בס"ד

[Shad Valley, U.N.B.- 2004] ארץ ישראל – לעבדה ולשמרה!

It sometimes happens that a good discussion gets rolling after a while, and I forget to say thank you before taking my leave. Allow me, then, to say a very warm thank you now even before we get started – to you, Prof. Bisson, for inviting me to speak here today and for giving me an opportunity to present a different point of view before your students – and to you, the participants in the Shad Valley program, for allowing me – a participant in a similar program nearly 40 years ago – to talk with and hopefully listen to, you, thereby partially paying back a debt and helping launch the next generation in advancing the program of creation. Thank you!

And it is the program of creation we are talking about when we speak of ways to preserve the environment. In one of the very first commands that Adam, the first man, received in the Garden of Eden, our Scriptures tell us: וַיִּקַּח ה' אֱלֹקִים אֶת הָאָדָם וַיַּנִּחֵהוּ בְגַן עֵדֶן לְעָבְדָהּ וּלְשָׁמְרָהּ. And the L-rd G-d took man and placed him in the Garden of Eden to work it and to preserve it. (Gen. Ch.2, V.15). Each of us is required to regard our own immediate environment as his/her own Garden of Eden, and the same imperative applies – to work it and to preserve it.

There is a dichotomy here – <u>to work it</u> means to take this "raw material of a world" and to develop it so that it will produce the potential that it is capable of. In the same way that each of us who are parents work to raise our children so that they develop the skills they need in order to produce the potential that is instilled in each of you at birth. That is the meaning of <u>to work it</u>.

On the other side, G-d says "<u>to preserve it</u>"- i.e. do not think that I am giving you carte blanche to do with this physical world as you wish. Yes, you are to develop it, but at the same time in a way that will maintain the balances – the very fine balances – that were instilled in the world at its birth. For anything that you do that upsets these balances, you must strive to find a countervailing solution that will return the situation to a state of equilibrium. But what we are looking for is a dynamic equilibrium, not a static one. The world is not just <u>going to</u> move forward, it <u>must</u> move forward. This is a Divine command.

The goal of care for the environment is best achieved by cooperation between nations, and we will come back to that topic a little later. But if, as we say, charity begins at home, care for our environment – physical and otherwise – begins at home, too. Literally at home.

And we all know of the advantages and benefits of both preservation of unused resources and of recycling of used resources. But is it all a one-way street – are there no minuses to this approach? Are there only plusses?

If there were, the question you dealt with yesterday in Dr. Coon's address – why are governments backsliding – wouldn't have come up.

At this point, I would like to give you a glimpse into a case-history of the care and concerns of a country for its eco-system, and of course, we are talking about the State of Israel, a country so small that it does not even appear on many maps of the world – it doesn't even appear on the globe of the world just outside the Engineering Building on this campus.

Besides being small in size, Israel is blessed with limited natural resources that are considered necessary for a basic level of consumption – it has forests, mostly in the north and central parts of the country, a few small streams, one major lake – the Sea of Galilee, and a large body of salt-water that ostensibly does not support life because of its high salinity, and is called the Dead Sea in many languages, but simply the Sea of Salt in Hebrew.

Much, perhaps most, of the arable land is cultivated for food products – grains, fruits and vegetables. But many parts of the lank are still neither cultivated nor populated. These include both the hilly regions as well as the flat desert regions.

Most important of all, our water comes through prayer – there is essentially no rain for 7-8 months of the year: the summer season. And in the winter, we pray hard, for our main source of water is RAIN. And rain, as you know, comes from up above.

These few lines deal with Israel's physical resources. It has, in addition, a resource that every country has – the HUMAN resource – but which in a country such as Israel is even more important.

Those human resources are required to develop and preserve the country, under constraints, which are quite unlike those of many other countries. We will mention briefly one example of responding positively to a constraint, while expanding a bit on another example, as it relates to my place of employment.

It should be noted, before we proceed, that one of the many laws to protect the environment dealt with in the Mishna, the original code of Jewish law enacted nearly 2000 years ago, require a place of leather-tanning industry to locate itself at no less that a kilometer east of a city so that the noxious smells do not affect quality of life in the populated area.

The first example is drip irrigation. Because of the total uncertainty of the water supply, coming as it does from rain, and whose quantity we have no control over, we have to be very circumspect about how we use this scarce resource. The result has been the development of a system of drip irrigation – a system in which water drips out of a perforated hose designed in a specific fashion so that the amount of water that each plant receives can be controlled. And no water goes to waste. It drips out only where and as needed.

Besides enabling agriculture to develop inside the hothouse as well as in the open field, this invention has proved to be a boon to many other countries in the world – both those with scarce water supplies as well as even those with abundant sources. This is a direct manifestation of a goal that Israel has set for itself from its very inception – to not only take care of its own needs, but also to export its technology to others who can benefit from it.

The other example is the chemistry of the Dead Sea, which we referred to earlier. Here we have an example of chemical technology taking advantage of a natural resource that apparently no one knew what to do with for close to 4000 years, since the days of the overturning of the cities of Sodom and Gomorrah in the lush valley of the Jordan River, and the creation of the so-called Dead Sea. This sea is called that because of its high mineral content – mainly salts containing ions of Na, K, Mg, Ca, Cl, and Br. A salt content that does not support life INSIDE of itself, but as it turns out, can support much life outside of itself.

Over the last couple of couple of centuries, a number of economists and others have delivered dire prophecies of the results of an ever-increasing population of consumers – due to advances in medicine and education that were enabling more people to live longer – better – while simultaneously the physical resources from which to derive our maintenance – what we call the biosphere – is becoming smaller and smaller. Several conclusions are possible from these predictions, but in the meantime historical fact has shown us the following:

- Developed nations are learning to limit their populations, and to a great extent so are what we call the less-developed nations.
- Great strides have been made in the field of agricultural pesticides thus allowing even small tracts of land to produce enough food to support large populations. This is the UP-side. This is the "to work it/to develop it" side of the coin.

What has happened on the "to preserve it" side?

To answer this, we come back to the chemistry of the Dead Sea. This famous body of water supports a number of chemical industries in Israel. Allow me to focus on one – the one I work for, The Dead Sea Bromine Group.

The brine of the Dead Sea goes through a number of crystallization and evaporation processes; each fraction being produced contains a high concentration of the ion of interest. That fraction that is rich in bromides becomes the raw material source for our company. The bromide is oxidized by the use of chlorine gas (produced in another stage of the brine development process) to the element bromine, a sister-element to chlorine, and almost equally noxious. However, bromine has a number of properties – physical and chemical – that make it eminently suitable for producing specialized chemical products. These various products, which our company produces, find application in drilling fluids, flame retardants, polymers and various kinds of agricultural pesticides.

One, perhaps the main one in this latter category, is METHYL BROMIDE, which you may be familiar with. Methyl bromide, at room temperature, is a gas: poisonous to most forms of animal and human life. Fed into the soil and maintained there for a number of days before the growing season starts, methyl bromide is perhaps the main factor that has enabled the agricultural revolution to proceed apace over the last half-century. It is the best fumigant known, effectively wiping out all subterranean forms of life that can kill or stunt the agricultural produce.

And that is the UP-side of "to preserve it". However, it appears that soil fumigation has its downside. This very chemical savior, methyl bromide, is accused of wreaking great havoc with the ozone layer. While the Montreal protocol mentioned in yesterday's address with Dr. Coon admits that 75% of the methyl bromide in the world's atmosphere is produced in the ocean depths, they have nevertheless required Israel and other nations producing this chemical to seriously cut back production by 2015 to about 20% of its 1995 level.

So here we have an example of deriving chemicals from the brine of the Dead Sea – resulting in a 2-edged sword – at one and the same time of great benefit agriculturally, and simultaneously causing great damage to the ozone layer.

The example of methyl bromide is more typical of the moral challenges Israel as a nation faces, and which all of us in the Mother Earth Biosphere face as a whole. While Israel has made great strides – especially around the Dead Sea chemical industry – in preserving the environment, by having the effluent of one process become the raw material for another, nevertheless the constraints are greater than the achievements.

Our country is small, it doesn't have where to dump things, it doesn't have water to waste, and it has no natural fuel sources other than the sun. And yet, while seeking ways to solve its own environmental problems, it is also constantly looking to help others solve theirs.

And here I want to bring the subject to a temporary close, by dealing with the subject of entropy. The second law of thermodynamics states that the natural order of the world is to seek a greater degree of disorder – breaking glass, splashing, etc. Therefore, if the choice is between increasing the physical biosphere at our disposal, and limiting human activity, we seem to be faced with a no-win situation.

For the here and now, Mother Earth is all we have. Expanding it would seem to be a non-starter. And if my understanding of entropy/disorder is correct, it is unnatural to assume that man's nature is going to change, and that he is going to limit himself.

So how do we both develop and preserve the environment? Well, I would suggest that perhaps the first assumption is not entirely correct – and that in turn, this provides an outlet for harnessing the second assumption.

Maybe even within the framework of "Mother Earth is all we have", there are many parts of the globe that are not developed as much as could be. And maybe man does not need to perform an anti-natural act of reining himself in, if he learns to channel his activities in ways that will continue to develop the world.

And what part can I, the individual, play in all this? To help answer that, I would like to propose the following demonstration:

(universal access) paper clips

By this, we see that with the investment of minimal energy, we have succeeded in combing two separate entities. On a broader scale, if we look at the whole picture of Creation, we can imagine it to be a jigsaw puzzle. Our job is to put the pieces together – we don't even have to – any of us – put all the pieces together, only those immediately surrounding us.

This parable comes to explain to us that the diversity of nations is not a curse, is not a stumbling block, but rather a natural consequence of the fact that each nation – as is true with individuals – is different one from another by virtue of its having been created with different potentials; the same as the different pieces in that jigsaw puzzle.

The job of the nations of the world is to put all the pieces of the puzzle back together – by working with one another, by helping solve one another's problems – so as to regain the harmony in nature that was present at the beginning, in the original Garden of Eden.

Thank you.