

REMINERALIZATION

In Friends of the Trees Newsletter #8 (1985), we reviewed John Hamacker's book "Survival of Civilization" and its warning that a return to Ice Age conditions is underway (related to the global carbon cycle) and that emergency tree planting and remineralization on a massive, world-wide scale are needed to forestall disaster.

Extremes in weather conditions throughout the world continue to corroborate the authenticity of this alarm, as demonstrated by El Ninos, the shifting of jet streams, increase in jet stream speeds, widespread drought in the mid latitudes and increasing weather extremes around the world. Crop yields are being adversely affected in many parts of the world

Friends of the Trees' editor considers soil remineralization to be one of the key techniques for healing the world. Remineralization of the Earth's soils is not a new concept, and indeed, fertilizing crops with rock dusts is already practiced to some extent, particularly by organic growers. But remineralization as advocated by John Hamacker and associates envisions rock dust powder (also glacial loess and riverbed silt) being applied to a large portion of the earth's land surface in large amounts. 5 to 20 tons an acre and up.

How would such massive amounts of rock dust be made available? What types of rocks are best used? How would such an extensive and transportation and application infrastructure be set in place? Obviously some big questions to be answered, but Hamacker and associates have dealt with many of these questions. The technical constraints are not insurmountable, however it would take a lot of public pressure to bring such mammoth, costly projects on line.

In many parts of the world glacial action has left deposits of ground glacial dust which can be mined. However in many places such deposits are not available and appropriate rocks would have to be ground to a fine powder. Hamacker has designed a prototype grinder which utilizes rocks to grind themselves into powder, thus reducing the cost of rock grinding compared to present day rock grinding machinery which wears out quicker and requires more power to operate. For more information on this rock grinder and remineralization in general contact the organizations listed in this section.

The two key points of Hamacker's recommendation, reforestation and soil remineralization, are closely related. To pull a significant amount of carbon out of the earth's atmosphere we need to greatly increase world forest cover and increase humus content of soils. Since so many soils are depleted of minerals due to natural processes, as well as agricultural and forestry practices and consequent accelerated erosion, it is hard to establish a vigorous, successful plant cover. Remineralizing soils with an appropriate mix of ground rock causes an explosion of microbial life with consequent feeding of plants and humus buildup.

In an article in the *Amicus Journal* of the Natural Resources Defence Council, (Page 8-12 (Issue ?)) it was stated that the atmosphere contains 700 billion tons of Carbon as Carbon dioxide. In comparison, the earth's vegetation and humus contains

2000 billion tons of Carbon. Three times *as* much Carbon is stored in the Earth's vegetation and humus as in the atmosphere. Thus it can be seen how an increase in the Earth's forest cover, vegetation, and humus can significantly draw down the amount of Carbon in the Earth's atmosphere.

The most important sources of information/action on remineralization are:

- * Hamacker-Weaver Publishers;
- * The Earth Regeneration Society;
- * Betsan Coates, Hamacker Coordination;
- * Joanna Campe, Hamaker Coordination.



Don Weaver Hamaker-Weaver Publishers

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Burlingame, California 94010
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The main source of information on remineralization and global climate changes has been the Hamacker Coordination Committee's Ice Age or Solar Age Bulletin (under the editorship of Don Weaver). The last Bulletin was several hundred pages long. Send \$5 to \$10 for a copy.

The Survival of Civilization is available from Hamaker-Weaver Publishers, for \$12.00.

On October 24, 1986 Don Weaver announced his intention to establish the First "Earth Regeneration Center" in Sonoma county, California. Following are a few excerpts from the announcement. Write Don Weaver for a complete copy.

WHAT? -- The Earth Regeneration Center will essentially be a place where people sharing a love for Life and the Earth will work together to demonstrate that people can quickly restore great fertility and health to our dying planet, and transform our dying civilization. We will work to communicate this to the world's people to inspire their own local and global regenerative thoughts and actions.

Vision:

** To see a marvelous proliferation of healthy plants and trees spring from healthy soil nurtured by people expressing their aliveness via simple love, honesty, thankfulness, humility and reverence for life, rather than merely through beliefs, solidified images of self and others, and the screens of judgement and comparison. A dynamic, peaceful, purposeful, intelligent, generous, exuberant, symbiotic community of life serving Life and the broader local and global community.

Victor A. Kovda

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[Victor A. Kovda is one of the most respected ecologists and soil scientists in the USSR, and in the world. editor. The following letter is from Victor Kovda to Don Weaver:]

Dear Donald,

I am most grateful to you for your letter, for the sent manuscript and for the copy of your wonderful Bulletin No 8 [*Ice Age or Solar Age Bulletin*] sent to me recently.

The Bulletin is of extreme interest, very informative and most useful for every ecologist. The collected information in these documents definitely confirms your-our (including myself) ideas on growing cooling (and aridization) of the Earth in current period of the epoch. The mechanism, of cooling suggested by Dr. Hamacker and by you (increased evaporation of ocean waters, transport of clouds towards polar regions, increased snowfalls and ice formation, increased Albedo and movement of ice masses from poles to neighboring territories) I consider as fully applicable and valid. In regard of CO2 global management I have published 2-3 times earlier my advice and suggestions: reafforestation of land, increase of humus content inside of the arable soils (+0.5; +1.0%), increase of agrobioproductivity of land by means of rational agriculture (no soil erosion, manuring fertilisers, grass rotation, additional irrigation of arid lands). These measures might ultimately adsorb 10-15 (10 to the 9th power) tons CO2 annually.

Remineralization and liming of exhausted and particularly of acid soils will be most useful in that sense. But eroded, badly compressed (compacted) soils, salted, alkaline and waterlogged soils will require more expensive definite methods of amelioration (reclamation). Any nation of the globe must have national program of soil fertility preservation and soil amelioration. These measures will result in considerable decrease of CO2 content locally and globally.

Universally, arable soils require organic manure in big doses. The discussion on future CO2 impact on global and zonal climate will be prolonged. I would like to keep our scientific contacts and exchange by publications.

Herewith I send you a copy of my future lecture in Hamburg (1986) Soil Science Congress. My best regards to you and your colleagues. Victor A. Kovda.

"The amount of man-caused suspended dust and aerosols in the atmosphere can now be compared to the volcanic ejections at the time of the Krakatoa eruption in 1883." V.A. Kovda.

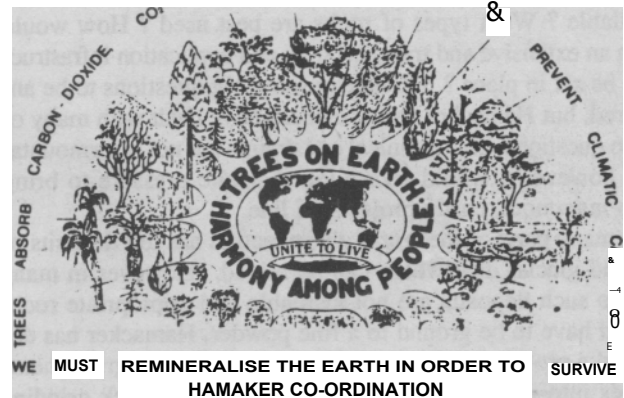
"The total annual loss of soil vegetative cover now reaches 6-7 million hectares, or even, according to the opinion of some experts, as much as 20-25 million hectares. All this cannot but influence the global biogeochemical cycles of multiple elements and the thermal and water regimes of the continents." V.A. Kovda.

Earth Regeneration Society, Inc.

470 Vassar Avenue
Berkeley, California 94708
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The Earth Regeneration Society, Inc. is a non-profit corporation formed as a catalyst to encourage action in response to the buildup in the earth's atmosphere of carbon dioxide, and the relationship of increased CO2 to worsening weather extremes and unpredictability, demineralization and degradation of soils, food shortages, deforestation and accelerated glaciation. [See also Earth Regeneration Society at the end of the previous section.]

... "If you want to begin immediately with the essential work of soil remineralization, you should contact your local gravel pit operations (usually in the Yellow Pages under "Sand and Gravel") and find out if "gravel crusher fines" are available or can be produced, what the cost is per ton (picked up or delivered), and if there is a minimum purchase. The cost per ton usually runs from \$1 to \$10. A glacial or river gravel deposit of a good variety of stones will prove excellent when crushed or ground in the fine dust size range. Three tons per acre of dust is the approximate minimum to produce observable first-year results; increased amounts are necessary for long run soil remineralization. Crusher screenings with larger particles will still be effective in fertility building if sufficient dust is present in the mix. Soil micro organisms can thrive on the dust! Plants and trees thrive in organism-rich soil!"



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Betsan Coats has been one of the most effective and indefatigable champions of remineralization on the international level. She has traveled to dozens of countries on every continent reaching the public and policy makers with the remineralization message. Betsan is an old family friend of St. Barbe Baker. She publishes a newsletter and has a list of remineralization contacts in many parts of the world. Write to Betsan at the above address for the list. Please include adequate funds for the international mailing. Following are several quotes from one of Betsan Coats' newsletters:

...This is to bring to your attention the world grass-roots
continued

movement for remineralizing impoverished soils, depleted in minerals, inspired by the book "[The Survival of Civilization](#)": by John D. Hamaker and Donald A. Weaver of the United States. Everyone working in this movement does so on a voluntary basis. There is no commercial objective involved. The aim is to re-establish balance in nature.

Worldwide, forests are dying. One of the main causes is the depletion of minerals in the soil leading to malnutrition of the trees, evidenced by the narrowing growth rings observed in many areas. Betsan Coates.

It has now been established that any plants fertilized with rock dust will grow faster and be more resistant to pollution and disease.

John Hamacker's book "The Survival of Civilization" contains a more complete presentation of the perspective

According to Hamacker the silicate rocks, or gravel, ground fine is what has the dramatic effect on the growth of trees and plants, when mixed with other ground gravel. Hamacker describes what is necessary for this as "fine ground gravels and sand, river, seashore and glacial deposits." He comments "Ground material from these sources includes igneous, metamorphic, and sedimentary rock in natural mixture". He says the great need is a suitable grinder available for farms, which will grind fine enough. Hamacker stresses that to have the necessary impact on forest growth the mix with the silicate rock is really essential. His aim is to grow forests, vigorous and sturdy enough to have them available quickly for absorbing the carbon dioxide in the atmosphere - which is the factor upsetting the climate.

John Hamaker has given some guidelines concerning how to set about remineralizing soil in gardens and larger areas. he suggests trying experimental plots with the least possible delay.

WE HAVE NO TIME TO LOSE.

It is important that gravel, glacier-river gravel, just about any natural mixture of gravel, should be ground to dust - fine enough for 90% to pass through 200 mesh screen. 5 lb. per 100 square feet is close enough for one ton (2000#) per acre application.

Dust, 90% of which will pass through a 200 mesh screen, is not likely to be easily available to anyone. Crushing must be done with this fineness in mind. Normal gravel crushing for concrete produces dust of which only 16% will pass through a 200 mesh screen. People willing to try experimental plots should take small sized river gravel to a soil analysis laboratory and ask them to grind it to dust with their laboratory grinder. Put the result on a small patch of garden and see what happens. Flowers, or whatever - will be about twice the size of those in an unmineralized plot. 5 tons of screenings will give 1 ton of dust per acre. Almost any mixture of gravel or igneous rock will give the right results but not crushed stone, sandstone or limestone. Good results from 2 ton per acre when there is good soil moisture are maintained through growing season. This application is too *little* to mix more than 3 to 4 inches deep. In dry weather this is not deep enough. Soil-type is unimportant. Even a clay sub-soil can be made fertile by mixing in mineral and plant residue, but this takes a long time; can take about 5 years to get clods broken up and gain some porosity by building up organic and mineral matter and mixing it in. The results with most soils, if there is sufficient depth of screenings, even in dry weather with a limited moisture, are good quality and the vegetables, or whatever will "jump out of the ground " The more you feed the micro-organisms the more growth you will get. 10 tons per acre produces huge plants.

In a recent letter John Hamaker wrote:

continued

"Doing a pot test is the most convincing argument I know of. Anybody can do it. There are testing laboratory grinders everywhere. There is no lag time. In 6 hours you can get a micro-organism population explosion. Taking some 6" clay pots, I filled them with a 50-50 mixture of earth and peat and 3 heaped tablespoons of dust".

The results were astonishing. - Coats/Hamacker Coordination.

Hamacker Coordination

Joanna Campe

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Joanna Campe publishes a newsletter and is the hub of a network of people interested in remineralization.

The following is a quote from an article by Joanna Campe.

The Earth Regeneration society of Berkeley, Ca. writes that "the present well publicized 'greenhouse' warming theory is in fact only the first step in a longer process which is beginning to *cool* the planet; and that we are very close to the critical point where rapid glaciation - the next Ice Age - will wreak havoc, causing worldwide famine and related conditions. This is a most critical issue of our times."

Warming is taking place at the mid latitudes as the droughts of Africa and northeast Brazil indicate. Because 70% of the earth's surface is ocean, the extreme heat releases moisture into the atmosphere. The moisture travels poleward, so the snow of the north *is* the drought of the tropics.

It is actually a *differential* greenhouse effect. Sir George Simpson pointed out that the glaciation which characterizes an Ice Age cannot come about by a general cooling of the earth's atmosphere - because some source of *increased* energy is required to transport poleward the huge amounts of moisture which make up the glaciers. The recent finding of Nicholas Shackleton and associates at the University of Cambridge accept CO2 as the "forcing agent" for glaciation and the date gives strong corroboration for *The Survival of Civilization* thesis.



Ra Energy Foundation

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Grandpa Walton, Will Geer and Brian Hutchings have done some of the most advanced thinking I have seen on how to adapt to massive climate changes and create highly self-sufficient living moduls. Using trombe walls in partially underground buildings they have designed housing units which are almost self-sufficient in energy and food. The scope of their approach is so wide that it's difficult to get through their larger publications. Their main publication is titled [The Cloning of Earth](#). Cost \$10 plus add \$2 for first class postage. Intriguing and stimulating reading.



Climate changes underway will affect the world's plantlife.

Changing climates and extremes of weather will change the boundaries of crop producing areas as well as the natural flora and fauna. In arid ecosystems, even small changes in precipitation amounts and/or seasonal distribution can cause species die-offs and expansion of some species into new habitats.

Paleobotany is the study of plant migrations across the landscapes of earth's surface over geologic history. As glaciers advance or retreat waves of plant species move across the landscape. Long term fluctuations in climate cause forests to move into, or retreat from, arid areas.

We are seeing a massive change in plant communities' species composition throughout most of the earth's ecosystems due to human activities such as logging, livestock grazing, agriculture, herbicides and settlements.

Our actions are also triggering changes in global climate patterns and this will cause various plant species to retreat or advance, depending on their adaptability and habitat needs. This is most likely a contributing cause in species die-off in forests in various parts of the world. For instance, there is underway a massive die-off of several shrub species in the Great Basin. Scientists studying the situation as of yet have no firm cause but some believe it is related to rainfall changes.

Climate changes must be kept in mind when we choose species for reforestation or long-term revegetation projects. Single species reliance is certainly a risk, especially if the species chosen are near the limits of adaptation to the site. Better to choose a diversity of species, which incorporate a wide range of climatic adaptation, thus ensuring at least part of the plantings survival no matter which way the climate changes over the expected lifetime of the planting. Which might be 50 years a 100 years or in perpetuity.

Every gardener has their favorite vegetable varieties that do well in their particular garden's conditions. Change in weather extremes and climate (i.e. length of growing season, number of degree-days, temperature extremes, etc) will dictate to the gardener that they change varieties for optimum production. Garden clubs and horticultural organizations help exchange this sort of information.

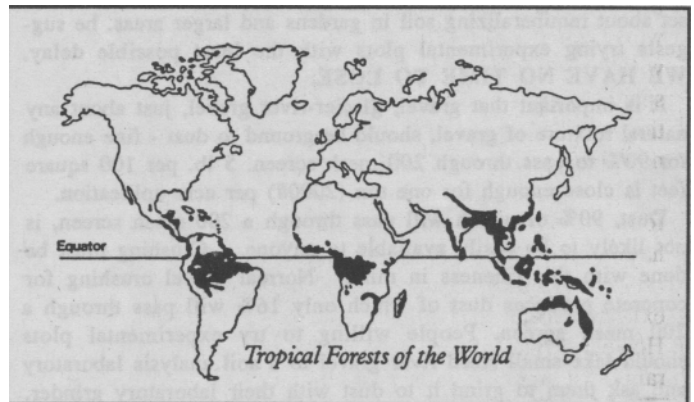
Farmers must also be prepared to change crop varieties or even crop species to adapt to climate and weather changes. Changing climates renders some marginal areas more feasible

to farm while in other areas the returns are lowered and increased soil erosion often results. Much of the world's marginal, cultivated farmland should be planted to trees.

The world is experiencing rapid extinction of crop germplasm at the time when we might need it most. The Green Revolution and hybrid, high yielding crop varieties are often ill-adapted to changes in weather or climate. The world's crop varieties are ever more vulnerable to changes in weather or climate at a time of climate instability. Planting millions of acres of one crop variety does not optimize production. We are setting ourselves up for a fall in food production, at the same time as population is increasing.

When calculating the costs of air pollution, seldom does anyone mention the loss in plant productivity from the sun's rays being blocked out by the increased smoke and particulate matter in the air. This reduces crop yields over much of the world, plus reduces the biomass productivity of forests and other natural vegetation. Agriculture causes much dust in the atmosphere (mainly resulting from tillage and overgrazing). Wide-scale plowing in semiarid regions is especially the cause of large duststorms which have negative results up to 2,000 miles downwind.

The way to forestall disaster if weather extremes continue to escalate is to set up the infrastructure to quickly disseminate new crop varieties, preserve as much as possible of still existing plant species and varieties, and determine what crop species and varieties are best adapted to current conditions of climate and site. Variety selection of crops should be expanded immensely - - and plant trees, lots of trees, billions of trees. .



Assessment of Research on Natural Hazards. G.F. White and E. Haas. 1975. MIT Press.

The authors detail the rise in occurrence of disastrous natural phenomena in the world.

Climatic Change. Agriculture and Settlement. M. L. Parry 1978, Dawson/Archon Books, 214 pages.

A historical overview of agriculturists migrations, expansions, and contractions as influenced by climate change.

The Role of Terrestrial Vegetation In the Global Carbon Cycle. Measurement by Remote Sensing. SCOPE 23. G.M. Woodwell, editor. 1985. Gives guidelines for using remote sensing to estimate how changes in vegetation will affect future atmospheric CO2 concentrations. \$57.95 from Agricultural Sciences, (see "Book Sources" section).