Creative Information: Tools For Environmental Education and Personal Change

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If people are to participate in any action, be it environmental or political, they must be able to feel that what they do has an effect. Low voter turn out stems from being left behind by the political system - a lack of understanding of the issues and process. We believe this analogy applies to the way people feel about science and general knowledge.

The transfer of scientific information to the general public is an important key to influencing sound environmental policy decisions. However, the collection and distribution of raw data has little meaning to most people. Unless it is quantified, formatted and presented in a manner that emulates society's proven learning systems, data may not be acted upon in large scale.

More and more avenues are needed to help people deal with change. Many intelligent, informed people are having trouble keeping up with the constant flow of new information and the corresponding changes in technology. We must personally open up to sharing and teaching in any way, to help people understand the issues which affect them.

The Energy Scale was created by the authors as an example of an information transfer model that meets the double need for science to be expressed and the public to be educated. The Scale pieces together building science research and data into a usable information format, enabling the public to swiftly access scientific issues that relate to their home energy use.

A Need for Creative Solutions

The Gulf

A reoccurring message over the past few years suggests that American workers cannot keep up with the competition. Data from a survey performed last year by the National Association of Manufacturers and Towers Perrin, a human resources consultant, suggest that the average manufacturer rejects five out of every six applications received. A January Associated Press article (Cunniff 1992) indicate there are many problems with the U.S. worker, ranging from a general lack of abilities to ". . .educational, social and skill deficiencies among masses of young people."

Whether it is manifested in poorer services or the way we are competing globally, things are happening that suggest most of the human population are not keeping pace with the changes in the world. One reason for the inability of the general population to keep informed on issues that affect them is a lop-sided distribution of personal wealth. A recent IRS study (Francis 1990) reported that "the richest 1.6% of U.S. adults . . . held 28.5% of the nations personal wealth"; up from 23% in just four years.

A closer look at the growth of population helps explain a growing correlation between wealth and knowledge. According to a recent CNN report, (CNN 1992) the population growth in developing countries is directly related to poverty and ignorance of other lifestyle choices.

In his book "Time Wars" (Rifkin 1987), Jeremy Rifkin states that survival of the fittest is being replaced by "survival of the best informed". Perhaps, with science, technology, and knowledge racing ahead at full competitive speed, it might seem that we are less intelligent, when in fact we might be the same. The world around us is changing too rapidly for many of us to keep up.

New Thinking

Governments, markets, weather and the distribution of wealth and knowledge all ebb and flow according to a complex and often chaotic set of circumstances. We look at these situations as cycles and we expect them to vary. With the changes we see around us in the environment and a population which is headed in one direction, these cycles seem to be heading into uncharted territory. To

help people understand the events which are affecting them, perspective and objectivity are needed from everyone. New ways of thinking, inventive ideas, and a willingness to get to the more basic and fundamental thoughts and philosophies which have shaped us, need to be looked at. Looking at both past and existing societal paradigms gives us some of the perspective we need. Though the shifts and influences are complex and varied, we need to make some generalizations to get a grasp of our own evolution.

Understanding the Problems

Evolution

Our history is one of evolutionary extremism. Morris Berman's (Berman 1984) view of the social evolution before and after the dawn of scientific thought, portrays the pre-scientific society as one of a "participating consciousness", being a part of the environment with not much control or understanding of nature. In contrast, the Cartesian process for seeking knowledge was the development of the scientific model: control the variables and record the observations. Science separated the observer from the observed and replaced "why" (feelings and experience) with "how" (observations and application).

Rifkin notes the hard initial transition from agricultural to industrial society, and relates that the change in how we perceive time is still affecting us today. If it is looked at in terms of Toffler's Three Waves of; 1) agriculture; 2) industrial; and 3) information; we are moving into the information wave without coming to grips with the industrial.

If at one time we had an 'environmental' or 'participatory' view of our world, where is that consciousness now? Research on the brain and hormone systems, (Restat 1984) allows us to trace human biology back to the reptiles. The question we should be asking ourselves is, "Where is our agricultural or hunter-gatherer past"? Integrating an 'old' understanding of our personal nature into our present worldview, could be of great benefit to our natural environment. But it will be a difficult task, requiring input and cooperation between science, industry, government and the global population.

One idea for beginning this process comes from Berman. He notes that a combining of quantum mechanics and certain ecological research could have the effect of bringing the last two epochs back to some ultimate understanding or coexistence. Quantum mechanics has pointed out the effect of the observer on the observed, and consequently the idea of our inter-connectedness. In order to be understood by a broader population, science must combine with perception and become a philosophy people live by.

We may be ready for a new evolution where people gain a greater understanding of science and environment. In order to effect this change, scientists will need to become more involved with the process of education, carrying their work responsibilities beyond a research only attitude. Too much of what the general population 'hears' from the scientific community is filtered through government and industry. Scientific data is used by all sides to fight political battles. Data has been mis-used and mis-represented, creating an atmosphere of confusion between science and fiction.

For example, the population is simultaneously told they have plenty and little. Is our burgeoning population going to perpetuate wide-spread starvation, or will technology be our savior (Berneby 1990)? How does an individual, a collective group, a society, or the world community, determine what is fact and what is fiction? Do we have enough rain forest? Has the ozone layer deteriorated, and if so, will it affect us? Are we really warming, or only experiencing a process normal to nature? Though the truth remains relative, sometimes it makes no difference, since perception is usually stronger than reality. How much more powerful would science be if it helped form perception?

Over the past three hundred years, science has driven the pace of industrial and cultural development. But in large part, it has been held hostage by having to devote so much energy to making the world habitable to an ever growing population. Science has had to 'give everything a number' just in order to keep up. By emphasizing the many technological transfer methods already in place and developing new ways to help people become informed, science could become a stronger advocate of the environment.

Creating Solutions

Science and Media

Reaching people with the environmental message will be a difficult task. Approximately 27 million people in the U.S. - about one-fifth of the population - cannot read, and another 46 million are listed as marginal (Ritchie 1990). Still, effort needs to be made to reach as many people as possible on as many levels of understanding as possible.

Many things are being done already. Organizations such as The Union of Concerned Scientists are doing wonderful things with 'infomercials' and programs for the general

public. Discovery Channel had the "In The Company of Whales" series which was captivating to watch and gave the viewer a chance for further action. The list goes on, but many of these avenues fail to reach a large segment of the population. Even when the environmental message meets people, many times they are not given a sense of the effect on them or what they can do about it.

Media has gone through unprecedented growth and change during the last ten years. As Bill Moyers (Moyers 1989), and Stuart Ewen (Ewen 1988) have pointed out, content has been replaced by style, reading by television, and reality by image. To reach people with an environmental or informational message of interest, the budgets, styles and quality of these efforts must compete with the advertising of large corporations and the lobbying of powerful special interest groups. In order to keep pace with other consumer advertising campaigns, science must be willing to make cutting edge efforts of its own.

To effectively transfer its knowledge, every scientist and policy maker needs to be their own public relations expert. Data to information translation teams should be an integral part of every information gathering endeavor. PBS, National Geographic Society, and Discovery channel can no longer be the sole outlet for "high end" information to the public.

Education

Our best and least cost course of action is our educational system. Informed citizens make better choices. As James Burke has observed, (Burke 1985) when kept out of the information loop people begin to feel alienated and out of control. As a result they either: 1) "stick thumb in mouth, mind in neutral", or 2) "over react and destroy the machines." Since neither of these alternatives seems to be in the best interest of governments or citizens, a closer look at the educational process is warranted.

Environmental and science education should be an integral part of a school curriculum, beginning with the first grades and continuing through secondary school and higher education. Programs such as those developed by the Canadian Energy Conservation Branch, Alberta Energy and Natural Resources, should be standard fare for all primary and secondary grade levels. (In Alberta, where natural gas is plentiful and low in cost, it is difficult to solicit support for conservation in the adult community. The Canadian Energy Conservation Branch developed a set of energy curriculum that is designed to educate a new generation of Canadian's on the need to conserve because its the "right thing to do", insuring a conservation oriented, economically stable, future for the Province).

An environmentally strong, future oriented continuing education program should address the needs of the general public, providing meaningful information based upon proven learning models. Schools and other institutions need outreach programs to help students and the public keep up with the changes in knowledge. And programs need to establish a relationship between the student, the environment and their jobs. Education should be tied to the local environment and community issues, where people have a hands on feel for problems and solutions.

Curiosity is the basis for all knowledge. Education programs should help the public and our youth have the types of experiences some of us were fortunate enough to have when we were young. The experiences which helped us choose our career path and set our minds to wondering. We should help people to ask the right questions, because all scientific endeavor springs from 'the question'. We need to be open to new types of media such as non-linear interactive multimedia presentations where a mind can wander to its own sense of curiosity.

The Energy Scale

As an example of appropriate information transfer, we have developed the Energy Scale (Figures 3a through 3d, The Energy Scale). The concept and name are derived from the bathroom scale, as a way to keep track of a resident's "energy weight", since our energy consumption can be looked upon as a weight problem. The scale attempts to be both an entertaining and informational tool that helps home occupants gain an understanding of their relationship with their home energy use.

To reach the broadest number of people we chose a low-tech solution, to make it affordable enough for each household or school child to have one. It is meant to appeal on some level to everyone. The interactive levels range from connecting the dots to find how much heat one BTU equals; to playing with the slider to see possible energy savings; to performing calculations based on energy bills.

Though some would argue that most people will not take the time or expend the energy to do these calculations, by making that assumption, we take away the opportunity to try. If we want people to be informed, we must expect that they deserve the credit of being able to think and interact. The scale reduces macro problems to micro causes, empowering individuals with information and

choices of actions they can pursue in their daily life (see DeCicco, et. al. 1990 for information on residential Co2 reduction).

On one level, the scale allows individuals to transfer energy use data from monthly energy bills - electric, gas, oil, etc., converted to Btu's per square foot - onto a chart (Figure 1, Energy Use Indicator Graph). The chart, modeled through the Sunday computer program (Ecotope 1984) provides occupants feedback on their relative energy weight or house type, e.g., is their home efficient or an energy glutton? It then refers them to the front side of the scale where they may select methods of improvement for energy weight reduction. The savings for each mitigation were either calculated using the WATTSUN computer program (WSEO 1992) or taken from data sets in the 1991 Northwest Power Plan (NWPPA 1991).

Occupants may choose any of 17 improvement methods for weight reduction (see Figure 3b, front page insert). The probable cost, savings potential and a piece of interesting information are listed for each improvement. The occupant is encouraged to implement one or more of the energy conservation measures and observe energy use reductions that may appear on the chart in subsequent billing months.

Other energy facts relating to residential energy use are listed throughout the scale. A bibliography is included to stimulate further reading for interested individuals, as well as invitations to call serving utilities and state energy offices.

Pie charts, (Figure 2, Energy Use Pie Charts) indicate percentages of energy (Idaho Department of Water Resources,1990) used by lights, water heating and space heating for three types of homes: 1) an energy miser, 2) the typical 1980's house, and 3) the energy glutton.

Conclusions

The solutions to our environmental problems are both general and specific in nature. The general approach deals with personal ideas of thought and action, such as: 1) an

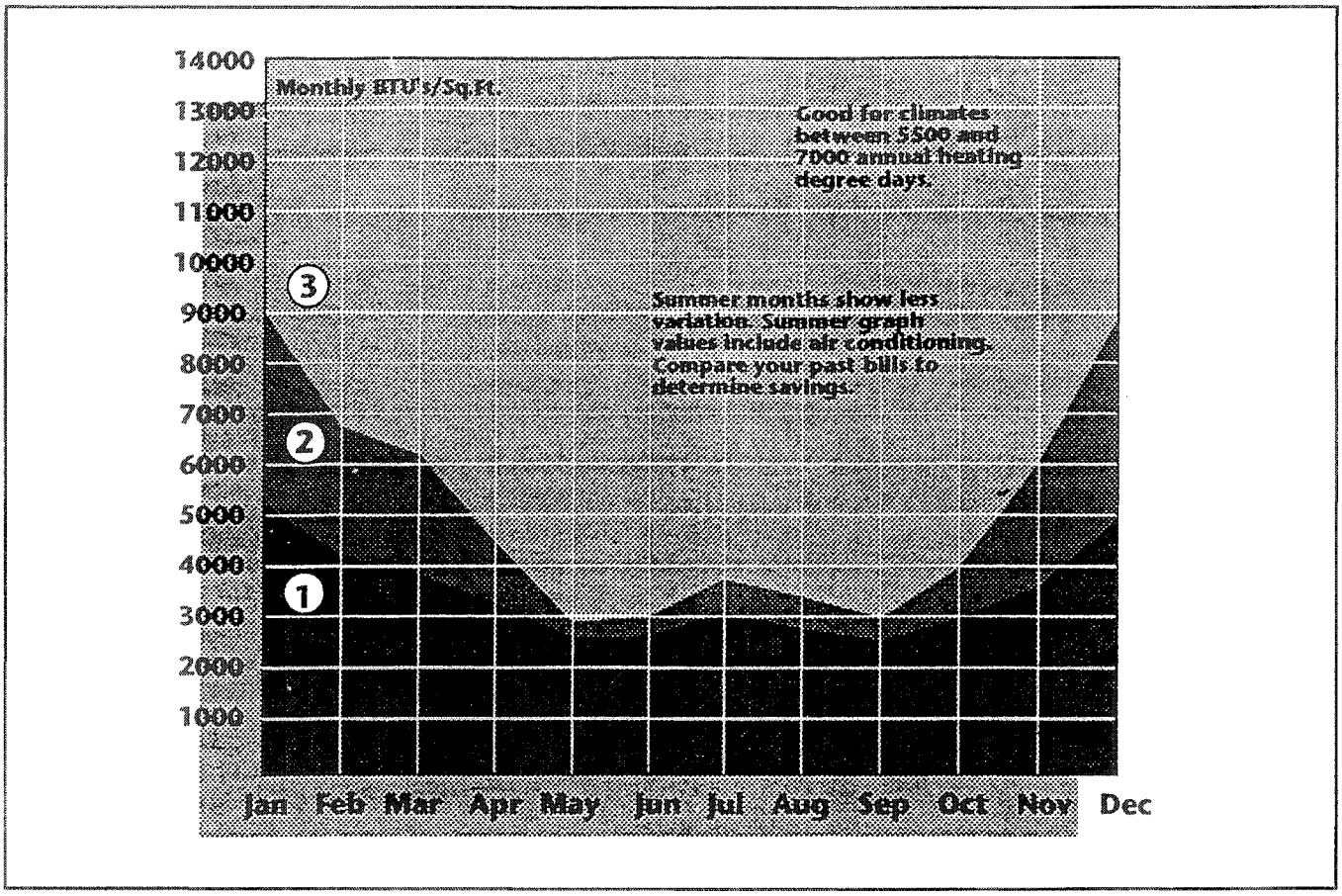

Figure 1. Energy Use Indicator Graph (Based on SUNDAY Simulations)

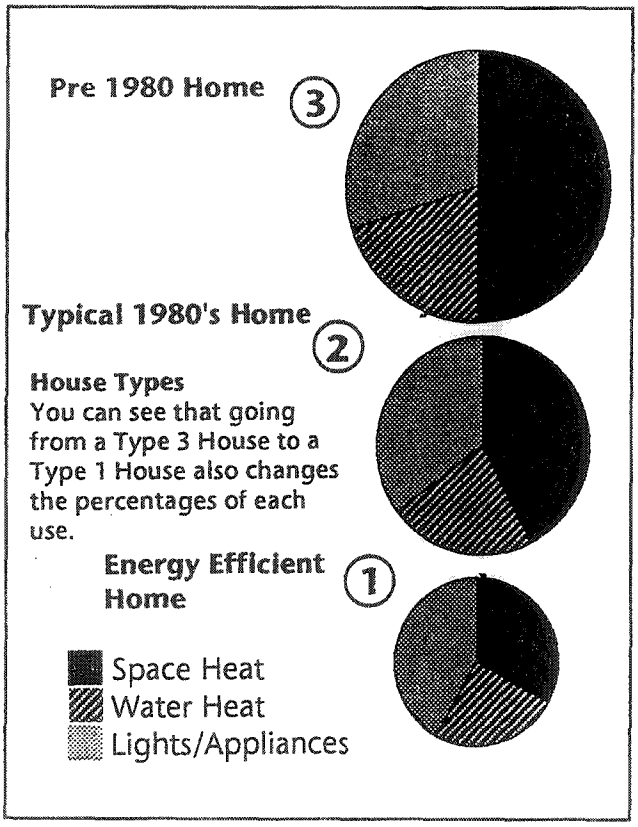

Figure 2. Energy Use Pie Charts

identification of relationships between social and scientific environmental observations; 2) follow through on technology. Once an invention, program, or idea is created, take responsibility for it by following its implementation and the understanding of its use. Scientists should make a habit of questioning the purpose and applications of their studies. As the observers and quantifiers of our expanding universe, they are the masters of change, and therefore share responsibility for the population's ability to understand and keep pace with new discoveries; 3) work toward producing reliable and unbiased information, people need something definite in order to act, even if there are few absolutes left we need information on which we can make decisions; 4) strive to give meaning to work and social communication.

The more specific approach would provide structured solutions to the problems and the creative presentation of these solutions to society, such as: 1) identifying existing successful education programs with the objective of emulating them for environmental education programs; 2) establishing clear learning objectives for society that include, presenting information in an interesting format, and promoting learning as fun, responsible and achievable; 3) making information transfer a deliverable part of scientific investigation; and 4) establish timelines for program implementation and criteria for monitoring our world environmental progress.

Beyond Extremes

We live in a world of special interests. Each interest with an agenda which dictates everything we do. We range from the religious zealot who responds out of faith for "one god, one way", to the scientific community, where truth is defined through observation of the scientific model. Both extremes deny the other, and fail to recognize the common ground and people which lie between them. To find common ground is to return to common sense, that age old euphemism that refers to intuitive capability to interact with both compassion and intelligence.

To educate the public, we must constantly strive toward more perspective and objectivity. Look around and see if you are isolated from the extremes in wealth and knowledge. Your ability to solve problems is directly related to how far up and down the social ladder you can see. Raw data should be looked at in a more holistic way so we can more clearly understand the possible effects, feelings and viewpoints that may be gained from it. This data to knowledge transfer will only happen when you approach problems on different understanding levels and make a connection with peoples 'pre-industrial' selves. There are so many different problems that we tend to get flustered just thinking about a few of them. We must back up and look at 'root' causes and actions which solve problems without stepping on special interests. Knowledge is not spread through observation but through applied experience and interaction. If we plan to protect and save the human environment, we must move quickly toward a knowledge of the whole earth environment.

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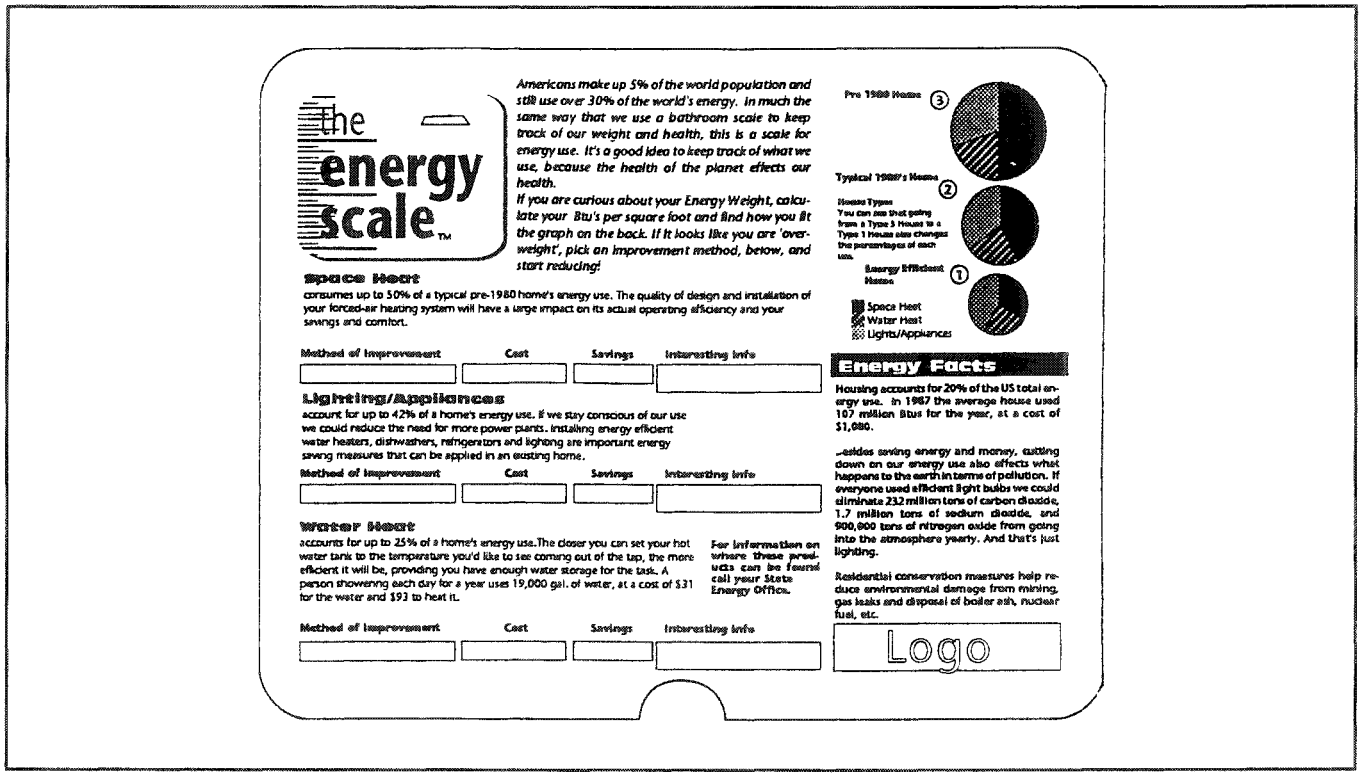

Figure 3a. Energy Scale Front Page

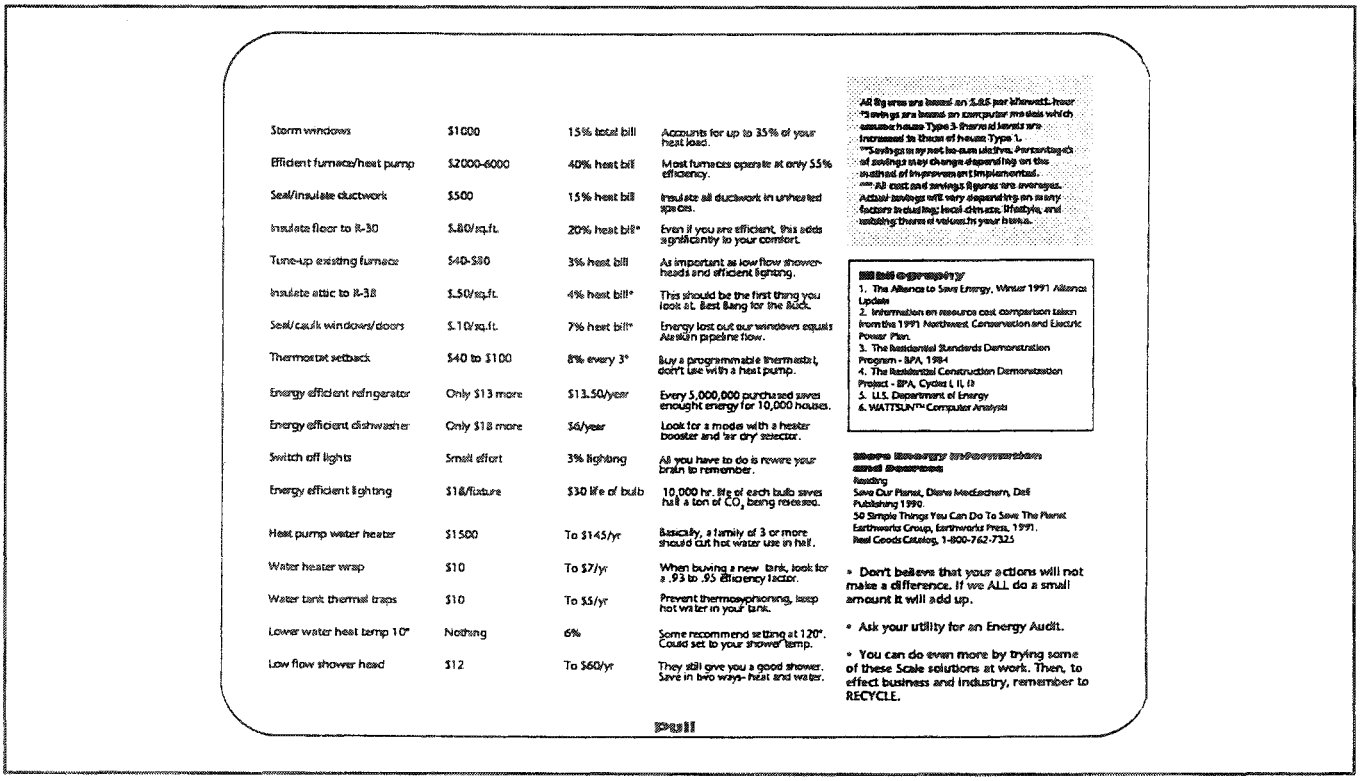

Figure 3b. Energy Scale Front Insert Page

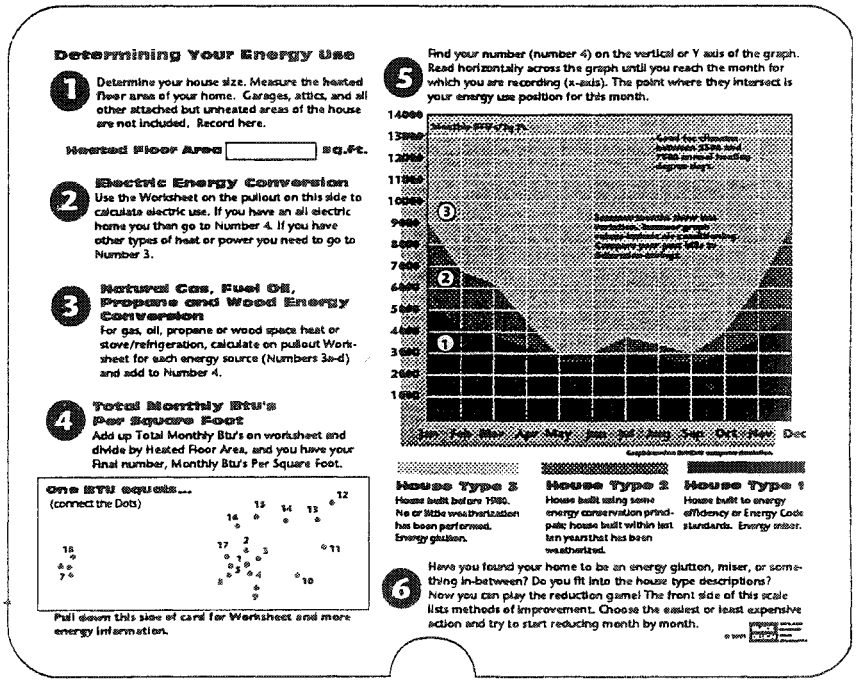

Figure 3c. Energy Scale Back Page

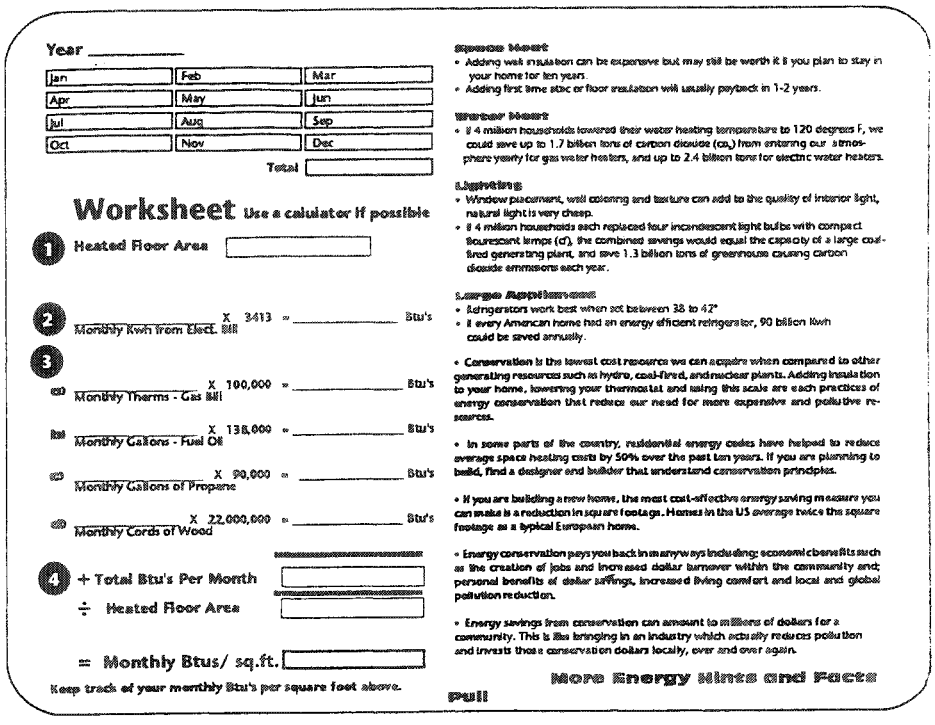

Figure 3d. Energy Scale Back Insert Page

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