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KEYS:/PROVOCATIONS NO. 61/
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PROVOCATIONS -- No. 61
Sea Level Rises With the Warmer Earth

Most of the scientific evidence favors a warmer earth as a consequence of the greenhouse effect. The best calculations suggest that things will get something like 3 deg to 5 deg C warmer by the middle of the next century from CO2 and the other greenhouse gases. This is a huge amount--enough to make the world climate warmer than anything since the first human trod the earth, perhaps two or three million years ago.

All of this, however, presupposes that there will not be a large change in the percentage cloudiness of world weather. I've just listened to a talk by Jim Coakley of NCAR that shows how very little we really know about clouds on the global scale. Until very recently the world cloud cover could not be estimated with any reliability. New techniques, using artificial satellite images in the visible and two wavelengths of the infra red, however, are opening up ways of measuring cloud cover daily.

A mere 5% to 7% increase in cloudiness could negate the greenhouse effect. Yet we know so little about it that we're not sure whether or not the greenhouse effect will make things cloudier. The best bets are for the warming, but how much the cloudiness will affect this is anybody's guess.

Let's assume that it does get warmer. How much, then, will the oceans rise above today's shorelines? Surprisingly enough, it won't be the same everywhere, as recent figures by James G. Titus of the EPA indicate. This is because the land masses at the seacoast are rising in some areas, and subsiding in others. At Sandy Hook, New Jersey, the land is subsiding at the rate of 13 inches per century; at Galveston, Texas it is sinking 22 inches; at Boston 6 inches; in Juneau, Alaska it is rising at the rate of 9 inches in a century. Most of the East Coast of the U.S. is sinking. Los Angeles is static.

On the U. S. East Coast the sea now averages one foot higher onto the land than a century ago. Assuming a conservative warming figure for the next century the East Coast rise will be 12 to 18 inches from simple thermal expansion of the sea water, 16 to 36 inches more from melting of snow and ice on land, and 8 inches still more from subsidence of the land. This means that a century hence the water will be 3 feet to 5 feet higher at the East Coast shoreline.

I am not familiar with data about land emergence or subsidence from other parts of the world, save for a few celebrated exceptions, like Venice. There, I can personally attest, it is not unheard of at highest tides to come to the ground floor of some of the older hotels to find them under six inches of water--and not the world's cleanest water at that!

The U.S. figures above are derived from extrapolating tidal gauge measures of the last century, plus different estimates regarding the magnitude of the warming and the rate of melting of land-based ice. The rise will be slow and steady, unless a very unlikely event occurs, namely that the West Antarctic Ice Sheet slides into the sea as the perimeter sea ice melts. This has apparently happened in the geologic past. In that case, we might get a 15 foot additional sea level rise over a decade or two at some undetermined future time. Barring this, urban planners, resort owners and others will have ample time to accommodate. Yet it is a large rise in practical terms. It is another reason for close attention to the greenhouse effect, and for the early invention of practical strategies to deal with it if it comes.

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