ECOLOGICAL DIAGRAM OF CURRENT CONDITIONS

This diagram shows how categories of Earth systems presently affect each other through positive and negative feedback. The result is massive change and deterioration of the planet's biological support system.

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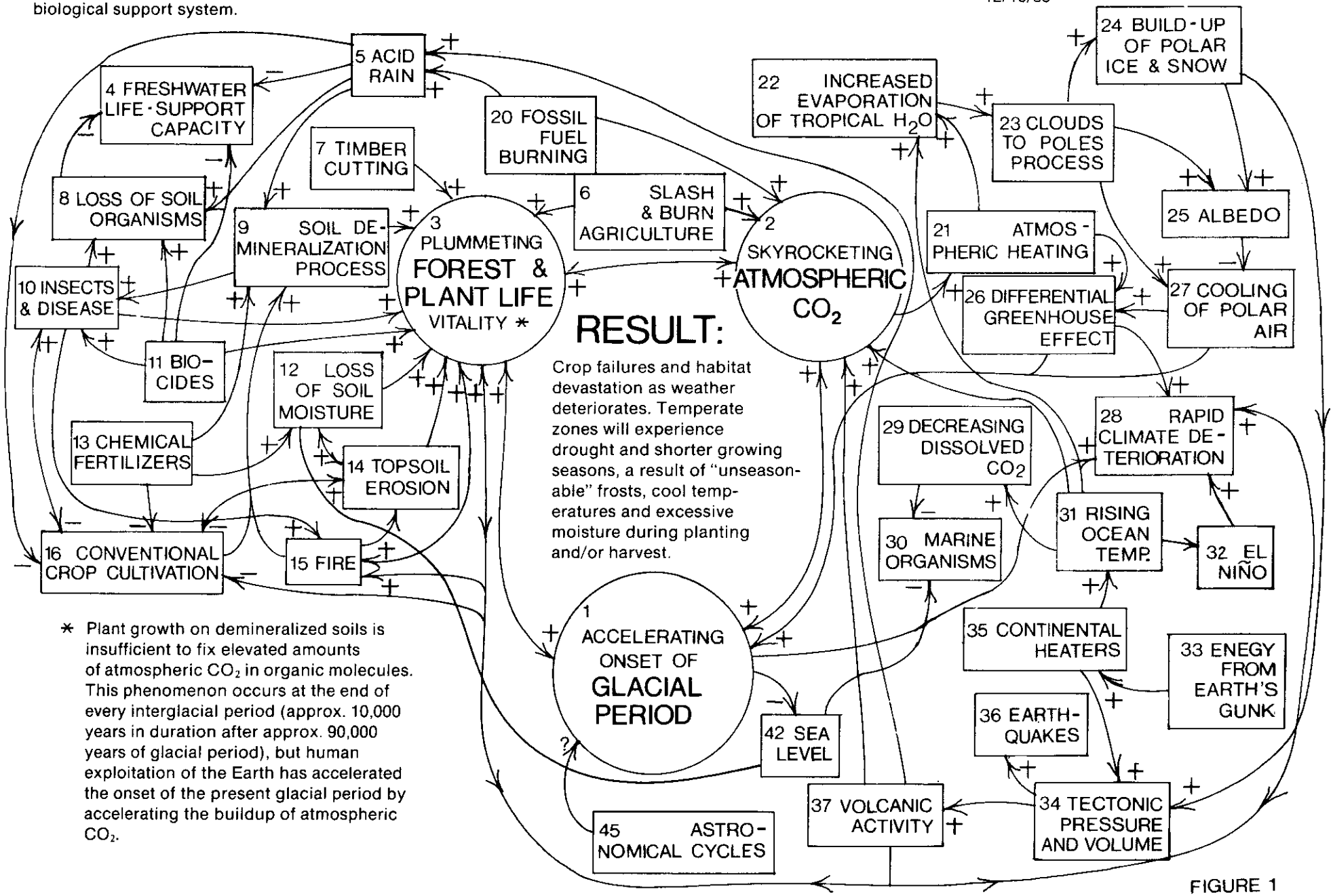

* Plant growth on demineralized soils is insufficient to fix elevated amounts of atmospheric CO_2 in organic molecules. This phenomenon occurs at the end of every interglacial period (approx. 10,000 years in duration after approx. 90,000 years of glacial period), but human exploitation of the Earth has accelerated the onset of the present glacial period by accelerating the buildup of atmospheric CO_2.

FIGURE 1

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DECEMBER 8, 1983

The above ECOLOGICAL DIAGRAM OF CURRENT CONDITIONS (Fig. 1) was derived from an expansion of a diagram developed by Dr. Charles Francois of Buenos Aires, Argentina, to explain the work of John Hamaker. (John D. Hamaker and Donald A. Weaver, The Survival of Civilization, Box 1961, Burlingame, CA 94010. (1982) 218 pp.) Hamaker's thesis is that the rising amount of atmospheric carbon dioxide has caused extreme weather changes and is accelerating the coming of the next glacial period on our planet. Descriptions of elements in the complex multiple feedback cybernetic system that progress to glaciation are explained in the following text. (Overall planetary cooling which started about 1940 can be seen in data in the following papers: M.I. Budyko, "The effect of solar radiation variations on the climate of the Earth," Tellus, XXI (1949), 5, pp. 611-619, Fig. 1; Data extended by Borzenkova, et al, "Izmenenie temperatury vozduha sevrnogo polushariya za period 1881-1975," Meteorologiya i Gidrologiya, No. 7, 27-35 (1976); Data extended by Vinnikov, et al, "New Interpretations of Northern Hemisphere Annual Temperature Anomalies, 1881-1978," Soviet Meteorology and Hydrology, 6 (1980), 1-10.

The ECOLOGICAL DIAGRAM OF CURRENT CONDITIONS illustrates what is happening in the biosphere of planet Earth. The ECOLOGICAL DIAGRAM OF THE SOLAR AGE (Fig. 2.) following these notes illustrates what can be done by humankind to cooperate with "Gaia" (Earth as living organism) to restore an ecological balance to prevent Earth's return to glacial conditions.

The principal factors affecting the ecological balance of Earth's biosphere are shown as numbered circles and rectangles labelled with abbreviated descriptions. (See following text for explanation.) At this stage of analysis, no attempt is made to put numerical values on the connecting arrows. Fig. 1 attempts to include all major feedback mechanisms. (Naturally we will need to add feedback mechanisms which have been omitted.) An arrow with a plus(+) sign indicates the source factor for that arrow increases the factor being pointed to. Similarly a minus sign(-) indicates the source factor decreases the destination factor. Double pointed arrows indicate bidirectional feedback.

We have studied "The Carbon Dioxide Research Plan, A Summary, April 1983," 34 pages, prepared by Frederick A. Koomanoff, Carbon Dioxide Research Division, Office of Basic Energy Sciences, Department of Energy, Washington, D.C. 20545. This research plan is a sound basic approach to study of the problems, but its time schedule is inadequate, and its consideration of feedback mechanisms insufficient. The rise in atmospheric carbon dioxide could easily reach a level beyond which humankind could effect a change by the time the U. S. Department of Energy completes its research.

The Environmental Protection Agency released a study, "Can We Delay a Greenhouse Warming?" on October 17, 1983. This report implies that the increasing carbon dioxide in the atmosphere will cause a simple warming effect leading to the partial melting of the polar ice caps and rise in sea levels. We believe that the interaction of the carbon dioxide with other parts of the planetary system is more complex and will lead to further cooling and a new glacial period on our planet. We need a Congressional investigation to assemble the experts on climate and at least fifteen related sciences to determine in an indisciplinary way how Earth systems interract to cause glaciation.

How is energy redistributed to move water from the hydrosphere (water throughout the world) to the cryosphere (ice and snow cover)?

On October 21, 1983, the Carbon Dioxide Assessment Committee of the National Research Council published a report, "Changing Climate." This report also gives precedence to the idea that a warming will melt polar ice over the next several decades, but the report also includes a chilling warning that its authors may have overlooked important phenomena in its compilation and conclusions.

As we studied weather and climate systems, we realized that much of the published work on atmospheric carbon dioxide has been oversimplified, and that important factors and feedback loops have been overlooked. A discussion of the possibility that a number of positive feedback relationships are not reflected in most published forecasts of the effect of rising atmospheric CO/2 can be found in O. W. Markley and Thomas J. Hurley III, "A Brief Technology Assessment of the Carbon Dioxide Effect," Technological Forecasting and Social Change Vol. 23, 185-202 (1983).

Certainly, many feedback mechanisms were overlooked in the statements made to members of Congress who conducted a half day hearing on CO/2 on March 25, 1982.
It is imperative that the Subcommittee on Natural Resources, Agriculture Research and Environment (chaired by James H. Sheuer) and the Subcommittee on Investigations and Oversight (chaired by Albert Gore, Jr.), of the House of Representatives' Committee on Science and Technology be given more complete information from which to make their policy decisions. Especially important is information relating to the role of the tectonic system of the Earth, which was not mentioned at the March, 1982, hearing. Text of John Hamaker's open letter of November 22, 1983, to James H. Scheuer, Albert Gore, Jr., Howard W. Wolpe, and Thomas P. O'Neill follows:

"On November 10, 1983, I wrote to Committee chairmen Sheuer and Gore suggesting that they call in a dozen of the nation's best machinery designers in an effort to establish an understanding of how the tectonic system (which is a mechanical system) works, and why it is the most important factor in glaciation. Since the people who have been working on the climate problem have not solved it in 20 years, they obviously won't solve it in 20 more years. If you really want answers to the CO/2 question with which you can go to the public, the way is open to do it.

"We had not much more than a 50% food production worldwide in 1982-1983 and we have every reason to expect a poor performance in 1983-1984. Surely at least one of you gentlemen appreciates the seriousness of our present situation enough to come back to Washington and see to it that the technical information on the tectonic system is established. I would anticipate that 12 designers who had read the subject materials could get together with me for a "bull session" in Washington and give the Committee a unanimous decision forming a basis for bringing Congress back into session to do what must be done if we are to have a chance to survive.

"We must not waste another day in getting at the job. Every day wasted makes our chances of success less likely." (End of Hamaker letter.)

Given the extreme deterioration of weather and necessity for long term food production, we need a crash program to quickly analyze these problems and institute corrective action speedily, such as the program conducted by the M.I.T Radiation Laboratory between 1940 and 1945, to develop the RADAR systems needed to outmaneuver the Nazis.

EXPANDED DESCRIPTIONS OF ECOLOGICAL DIAGRAM CATEGORIES:

(1) ACCELERATION OF GLACIAL PERIOD ONSET marks the beginning of a 90,000 year build-up of glaciers. Various researchers have concluded that the initial stages of glaciation happen quickly, in perhaps as little as 20 years. Pollen studies of lakebed deposits show this. (See Genevieve Woillard, "Grand Pile Peat Bog: A Continuous Pollen Record for the Last 140,000 Years," Quaternary Research 9, 1-21 (1978); "Abrupt End of the Last Interglacial s.s. in North-east France," Nature, Vol. 28, Oct. 18, 1979 [s.s. or sensu stricto means "in the strictest sense".]; and Hamaker, p. 53, and p. 152.

(2) SKYROCKETING ATMOSPHERIC CARBON DIOXIDE is the result of fossil fuel burning, aggravated by deforestation, slash and burn agriculture, the diminished fixing of carbon by trees and plants on demineralized soils, exacerbated by acid rain, forest fires, decline of carbon in soils (diminished soil organisms, humus and plant material), warming oceans, and volcanic activity.

(3) PLUMMETING FOREST AND PLANT LIFE VITALITY is occurring due to a combination of soil demineralization and acidification resulting in accompanying infestations of insects and disease. There is also a decline in area covered by forests and vegetation because of timber cutting, primitive and mechanized slash and burn agriculture, topsoil erosion, desertification, conventional crop cultivation, fires, shortened growing seasons, drought, and "unseasonable" weather extremes (experienced during early stages of glacial period).

(4) FRESHWATER LIFE-SUPPORT CAPACITY is reduced or destroyed by ecosystem demineralization exacerbated by acid precipitation and the long term use of biocides. Tens of thousands of dead and dying lakes in North America and Europe are now documented. Chemical pollution of ground and surface water has also damaged the Earth's freshwater life support capacity.

(5) ACID RAIN, (caused by increasing fossil fuel burning, forest fires, and volcanism), falling on already fragile acidified soils, is hastening the death of vast areas of forest worldwide. Lowering pH of acid soils further strips them of many essential minerals including calcium and magnesium. As pH drops further, aluminum is mobilized. Toxic aluminum compounds damage root hairs and the cells of the root endodermis, interfering with water and nutrient uptake. Trees deprived of nutrients and water, their root systems crippled, tend to quickly die. (John R. Luoma, "Dead Forests and Acid Bananas," Audubon, Vol. 85, No. 5 (September, 1983) pp. 38-41.) Acid rain also removes minerals and changes the mineral balance in agricultural soil. (See also Ulrich, "March Winds: They Bring with Them Acid Rain, Which I Can Monitor but Would Rather Change," Science 83, March 1983. Ulrich states that pH of 4.2 is the critical aluminum-unleashing level.)

(6) SLASH & BURN AGRICULTURE Both hand methods and mechanized type used in tropical regions such as the Amazon River Basin and in Central America, have a compound effect which both reduces forest cover and directly increases the atmospheric CO/2.

(7) TIMBER CUTTING without adequate remineralization and reforestation contributes to the impoverishment of soil, decline of soil organisms, and erosion, which result in lowered vitality of subsequent plant growth.

(8) LOSS OF SOIL ORGANISMS (hence soil fertility) is caused by a number of factors: primarily soil demineralization, plus acid rain, topsoil erosion and present widespread worldwide "soil mining" agriculture and forestry practices employing chemical fertilizers, biocides, and crop nutrient export systems.

(9) SOIL DEMINERALIZATION PROCESS becomes more pronounced near the end of interglacial periods which have averaged a comparatively brief 10,000 years during our present 1.8 million year-old Quaternary Epoch. (Duration of Quaternary Epoch according to Raymond Seiver, "The Dynamic Earth," Scientific American, Vol. 249, No. 3, (September, 1983) p. 48). We are presently in the transition phase (which will last only a few more years) between interglacial and glacial conditions. Reduced plant vitality removes less CO/2 from the atmosphere. Demineralization also leaves plants more vulnerable to insect attack and destruction by fire, climatic extremes, and disease, adding to atmospheric CO/2.

(10) and (11) INSECTS AND DISEASE and BIOCIDES. Demineralized soil and long term use of biocides reduce soil microorganism productivity. Plants and trees deprived of microorganisms (nutrients) are increasingly subject to disease and insect infestation and more likely to burn because of an increase in dead vegetation.

(12) SOIL MOISTURE must be within certain limits for optimum crop cultivation. Too little or too much can severely disrupt the growth cycle and result in wind and water erosion of topsoil. Drought-stressed plants become highly susceptible to fire.

(13) CHEMICAL FERTILIZERS are known to increase yields in conventional crop cultivation to a short-term peak, after which ever-increasing applications bring diminishing returns along with extensive soil degradation. Mineral depletion and wholesale erosion, combined with build-up of toxicity and depletion of soil organism/organic matter, inevitably lead to dangerous or disastrous decline in crop quality and quantity. Without complete replenishment of soil nutrients, fertility turns to sterility.

(14) TOPSOIL EROSION contributes to soil demineralization (as well as soil organism/organic matter depletion) thus reducing soil fertility and plant vitality. Also, thin soils will not hold water.

(15) FIRE occurs more frequently as a result of rapid climatic deterioration and drought. The decreasing vitality of soils and plants makes whole systems more susceptible to fire.

(16) CONVENTIONAL CROP CULTIVATION contributes to the increase of CO/2 in the atmosphere. Use of NPK fertilizer disables the natural plant feeding processes by "mining" soil reserves and starving soil microorganisms. NPK fertilizer is also a factor in diminishing the ozone layer (see National Research Council, Ozone and Other Photochemical Oxidants National Academy of Science, Washington, D.C. (1977) pp. 257-259), resulting in increased ultraviolet-induced skin cancer.

(17)- (19) numbers reserved for additional feedback mechanisms.

(20) FOSSIL FUEL BURNING has a compound effect: first, it increases atmospheric CO/2, and second, its sulphur and nitrogen compounds worsen acid rain and soil conditions which accelerate the death of forests, eliminating primary natural absorbers of atmospheric CO/2.

(21) ATMOSPHERIC HEATING in the tropics and mid latitudes occurs as carbon dioxide, a gas transparent to the visible light from the sun, but which blocks infrared radiation, traps heat that the Earth otherwise would radiate back to space. CO/2 and other gases

such as oxides of sulfur and nitrogen, methane, and chlorofluorocarbons accentuate the greenhouse effect and are increasing via fossil fuel burning, biomass destruction, volcanism, and human pollution. (There is some uncertainty about the amount of greenhouse gases generated by termites. See Zimmerman, et al, Science Vol. 218, pp. 563-565 (1982).) (The amount of carbon given up by biota (from deforestation in addition to carbon oxidized in disturbed soil, in 1980 alone, is estimated as a range between about 1.8 and 4.7 gigatons. See Simon, Science News Vol. 124, No. 11, p. 160 (Sept. 10, 1983).)

(22) INCREASED EVAPORATION OF TROPICAL WATER is caused by elevated atmospheric heat. Increasing water vapor contributes to greenhouse effect and produces more clouds which are carried toward polar regions in the natural exchange with cold polar air masses.

(23) CLOUDS TO POLES PROCESS [and (23A) from Automatic Phase of Glaciation diagram on p. __] is accentuated by the differential greenhouse effect. Seasonal wind patterns are speeded up because of the increasing temperature differential between tropical air and polar air. Thus more clouds are carried from the tropics to the polar regions.

(24) BUILDUP OF POLAR ICE & SNOW [and (24A) from Automatic Phase of Glaciation diagram on p. __] is accelerated by the increasingly heavy cloud cover coming from the tropics. As the clouds near the poles, they cool and drop more snow which increases the area of snow cover and thickness of glaciers. Increased clouds and snow cover increases the albedo which reflects greater amounts of solar energy back into space, thus reducing snow melt and cooling these regions and beyond. This process gradually causes a vast expansion of glaciers so that a large part of the Earth is under ice for approximately 90,000 years. During the (approximately) 90,000 year glacial period, immense glaciers grind up Earth's rock crust and move the gravel and rock dust out over the continents. Glacial meltwaters form rivers which carry gravel, sand, silt, and dust which remineralize much of the land masses. Wind blown dust remineralizes broader and more distant areas. This glacial period of land remineralization supplies the soil with minerals which last approximately 10,000 years. To immediately supply forest, wood plantation and agricultural soils with necessary minerals, we must spread finely ground rock dust (circa 250 mesh) from glacial (i.e., mixed) and river gravel deposits.

(25) ALBEDO is increased as clouds move to the poles and reflect more solar energy back to space, as well as by the larger area of snow and ice cover on the ground, and by soil degradation, desertification, devegetation, and deforestation. Increased albedo contributes to Earth's overall cooling and return to glacial eco-climatic conditions.

(26) DIFFERENTIAL GREENHOUSE EFFECT occurs as carbon dioxide blocks the reradiation of infrared wave lengths, causing more heating in tropics. Colder, high-pressure polar air plunges toward the equator while hot, cloud-containing, low-pressure tropical air rises and moves poleward.

(27) COOLING OF POLAR AIR occurs as increased cloud cover in upper latitudes increases albedo and reflects more solar energy away from Earth, accentuating temperature diffferential.

(28) RAPID CLIMATIC DETERIORATION occurs at the beginning of a "normal" glacial period and before the glacial expansion is markedly observable. Rainfall patterns are changed in amount and distribution. Storms and winds become increasingly violent because of the constantly increasing temperature differential between warm and cold air masses. (There has been a large increase in the number of tornadoes, as reported in the World Almanac through 1974, and The Survival of Civilization, for 1978-1980, p. 86:

1925: 130 tornadoes	1955: 593	1978: 788
1935: 180	1965: 899	1979: 847
1945: 121	1974: 945)	1980: 866

(The very low early figures are partly due to incomplete monitoring.)

(29) DECREASING DISSOLVED OCEAN CO/2: Cold oceans hold more CO/2 than do warm oceans. Oceans hold more carbon than do land masses. (It should be noted that oceans change temperature more slowly than land surfaces due to ambient air influence.) Depending on pressure and temperature of ocean water, a phenomenon occurs called the calcium compensation depth. Below the CCD, calcium carbonate dissolves and becomes carbonic acid and bicarbonates. Carbonates are found in ocean depths.

(30) MARINE ORGANISMS: Where sunlight penetrates ocean waters, atmospheric CO/2 is utilized by phytoplankton and concentrated into carbonates by them and the rest of the marine organism food chain. Zooplankton, especially Foraminifera, create calcareous exoskeletons and oozes. When minerals are abundant, as at glacial river mouths (most dramatically during glacial periods, decreasing through the interglacial period), along ocean upwellings, and in the vicinity of sea-floor volcanoes, marine organism populations flourish. Carbonates formed by marine plants and animals precipitate to form sedimentary deposits on the ocean floor.

(31) RISING OCEAN TEMPERATURE occurs at temperate and equatorial regions because of CO/2 and other greenhouse gas induced warming. (See Hamaker, ch. 6.)

(32) "EL NINO" is the name given to an approximate 12 degree temperature rise in the Pacific Ocean waters off the west coasts of North and South America. This began in the spring and has persisted through 1983. Hamaker explains that this extreme ocean warming has been caused by the water's contact with molten material churning in the cracks of the (feeding--widening) ocean floor ridge at the Christmas Islands and along the Clarion and Clipperton Fracture Zones. As pressure built below, a long strip of ocean floor between the Clarion and Clipperton Fracture Zones was pushed east into the North American continent, resulting also in the eruption of El Chichon. This movement split the floor apart and exposed vast amounts of water to the molten rock below. (See Hamaker, "Comments on Matters Pertinent to Survival", in "Solar Age or Ice Age? Bulletin No. 2," June, 1983, pp. 2-5, edited by Don Weaver.)

(33) & (35) ENERGY FROM GUNK and CONTINENTAL HEATERS: Earth's second source of energy, in addition to that from the sun, is energy from the planet's naturally occurring nuclear reactors, the continental heaters. This is an important and largely overlooked phenomenon with profound effects.

The layers of the Earth from core to crust are as follows:

1. Solid inner core
2. Molten outer core
3. Semi-solid mantle:
4. Moho (gunk)

The mantle and Moho ("gunk") contain all potential energy (useful radioactive elements). Energy is released in heaters. Energy from radioactive decay is insignificant in the working of the tectonic system.

5. Crust

Gravity separation in the heaters concentrates molten radioactive materials which accumulate sufficiently to form a critical mass. The resulting nuclear fission releases large amounts of energy. Fissionable masses occur in the "gunk" (Moho) layer

where the ocean floor moves under a continent and are therefore called continental heaters. Their extreme heat generates enough energy to melt and push up magma which builds continents by raising mountains and plateaus above sea level. The heaters connect through openings with the molten outer core. (See Chapter 6 of The Survival of Civilization and Hamaker, "The Climate Cycle Revealed--A Basis for Immediate Action," in "Solar Age or Ice Age? Bulletin #5," December, 1983, edited by Don Weaver) for explanation of how the tectonic system works.)

(34) TECTONIC PRESSURES [and (34A) from Automatic Phase of Glaciation diagram]: The tectonic system of the Earth is a thermomechanical system consisting of the following parts: (A) tectonic plates (Earth's crust down to 25 miles) which constitute the continents and ocean bottoms; (B) Mohorovich Discontinuity (gunk) layer (of variable thickness,) under the crust, consisting of solids, semisolids, and fluids which can be compared to the materials in freshly poured concrete; (C) a semi-solid mantle, 1,695 mi thick, in which the solid materials are sintered together like a frozen sponge. Melted silicates move as a free flowing fluid through the "sponge" holes. Below this, "... seismic studies indicating a heat zone at a depth of 250 miles probably locate the network of tunnels which carry the hydraulic fluid to and from all parts of the crust in response to forces affecting various parts of the crust." (See Hamaker, "Solar Age or Ice Age Bulletin #5," Dec., 1983, edited by Don Weaver; (D) a 1,350 mile thick molten outer core; (E) an 800 mile radius solid inner core; and (F) continental heaters consisting of naturally occurring nuclear fission reactors at the junction of the gunk and mantle along edges of building continents. These continental heaters provide the energy for raising part of the crust (tectonic plates) to make mountains.

The buildup of polar ice and snow results in gravity pulling the polar tectonic plates toward the center of the Earth, forcing fluid to flow in the larger channels in the mantle to other parts of the Earth's hydraulic system of channels. This changes the pressure balance at the continental heaters leading to feeding of molten materical at the oceanic ridges, earthquakes and more volcanic activity. Volcanic activity puts out more CO/2 (2) and sulfur dioxide which reinforce the cycle through atmospheric heating, increased evaporation of tropical water, clouds to poles process, and buildup of polar ice and snow.

Mineral release, enhancing phytoplankton growth, occurs along ocean ridge cracks, in the trenches in front of heaters, and when one section of ocean floor moves and grinds against another. (Short term emission of poisonous gases may kill phytoplankton, temporarily disrupting the food chain and causing fish to move elsewhere.)

(35) CONTINENTAL HEATERS (ACTION) and (35A) from Automatic Phase of Glaciation diagram on p. __: see (33).

(36) EARTHQUAKES occur more frequently now because tectonic pressures are increasing as the weight of glaciers increases, forcing fluid to the parts of the system to restore the dynamic balance.

(37) VOLCANIC ACTIVITY [and (37A) from Automatic Phase of Glaciation diagram on page __] is increasing during this time. Volcanoes emit acidic gases including large amounts of CO/2 and sulfuric acid. These add to forest and soil destruction and exacerbate climate deterioraton. The volcanic ash suspended in the air can briefly block solar energy, slowing seasonal melting of the snow in the polar regions, and causing further high-latitude cooling. Volcanic activity at middle and equatorial latitudes distributes minerals over land (and sea) again.

(38) HYDRAULIC FLUID from Automatic Phase of Glaciation diagram on p. __ refers to the molten silicates which circulate through channels in the semi-solid mantle in response to pressure of the tectonic plates above. (See Hamaker, "The Climate Cycle Revealed--A Basis for Action," "Solar Age or Ice Age? Bulletin No. 5," Dec., 1983.)

(39) Cracking of ocean floor RIDGE (from Automatic Phase of Glaciation diagram on p. __) increases feed rate of ocean floor into continental heaters. (Ibid. and Ch. 6 of The Survival of Civilization.

(40) CLOUDS increase extent of glaciation system. (On Automatic Phase of Glaciation diagram on p. __.)

(42) SEA LEVEL fluctuates according to buildup of glacial ice. Ice accumulation decreases ocean water volume, but increased weight of ice on land masses forces ocean floors to rise (lifting ocean water) enough to restore dynamic pressure balance. Rising seas cover low lying land. A nine centimeter rise in sea level since 1885 charted by Landsberg ("Climate - A Second Look at Global 2000" (Global Tomorrow Coalition Conference, June 2, 1983, Fig. 9 based on Gormitz et al, Science, 215, 1611-1614.(1981)) is used as evidence that polar ice has melted, but the water could have been displaced by rising ocean floors.

Melting is unlikely because the average temperature of the northern hemisphere has decreased since 1940 (Vinnikov et al, Soviet Meteorology and Hydrology, 6 (1980), 1-10). In the Arctic Ocean pack ice persisted 70 miles south of its usual line of retreat during the summer of 1983. (See J. Marvin Dodge, "Western Weather, Long Range Forecasting", p. 2, October 4, 1983.) Colin Bull shows that the Antarctic glacial ice balance has increased even though melting of pack ice (which does not change sea levels) has been observed in the Antartic Ocean. (See "Snow Accumulation in Antarctica", Research in the Antarctic, American Association for the Advancement of Science, 1971.)

Other possible sources for the nine centimeter sea level increase are depletion of ground water reserves, draining of wetlands, faster runoff of rains due to diminishment of soils' ability to hold moisture because of decline in microorganism and numus content, water given up by vast decline in forested and vegetated areas, and thermal expansion from CO/2 greenhouse and tectonic heating.

(45) ASTRONOMICAL CYCLES: Some of the subcycles of astronomical cycles line up with the lesser fluctuations of the amount of ice in the polar ice caps and organic life fluctuations (which cause limited retreats.) According to John Hamaker ("Comments April, 1983", in "Solar Age or Ice Age? Bulletin No. 2," June, 1983, pp. 8-10, edited by Don Weaver), a timing correlation of glacial buildup with the cycles of variation in the Earth's orbit is insufficient evidence that glacial periods are primarily triggered by astronomical cycles. Some scientists (Milankovitch) believe that the correlation between the glaciation cycles and cycles of changes in the Earth's orbit, tilt, and precession cause the glaciation. John Hamaker has shown that though there is a tendency for the two to come together, the orbital timing at 100,000 years is caused by a change in the Earth's spin which changes the centrifugal force acting on the crust. (See Hamaker's paper "The Climate Cycle Revealed--A Basis for Immediate Action" in "Solar Age or Ice Age? Bulletin #5," December, 1983, edited by Donald Weaver.)

ECOLOGICAL DIAGRAM OF THE SOLAR AGE

Factors featured in "current conditions" diagram which are not included below will have become negligible and/or have stabilized.

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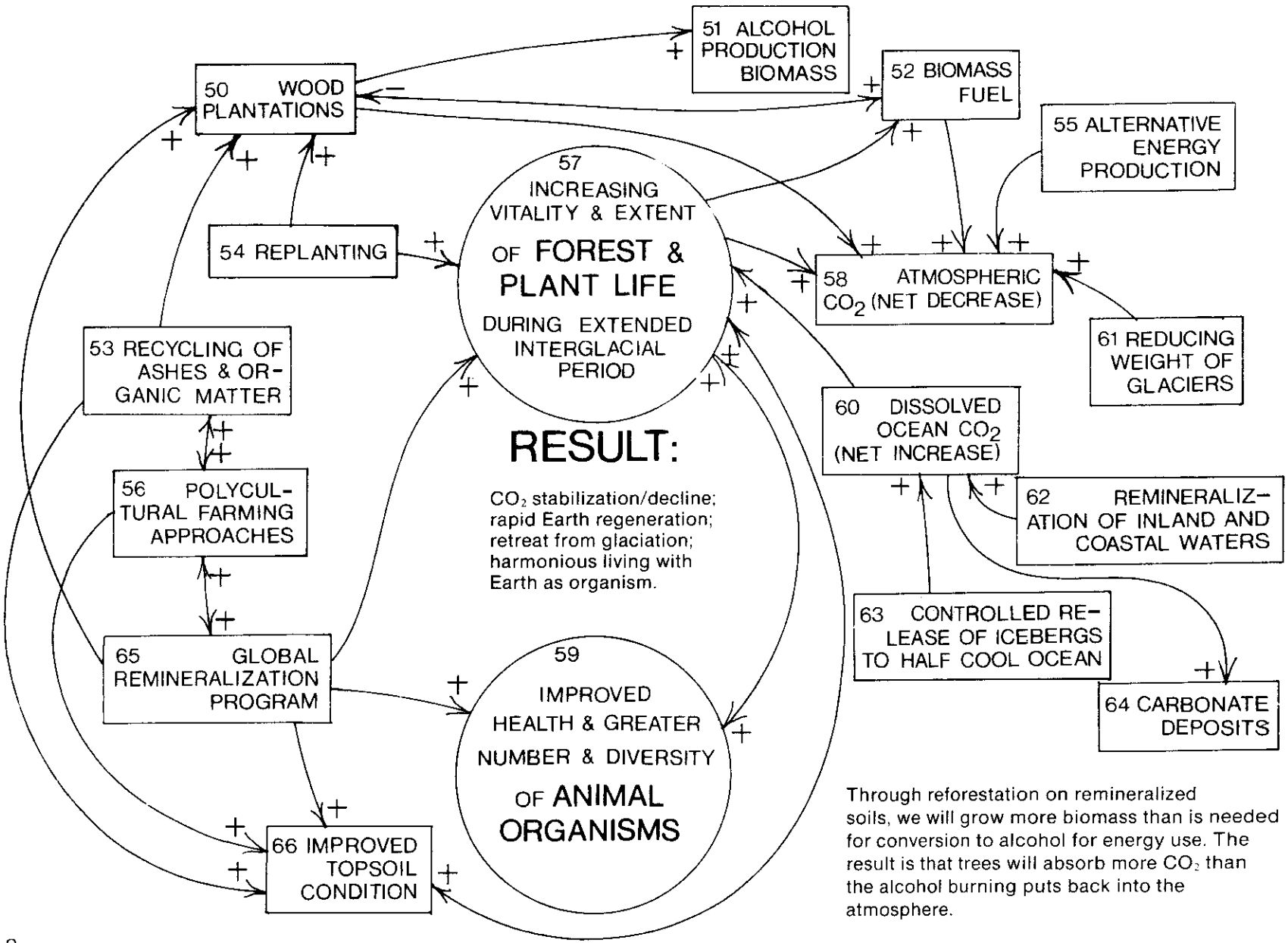

Through reforestation on remineralized soils, we will grow more biomass than is needed for conversion to alcohol for energy use. The result is that trees will absorb more CO_2 than the alcohol burning puts back into the atmosphere.

FIGURE 2

ECOLOGICAL DIAGRAM OF THE SOLAR AGE (Fig. 2. See above.)

(50) WOOD PLANTATIONS need to be established to grow trees both to remove CO/2 from the atmosphere and to serve as our major energy source. The time it takes to grow a tree demands the planting of many more trees than are used annually so that each year there is a mature crop to harvest. The net carbon taken from the atmosphere is that in the standing forest and the annual leaf fall and branches (from harvested trunks) which go into the soil.

(51) ALCOHOL AND BIOMASS PRODUCTION by "... small local alcohol and methane power plants ..." will minimize "the very heavy cost and energy requirements for transportation of energy supplies...." (Hamaker, The Survival of Civilization, p. 104).

(52) BURNING BIOMASS such as plantation-grown trees should be substituted for burning of fossil fuels. For general energy production, plantation tree output can be converted to alcohol for continuous flame systems like steam engines to eliminate nitrogen and sulfur oxides. Well-engineered power plants could be designed to burn wood directly. The reason solar energy "hardware" systems are not being advocated in the near future is that, unlike trees, in the starting phase the production of solar energy systems would add more CO/2 to the atmosphere than it would remove. All forms of ecologically beneficial energy conversion (non-polluting in manufacture and use), including boiling fluid solar energy and photovoltaic solar energy, may be encouraged after CO/2 levels are restored to interglacial levels. Tree-plantation solar energy is the only form which can simultaneously provide energy, replace fossilized-carbon fuels, and create a net withdrawal of carbon from the atmosphere--as the carbon fixed in roots, small branches, and leaves goes into the soil and the standing forests.

(53) RECYCLING OF ASHES AND ORGANIC MATTER along with periodic remineralizaton will help the wood plantations grow fast, improve topsoil condition, and create a high level of nutrient cycling.

(54) REPLANTING trees on deforested areas that are also remineralized will regenerate whole ecosystems,and will create ripple effects reversing trends toward desertification.

(55) ALTERNATIVE ENERGY PRODUCTION using such devices as photovoltaic cells, wind turbines, etc. must preliminarily be encouraged in areas where is is not feasible to grow biomass.

(56) POLYCULTURAL FARMING, including perennial and tree/orchard crops, as well as rotated annual crops, supplemented by remineralization and crop residue can build rich deep topsoils.

(57) INCREASING VITALITY AND EXTENT OF FOREST AND PLANT LIFE DURING EXTENDED INTERGLACIAL PERIOD is promoted and maintained by remineralization, replanting of plantations and rejuvenation of forests and stable weather conditions from reduction of the CO/2 in the atmosphere.

(58) DECREASING ATMOSPHERIC CO/2 will be accomplished by growing more trees (on wood plantations, in orchards, etc., as well as in natural forests), than are burned or fermented for energy.

(59) IMPROVED HEALTH AND GREATER NUMBER AND DIVERSITY OF ANIMAL ORGANISMS will be the

result of increasing quality and quantity of plant life.

(60) INCREASING DISSOLVED OCEAN CO/2 will occur as atmospheric CO/2 and greenhouse effect declines and oceans cool. Melting the ice and slowing down the ocean floor feeding and heater action is big ocean cooling factor. (See Hamaker, "The Climate Cycle Revealed--A Basis for Immediate Action", from "Solar Age or Ice Age? Bulletin #5", edited by Don Weaver, December, 1983.)

(61) REDUCING WEIGHT OF GLACIERS would allow readjustment of tectonic systems' hydraulic fluid, reduced pressure in continental heaters, slowed ocean floor feeding, reduction in intensity and numbers of earthquakes and volcanic eruptions and accompanying greenhouse gas emission. (See Hamaker, "The Climate Cycle Revealed--A basis for Immediate Action", from "Solar Age or Ice Age? Bulletin #5", edited by Don Weaver, December 1983.)

(62) REMINERALIZATION OF INLAND AND COASTAL WATERS will promote carbon fixation by marine life. (It is true that a great deal of water erosion has and is continuing to put large amounts of depleted soil particles into coastal waters. Unfortunately, these are demineralized soils that are in many cases accompanied by toxic chemicals which can severely limit normal life processes. It will be imperative that pollution agents be eliminated from the biosphere.

(63) CONTROLLED RELEASE OF ICEBERGS TO HALF-COOL OCEAN will further cool ocean waters (lessening the amount of cloud production), and will promote absorption of CO/2 from the atmosphere by cooler ocean, making it available to marine life which fixes the gas into organic carbon molecules.

(64) CARBONATE DEPOSITS will form and increase on ocean bottoms as marine organisms die and give up their exoskeletons, skeletons, shells, etc. Increasingly cold oceans will fix greater amounts of dissolved carbon dioxide below the calcium compensation depth line too. (See 29 above.)

(65) GLOBAL REMINERALIZATION PROGRAM: The primary thing that humans can do to regenerate the soil and Earth's biosphere and to decrease atmospheric CO/2 is to remineralize soil. Grinding a variety of mixed rocks (glacial deposits and river gravels from a cross-section of strata are usually adequately mixed) to a fine flour to add to soils will result in much improved plant growth wherever moisture and sunlight are adequate. (Experience of Arthur Carter Savage in his gardens in Nicholasville, Kentucky, showed that abundant soil minerals also gave vegetables and trees high resistance to cold.) (Hamaker, chapter 5, many references.) Unfortunately, we cannot immediately grind enough dust because there are too few suitable ginders. In the initial phases, natural glacial deposits (which have fairly large proportions of dust) must be used in larger quantities than dust ground by machine.

(66) IMPROVED TOPSOIL CONDITION will nourish microorganisms, the first link in the protoplasm/food chain. (Hamaker, pp. 24-28.) Through remineralization combined with ecological cultural methods, soils can be improved to enable plants to withstand "unseasonable" conditions.

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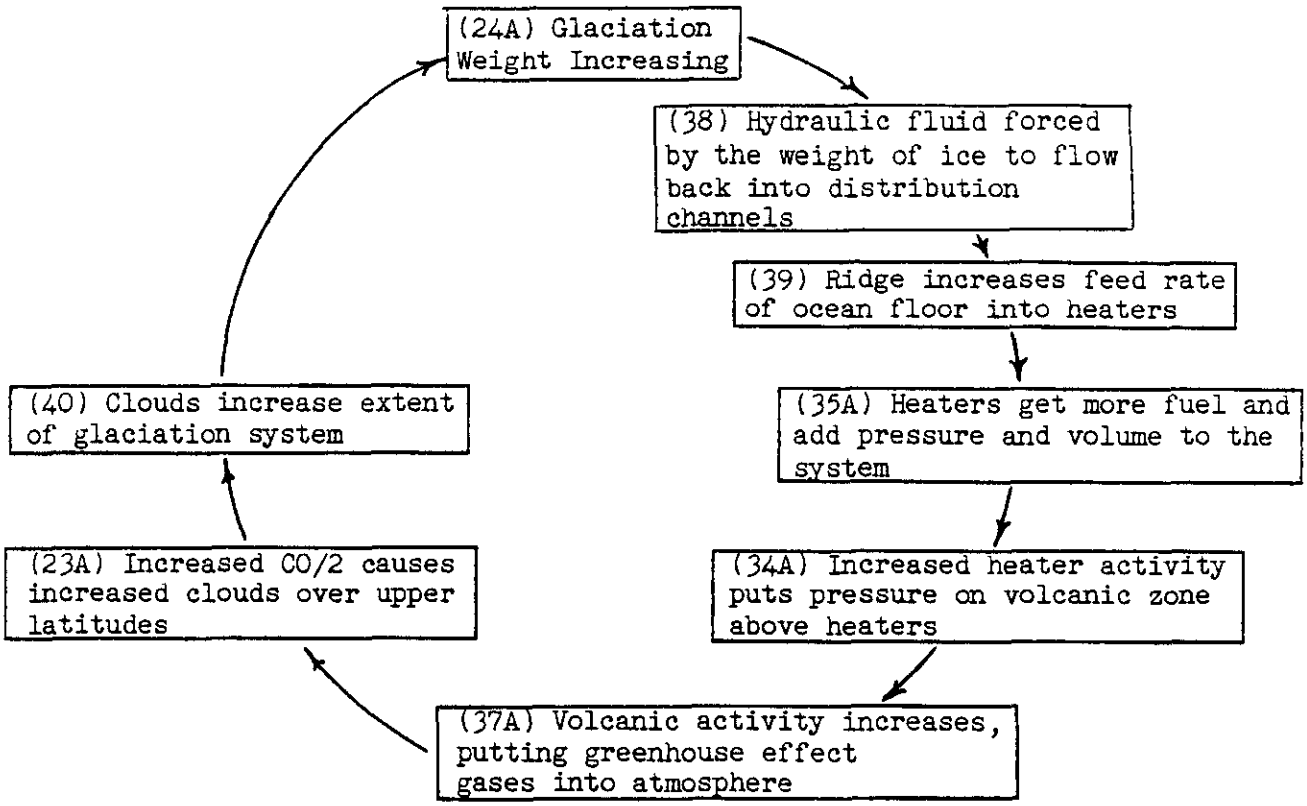
(please turn page)

AUTOMATIC PHASE OF GLACIATION

Diagram sent 11/18/83 by John D. Hamaker to Earth Regeneration Society, Inc., (470 Vassar Ave., Berkeley, CA 94708), to expand "Ecological Diagram of Current Conditions" and "Ecological Diagram of Solar Age."

[Please use these diagrams and description to promote discussion and action among everyone who is interested. We welcome your participation in whatever capacity you choose.]



1. The feedback from an increasing ice field (24A) causes the icefield to keep expanding.

2. The bigger the icefield is, the more fluid (38) is displaced and the faster the rate of growth of the icefield.

3. At the present time the system has been activated as shown by increase in numbers of volcanoes and earthquakes. The glaciation initiating factors are no longer required to insure 90,000 years of glaciation.

4. Through vigorous programs of remineralization and reforestation and reliance on biomass generated energy instead of fossil fuel generated energy, it may be possible to reverse this automatic glaciation phase. Certainly, we must do everything possible to accomplish this task.

Please donate $1 to cover costs of printing.