighteningly high. This loss of human lives can be ascribed to three main causes: faulty diet, a lack of exercise, and stress syndromes. Exercising equipment with built-in motivation might spare the lives of many people in this group, a group desperately needed all over the world to keep humanity going.

Basic shelters for American Indians and the Lapp population of Norway, Sweden, and Finland—and shelters (both temporary and permanent) for all men poised at the edge of an alien environment—need design and discovery. Whether it be a comparably simple



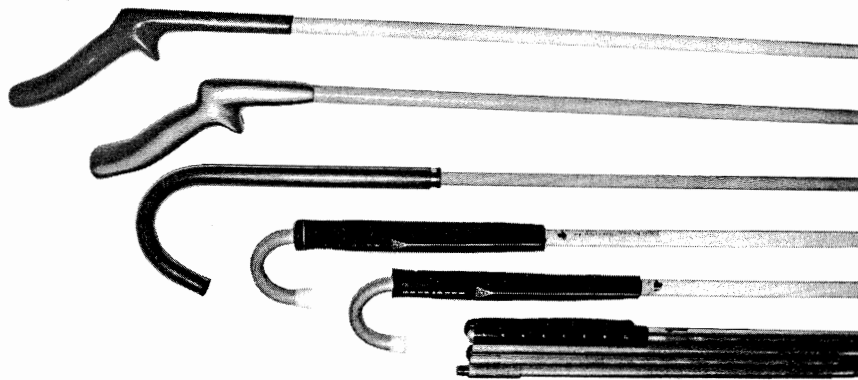
Package for birth control pills for use by largely illiterate people. A run of placebos is included so that counting is unnecessary. If a user forgets to break off one day's pill from styrene wafer, the U-shaped tube turns red, as a reminder. Designed by Pirko (Tintin) Sotamaa, Purdue University.

shelter such as a space station or dome cities for Venus or Mars or something as complex as the complete "terraforming" of the moon, our design office will be needed here just as it is in sub-oceanic cities, Arctic factories, and artificial island cities to be anchored like so many pleasure boats in the Amazon River Basin, the Mediterranean, or around the (gen- uine) island chains of Japan and Indonesia.

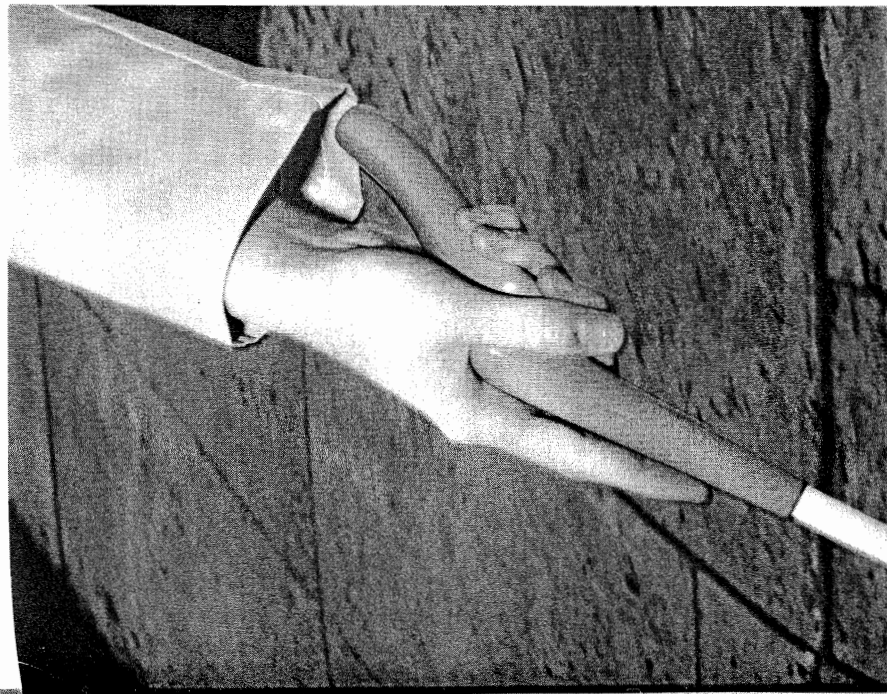
Research tools are usually "stuck-together," "jury- rigged" contraptions, and advanced research is suffer- ing from an absence of rationally designed equipment.

From radar telescopes to simple chemical beakers, design has lagged behind. And what about the needs of the elderly and the senile? And of pregnant women and the obese? What about the alienation of young people all over the world? What about transportation (surely the fact that the American automobile is the most efficient killing device since the invention of the machine gun doesn't permit us to rest on our laurels), communication, and design for entirely new "break- through" concepts?

Are we still designing for minorities? The fact of



Canes for the blind, of hand-aligned fiber op- tics. They glow in the dark and also provide a more sensitive tac- tile feedback for the hand. Student designed by Robert Senn, Purdue University.



the matter is that all of us are children at one point of our lives, and that we need education throughout our lives. Almost all of us become adolescent, middle-aged, and old. We all need the services and help of teachers, doctors, dentists, and hospitals. We all belong to special need groups, we all live in an underdeveloped and emergent country of the mind, no matter what our geographical or cultural location. We all need transportation, communication, products, tools, shelter, and clothing. We must have water and air that is clean. As a species we need the challenge of research, the promise of space, the fulfillment of knowledge.

If we then "lump together" all the seemingly little minorities of the last few pages, if we combine all these "special" needs, we find that we have designed for the majority after all. It is only the "industrial designer," style-happy in the seventies of this century, who, by concocting trivia for the market places of a few abundant societies, really designs for the minority.

Why this polemic? What is the answer? Not just for next year but for the future, and not just in one country but in the world. During the summer of 1968 I discovered a Finnish word dating back to medieval times. A word so obscure that many Finns have never even heard it. The word is: *kymmenyket*. It means the same thing as the medieval church word *tithe*. A tithe was something one paid: the peasant would set aside 10 per cent of his crop for the poor, the rich man would give 10 per cent of his income at the end of the year to feed those in need. Being designers, we don't have to pay money in the form of *kymmenyket* or a tithe. Being designers, we can pay by giving 10 per cent of our crop of ideas and talents to the 75 per cent of mankind in need.

There will always be men like Buckminster Fuller who spend 100 per cent of their time designing for the needs of man. Most of the rest of us can't do that well, but I think that even the most successful designer can afford one tenth of his time for the needs of men.

It is unimportant what the mechanics of the situation are: four hours out of every forty, one working day out of every ten, or ideally, every tenth year to be spent as a sort of sabbatical designing for many instead of designing for money.

Even if the corporate greed of many design offices makes this kind of design impossible, students should at least be encouraged to work in this manner. For in showing students new areas of engagement, we may set up alternate patterns of thinking about design problems. We may help them to develop the kind of social and moral responsibility that is needed in design.

Problems are everywhere. Left-handedness has never been designed for (see Chapter Six). The SDS used compelling rhetoric some years ago about "talking to the workers." But how about working with the workers? "Hard hats" are given their name because of the protective headgear they wear. But these hats are unsafe, not sufficiently tested for absorption of kinetic energy. I should like to quote from the pamphlet of the "safety" helmet made by Jackson Products of Warren, Michigan:

CAUTION: This helmet provides limited protection. It reduces the effect of the force of a falling object striking the top of the shell.

Contact of this helmet shell with energized electrical conductors (live wires) or equipment, should be avoided. NEVER ALTER or MODIFY the shell or suspension system.

Inspect regularly and replace suspension system and shell at first sign of wear or damage.

The WARNING stated above applies to all industrial safety hats and caps, regardless of manufacturer. (My italics.)

This last statement really seems to be true since all hard-hat pamphlets carry this warning, using almost identical words.

The nearly two million safety goggles manufactured annually in this country are unsafe—the lenses scratch easily, some may shatter, and most crack the bridge of the nose under a blow. So-called “hard shoes,” designed to protect the front of the foot against falling debris, do not absorb sufficient kinetic energy to be useful; the steel cap over the toes can be crushed by a small steel beam falling one yard. Most cabs in long-distance trucks vibrate so that they will materially destroy a man's kidneys in 4 to 10 years. The list could go on.

What may be needed here is a designers' commune. Most communes in this country have determinedly marched into the past. But baking bread, playing a guitar, weaving fabrics, and doing ceramics are not the only rational alternatives to a consumer society. Nor is the mind-blowing violence of a Charles Manson. With most of the communes poised in a choice between nihilism and nostalgia, a commune of planners and designers might prove to be the best alternative. (I've written more about this in Chapter Twelve.)

There must have been a time a few million years ago when some nameless early caveman killed a rabbit, ate it in his cave, and threw the bones on the ground. And surely his wife implored him to throw the bones out of the cave, to keep it neat and clean. Times have changed. We are all in the same cave together, and there is no longer any place to throw the trash. Or to change to a more meaningful metaphor, we are all together on this small spaceship called “Earth,” 7,900 miles in diameter and sailing through the vast oceans of space. It's a small spaceship and 50 to 60 per cent of the population cannot help to run it, or even help themselves stay alive, through no fault of their own. Where hunger and poverty lead small children to eat the paint off walls and die of lead poisoning in Chicago and New York ghettos. Where children in Los Angeles and Boston die of infected rat bites. To deprive ourselves of the brain and po-

tential of any person on our spaceship is wrong and no longer acceptable.

All this raises the question of value. If we have seen that the designer is powerful enough (by affecting all of man's tools and environment) to put murder on a mass production basis, we have also seen that this imposes great moral and social responsibilities. I have tried to demonstrate that by freely giving 10 per cent of his time, talents, and skills the designer can help. But help where? What is a need?

In the early fifties I had the good fortune to enjoy a lengthy correspondence with the late Dr. Robert Lindner of Baltimore. Together we worked on a book to be called *Creativity Versus Conformity*, a collaboration ending only with his untimely death. I should like to quote extensively from the Prologue (pp. 3-6) of his *Prescription for Rebellion* concerning his concept of value:

The end to which man studies himself cannot be other than to realize the full potentiality of his being, and to conquer the *triad of limitations* fate or God, or destiny, or sheer accident, has imposed on him. Human beings are enclosed by an iron triangle that forms for their race a veritable prison cell. One side of this triangle is the medium in which they must live; the second is the equipment they have, or can fashion, with which to live; the third is the fact of their mortality. All effort, all being, is directed upon the elimination of the sides of this enclosure. If there is purpose to life, that purpose must be to break through the triangle that thus imprisons humanity into a new order of existence where such a triad of limitations no longer obtains. This is the end toward which both individual and species function; this is the end toward which the race strives; this is the end which gives meaning and substance to life.

Behind and beyond the word-games philosophers play, and in the final analysis, all that man does—alone or in the organizations he erects—has as its design the overcoming of one or more or all aspects of

this basic triad of limitations. What we call progress is nothing more than the small victories every man or every age wins over any or all of the sides of the imprisoning triangle. Thus progress, in this one and only possible sense, is a measurable thing against which the sole existence of a person, the activities, and aims of a group, even the achievements of a culture, can be estimated and assigned value.

The as yet uncalculated millennia during which man has tenanted Earth have been witness to his continued valiant efforts to escape from the triangle that interns him. Inexorably and against odds, over the centuries, he has fought against and conquered the medium of his habitat until now he stands poised on a springboard to the stars. Today, earthbound no longer, and loosening even the fetters of gravity, he can look backward to count his conquests. The elements have succumbed to him, and also the natural barriers of space and time. Once confined to a small area bounded by the height of the trees he could climb, the distance his legs could carry him, the view his eye could encompass, the length his voice could carry, the reach of his arms, and the acuity of his remaining senses—once a cowed victim of every hazard to existence vagrant Nature has in her catalogue—now he is lord over those containing powers that would have held him slave to them forever. So one iron wall of his cell has been worn thin, and, through the vents and cracks he has made in it, come far-traveled winds of freedom and the beckoning gleam of the universes outside.

Similarly, the second side of the triangle—the limitations imposed by the biologically given equipment of human beings—has yielded step by step to the ongoing, persistent struggle against it by men. In the main, this has been a process of extension. It has been marked by the fashioning of tools to improve the uses of the limbs, the sensitivities of the specialized end-organs and the efficiency of those other parts and organs that complete the body. Here the victories have been of an immense order of magnitude. They have culminated in what amounts to

a total breakthrough of the envelope of skin that enwraps us, even to the point where the products of hand and brain—as in the giant computing machines and other physical miracles of our time—by far outdo many capacities of their creators. And, finally, in the matter of the last side of the triangle, while the days of our years still last but an eyewink on the bland face of the eternal clock, longevity if not immortality is now more than a promise.

The uses of knowledge are clear despite the turbulent morass through which a seeker must plow to find order and sense therein. The sciences and arts—like the individual lives men live—are all strivings and experiments. They are pointed toward the realization of human potentiality and ultimately contributory to that evolutionary breakthrough which will come when the walls of the containing triangle finally crash to earth. Thus the value of an item of knowledge, an entire discipline, or a deed of art can be placed upon a scale, and its measure also taken.

Much as we have established a six-sided "function complex" in order to evaluate design in the first chapter, we can now plug in the "triad of limitations" and use it as a primary filter to establish the social value of the design act. While the American automobile is examined in great detail in a later chapter, it can be used as a demonstration object now.

Early automobiles overcame one of the three prison walls of the triad. It was possible to go farther and faster in an automobile than a human being's legs would carry him, and to carry a heavy load as well. But today the automobile has become so overloaded with false values that it has emerged as a full-blown status symbol, dangerous rather than convenient. It breathes and exhales a great amount of cancer-inducing fumes, it is overly fast, wastes raw materials, is clumsy, and kills 50,000 people in an average year. On an average weekday the time needed in rush hour to go from the East River to the Hudson on Forty-second Street in New York is at least one hour: a

man walking can easily do it in but a fraction of that time. Considering these aspects, the concept of the automobile has been manipulated so that it now shores up the wall of mortality in the triad; its contributions have grown negligible by comparison.

The car, however, is only one example. Everything designed by man can be forced through the filter and evaluated in a similar matter.

K. G. Pontus Hultén's *The Machine as Seen at the End of the Mechanical Age* (1968) is an excellent book. Two quotes from it are relevant here. Commenting on Jean Tinguely's "Rotozaza No. 1," Hultén says:

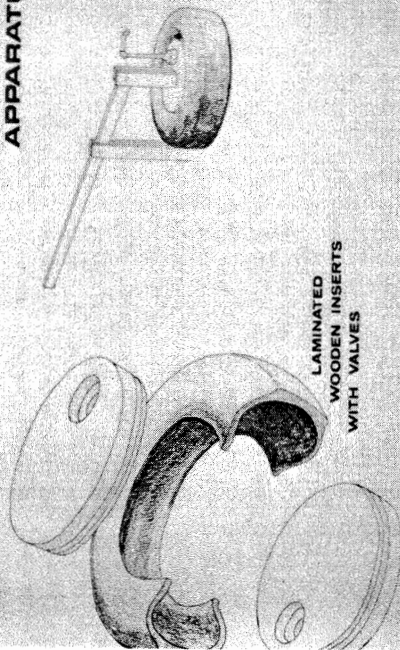
The production of articles that nobody really needs, but which occupy the ground floors of all big stores, is one of the many outward symptoms of something basically wrong in a world of overproduction and undernourishment. In order to control overproduction, without going through the intricacies of selling the product, it becomes necessary for a wilfully destructive war to be going on permanently somewhere. Today, the world is spending over \$150 billion per annum on the actual or potential destruction of lives and property, as compared with the capital transfer from rich to poor countries of about \$10 billion per year—including a large share for military aid.

And on the following page, in reference to another work, he continues:

Probably the greatest political problem facing the world today is the difference among various regions as regards their technological development. Many parts of Europe and America are already leaving the mechanical age to enter the electronic era, while much of Africa, for example, is only beginning to be industrialized.

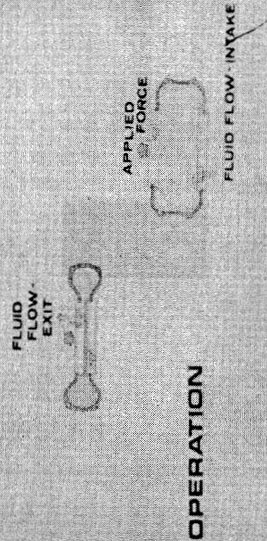
To some extent, the mechanical age seems linked to the age of colonialism. Both reached their apogee in the nineteenth century; both were based on the instinct for exploitation. The world was prospected to discover and cultivate raw materials with which to

POSSIBLE WORKING APPARATUS



LAMINATED WOODEN INSERTS WITH VALVES

PUMPING DEVICE



OPERATION

One of a series of twenty investigations into the use of old tires, which now abound in the Third World. Both of these irrigation pumps have since been built and verified. Designed by Robert Toering, as a student at Purdue University.

feed the machines. It rarely occurred to the ruling powers that the people whose soil produced these materials, and who sweated to bring them forth, should have any appreciable use and benefit from other products. Whenever the natives made any serious trouble, the usual response was to send a gunboat.

Up to 1950, there were four independent countries in Africa; today, there are more than forty. They are politically aware and highly nationalistic, but technologically extremely underdeveloped. Industrial output in all of Africa (except South Africa) is, in fact, less than that in Sweden alone. Unless foreign governments and private corporations unite with the African nations in a massive and long-range program of industrial development, the social and political results will probably be explosive.

What needs to be done? And how can we do it? A series of examples may serve as the best answer.

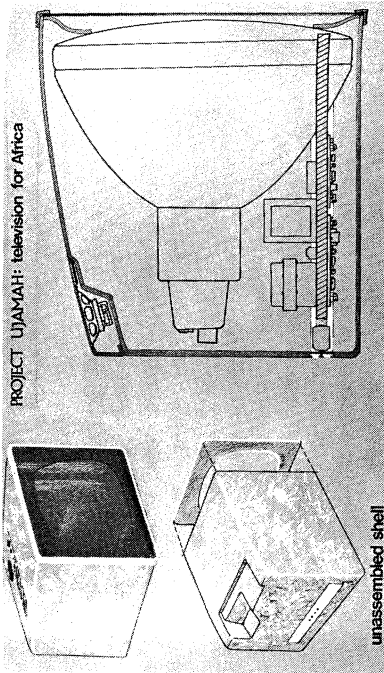
One of the world's few really great designs for emergent countries was developed during the last 25 years by a team of 3 designers from as many different countries. It is a brick-making machine. This simple device is used as follows: Mud or earth is packed into a brick-shaped receptacle, a large lever is pulled down, and a perfect "rammed earth" brick results. This apparatus permits people to "manufacture" bricks at their own speed—500,000 a day or 2 a week. Out of these bricks schools, homes, and hospitals have been built all over South America and the rest of the Third World. Today schools, hospitals, and entire villages stand in Ecuador, Venezuela, Ghana, Nigeria, Tanzania, and many other parts of the world. The concept is a great one: it has kept the rain off the heads of people, and it has made instruction possible in schools where it was not possible before and where the schools themselves did not exist a few years ago. The brick machine has made it possible to construct factories and install equipment in areas where this had never

been attempted in the past. This is socially conscious design, relevant to the needs of people in the world today.

During the international design festival at Jyväskylä, Finland, in 1968, I participated as part of a UNESCO team of international design experts to develop new ideas for Black Africa. Many problems await solution. The circulatory system of the Third World, and specifically Black Africa, is very bad. The people get sick because waste products cannot be efficiently rinsed away; there is almost no sanitation. There is not enough water because water is polluted by precipitation, by flowing through open ditches, and by incredibly fast evaporation. Often water is uncontrolled and washes away precious topsoil. Irrigation is virtually non-existent in the villages. The missing element is a *pipe*, or rather a simple device that will it possible to manufacture pipe segments in the village, by "cottage industry" or by an individual. So the task is to design a pipe-making machine. A pipe-making machine that can be built in Africa by Africans and used for the common good. A machine (or tool) that will by-pass private profit, corporate structures, exploitation, and neo-colonialism.

Black men from seven nations told me that one of their greatest needs was an inexpensive educational TV set. This will be a set to be distributed to African states through UNESCO, to be made in Africa, using native materials as far as possible, as well as local labor. It should give no profit to any private corporation in Europe or North America.

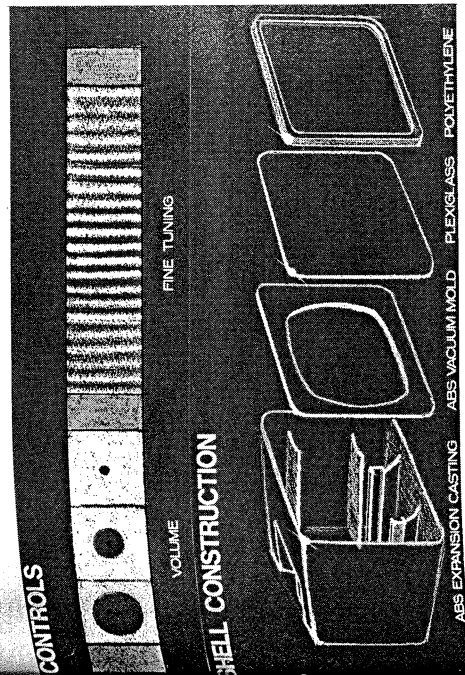
Television was developed in Great Britain and the United States nearly 40 years ago. Since these were the first countries to develop it and because of their market structure, set design has been frozen into early levels, technologically. TV sets in North America show images with a line resolution of 525 lines to the inch. Russian sets have 625; Great Britain has 405 and 625. French sets have a line resolution of 819 to the inch.



Low-cost educational TV set to be built by Africans in Africa.
Designed by Richard Powers, as a student at Purdue University.

This means that these images are clearer and demand less from the eye and brain to decode the information. Obviously a television set that is completely new, devoted primarily to educational needs, should carry a high line resolution.

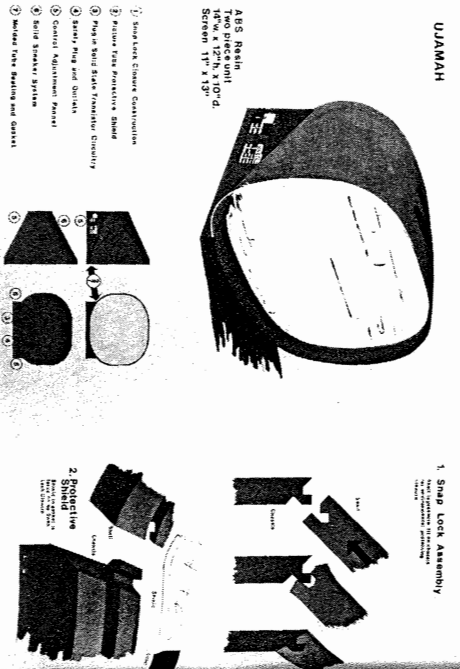
In doing the basic research for this set, my graduate students and I have found much to astonish and delight us. Even in a sophisticated, technologically advanced country like Germany, TV sets have selectors for 13 different channels, even though only 2 channels are used. In our case this entire selection mechanism can safely be left out because we are working on a one-channel set. The eventual breakdown of the vacuum tube is speeded up through the use of on-off switches. We plan to broadcast educational material only, and the set will always be "on." Current drain is negligible with the use of transistors. Since the set must be tropicalized, venting it seemed to be crucial. Tropicalization in Africa, however, also means preventing the entry of thousands of small insects. We found



that through the use of integrated circuits, internal heat build-up was negligible enough to eliminate all need for fans and/or vents. In fact, by burying an aluminum heat sink in the housing of the set, enough heat is drained off.

Our research had to consider climatology, anthropology, electronics and electronics, population densities, prevalence of African languages in various areas, terrain (for transmission reasons), social attitudes, and many other guidelines of design.

After we discovered, somewhat late in our research, that a highly sophisticated, market-competitive TV set (including 36 channels, on-off switching, internal fans, and an inordinate amount of "sexy" styling) sold for \$119.95 retail in the United States (including all profits, shipping, and customs charges), we investigated that set. We found that labor, manufacturer costs, and material cost the Japanese manufacturer less than \$18. We have accepted the fact that in terms of existing African skills, factories, and distribution



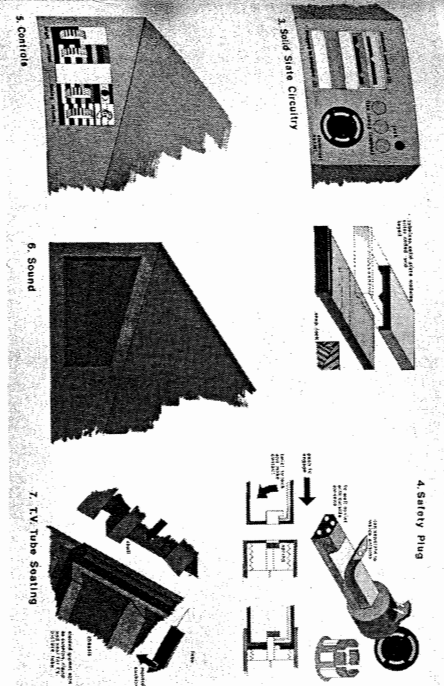
Another version of African TV
Crofty, as a student at Purdue

networks, our set can be made for considerably less than \$9.

Our final concept of the shell of the TV set will permit both mass production (at the rate of 2,000 shells per machine-day) or individual production by one individual standing in a village street. It can then be his decision as to whether he wishes to make 30 shells a day or one every few days.

At the time of this writing (December 1970), the introduction of video-tape cartridges in both black and white and color is only a matter of time. It is for this reason that we are redesigning our educational television set so that it will also accommodate the cartridge. There can be no doubt that, especially in areas of education, video cartridges will completely revolutionize the development of the Third World.

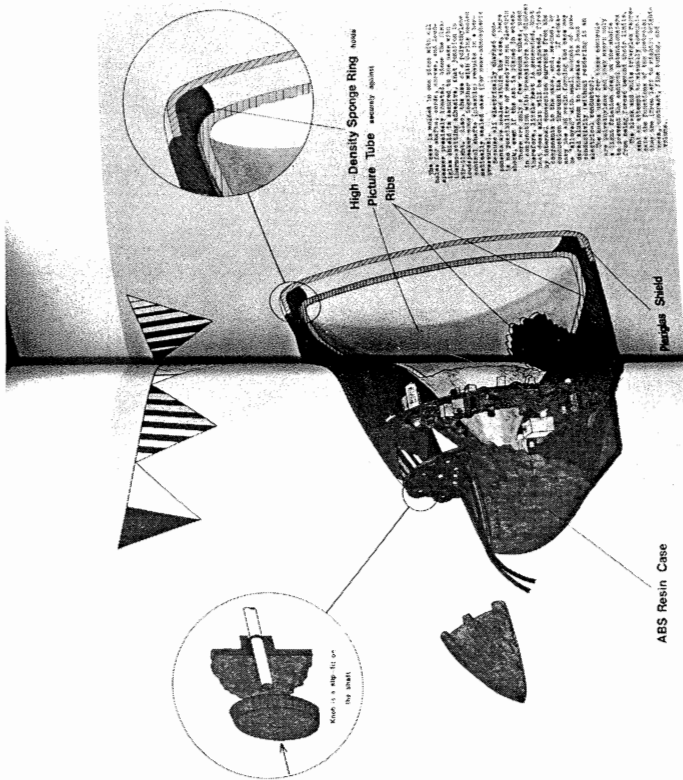
In a short time this \$9 TV set will be completed and given to UNESCO. It will join our 9¢ non-electric,



proposal. Designed by Michael
University.

thermocoupled, cow-dung-powered radio (designed for Indonesia).

There are many ways of working for the needs of underdeveloped and emergent countries. The simplest, most often employed, and probably shabbiest is for the designer to sit in his New York, London, or Stockholm office and to design things to be made in, say, Tanzania. Souvenir-like objects are then manufactured, using native materials and skills, with the pious hope that they will sell in developed countries. They do, but for a short while only, for by designing "decorative objects for the home" and "fashion accessories," we merely tie the economy of that country to the economy of other countries. Only two possibilities remain: Should the economy of the wealthy Western country fail, the emergent country's new economic independence fails with it. Should the economy of the wealthy Western country continue climbing, the fashion likes



Another version of African TV proposal, designed by Stanhope Adams, Jr., as a student at Purdue University.

and dislikes of its population will be manipulated even more, and consequently, the emergent country's new economic independence will fail also.

A second, slightly more effective way for the designer to participate would be to spend some time in the underdeveloped country developing designs really suited to the needs of the people there. This still begs the question of meaningful engagement.

A somewhat better way: to move the designer to the underdeveloped country and have him train designers there, as well as designing and working out the logistics of design needs for that nation. But even this is no ideal solution.

Ideally (as things stand now): The designer would move to the country and do all the things indi-

cated above. But in addition, he would also train designers to train designers. In other words he would become a "seed project" helping to form a corps of able designers out of the indigenous population of the country. Thus within one generation at most, five years at the least, he would be able to create a group of designers firmly committed to their own cultural heritage, their own life style, and their own needs.

All design must be *operative*. Just as the African TV set becomes synergetically more than a TV set as its manufacture requires new native skills, a large pool of labor reserve, new factories, and new communication channels, design itself must, as shown in the above example, always be a seed project, always operative.