FRESH WATER FROM THE SEA

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There are many areas within the world, including some which lie quite close to the oceans, which suffer from a water shortage. The conventional approach to this problem is to distil or otherwise treat the sea water to render it fresh enough for use.

However, there is an enormous source of fresh water, freely available to such countries, which does not seem to have been taken into consideration before now. This source is marine rainfall.

Most people think of the oceans as areas where little rain falls, but this is not the case. Judging from published sources such as the Russian "Atlas Okeanov" (Atlas of Oceans), the average rainfall over the whole of the world's oceans is about 1500mm. This is a very respectable figure, probably at least as high as the average precipitation over the whole land surface.

When it is realised that the oceans occupy well over two-thirds of the Earth's surface (about 72% of the surface is water), it can be seen that availability of marine rainfall would more than triple the amount of fresh water potentially available for use.

How can this source be exploited? This is perhaps an engineering problem but some suggestions can be made. One method would be to use very large sheets of plastic floating on top of the sea, and suspended between a large inflated ring, like an enormously wide rubber dinghy. Such a collector is of very simple construction, and could be miles across. It could be permanently extended, or could be deflated and stored when not in use.

Rain falling on such a collector would form what was, in effect, a large freshwater lake floating on top of the ocean. An interesting effect is that, because fresh water is less dense than sea water, the freshwater lake would rise to a higher level than the sea and would keep the surround ring extended by its own pressure. If the collector bed (the lake bottom) were reasonably flexible, the height of the lake above sea level would be limited by the height of the surround ring. As rain fell into the lake, the lake bed would fall and the lake surface would rise by a lesser amount.

These rises and falls would be governed by Archimedes' Principle, with the weight of the lake water equal to the weight of the sea water displaced, and thus dependent on their relative densities at the time.

Clearly there are possible problems with breakage of the lake bed by marine life, inflow of salt spray over the collector surround ring, and such. However, since the lake would basically contain pure rain water with no

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dissolved salts, a certain amount of contamination from spray and small leaks could be tolerated. Because of the open form of the collector, there is no effective pressure difference forcing sea or fresh water through a small leak in the bed.

Such problems could also be overcome by dividing the collector up into separate cells (some of which could be discarded if contaminated), having floating covers over parts of the collector, and so on.

Once a collector lake had enough rainfall in it, the fresh water could be pumped to the point of use through floating or submerged pipelines, or the whole lake could be towed to an anchorage close to the point of use. After pumping out the water, the collector could be deflated and taken out to the next point of use.