[It came as quite a revelation to the author that it had been Ralph Nader himself who had posed this loutish question to AEC Commissioner Doub at the 1974 "Critical Mass" meeting — at the time, the question had been reported in the press without identifying the speaker.]

Did it embarrass Nader when it was pointed out to him that the quote was nowhere attributed to him? Not in the least:

"You left out my name just so it wouldn't be libelous," he fumed with the expertise of one who is used to suing everybody in sight. "That's typical McCarthyism!"

It is not surprising that a man of such paranoid self-centeredness should be utterly void of any sense of humor. Omahan Harold Slosburg offered to take him from the airport to the city in his 1969 Corvair convertible, so that he might wave to the crowds from the car he had condemned. But one of The Master's apostles, equally long-faced and somber, whom He had dispatched in advance to prepare things for Him, did not believe He would see the humor in it.

Undismayed, Mr. Slosburg went to the airport anyway, to pick up this writer, who has rarely ridden a finer car, and who would not have turned down a ride in a solmobile, either, if only there were such a thing. He would even have taken an earlier plane to make it at up to 5 miles per hour in the Krautmobile described below. . .

RECRIMINATIONS

Nader's tactic is to shower his opponent with halftruths and three-quarter lies which are impossible to refute in a 10-minute reply period. Listening to the tape afterward, one dies of recriminations for having spent too much time on one point and having missed the time to reply to some others, such as:

"Nuclear material is unsafe for transport. It has to go by road and rail, and we all know what our roads and railroad tracks are like. The other day a truck overturned in Colorado and spilled nuclear material. This time it was only uranium oxide, but what will it be next time? The truck had collided with wild horses — I wonder what the probability of *that* was?"

The answer, not given at the time: That probability is entirely immaterial. Even the probability of a truck colliding and overturning, which is well known, is immaterial, for the real point is that uranium oxide gives rise only to low-level radiation. You would be ill advised to eat it or to bathe in it for more than a couple of hours, but I can think of lots of stuff spilled on the roads that one should not eat or bathe in. Nuclear fuel, on the other hand, is shipped in casks that have been tested in a series of wild torture tests, such as slamming it into a concrete wall at 60 mph. The vehicle carrying it and everything else flew to pieces, but the shipping cask came through unscathed.

"My predecessor has not kept up with the literature in the field, or he would know of the work by Prof. Pohl who has shown that coal is less dangerous than nuclear fuel."

Pohl's report (which to my knowledge has never been published in a reputable journal, but is well known due to the efforts of such nuclear experts as Nader and Comey) could hardly be missed by any engineer, for it is exquisitely hilarious nonsense. It is based on the uranium tailings whose U 238 content will eventually decay to radon, a radioactive gas that can cause lung cancer; and there could come a time when its victims might outnumber the victims killed by coal. When? In 80,000 years, in the future lying beyond the next two ice ages. The theory is so bizarre that it no longer matters much whether it is right or wrong; but it so happens that it is wrong anyway. Uranium is, in small quantities, ubiquitous, so that the same "effect" sets in no matter what one digs up (but especially coal); more important, there is no reason to leave the U 238 lying around — it is valuable raw material that can be bred into fuel and burned, to name but the most attractive option. Although the theory is one of cosmic imbecility, it does have one significant aspect: It shows to what lengths you have to go trying to prove coal safer than nuclear power.

And so it went; no matter what points you answer, you will afterward eat your heart out for not having answered the other 996. But one omitted point, after Nader's harangues about lack of economy and reliability, causes particular pain: In 1977 (even before the coal strike!) nuclear power amounted to 9.6% of the capacity, yet produced almost 13% of the country's electricity. Unreliable? Uneconomic? If 9.6% of a farmer's horses pull 13% of the load, it must be some very special horses which he is using more often — presumably because they do the same work on less hay. If nuclear plants leak and crack and produce nothing but headaches, how come 9.6% capacity pulled 13% of the load? And if they are so uneconomic, why did utilities use them more than the rest of their capacity?

Just so they would have more nuclear wastes to spill into the orphanages?

OTEC REVISITED. . .

For an organization chaired by Sen. Kennedy and directed by Russell Peterson, the Congressional Office of Technology Assessment often does remarkably good work; one of its latest excellent efforts also shows the obviously absent hands of board members Sen. Stevenson and Rep. Udall.

OTA's report on *Renewable Ocean Energy Sources (Part I, Ocean Thermal Energy Conversion)*, May 1978, takes a fresh look at OTEC, the method of generating electricity by using the temperature difference between surface and deep waters of tropical oceans to run turbines on a working fluid with low boiling point, such as ammonia (*AtE* Feb.77). OTEC is one of the more hopeful aspects of solar energy, since it can produce large amounts of power without the usual drawback of enormous man-made collecting areas: The vast areas of ocean are collecting solar energy already. An OTEC plant could produce electricity for transmission to shore (Puerto Rico, Florida, Hawaii) or manufacture energy-intensive commodities such as aluminum or ammonia for fertilizer.

But OTA's analysis does not see OTEC as a competitive energy source before the next century, mainly for economic reasons, but also due to technical development problems. Although no scientific breakthroughs are needed, there is no experience with at-sea asssembly and mooring of such large structures, and the engineering problems are by no means minor — the cold water intake pipes, for example, must be 125 feet in diameter and extend 2500 ft down, "the equivalent of 20 to 30 Baltimore Harbor Tunnel tubes hanging vertically in the ocean." Even if these and other problems are solved, nothing is known about reliability of an OTEC plant, or the penalty for interrupting production if it fails.

OTA recommends a continuation of the present funding in the tens of millions of dollars — not so low as to let OTEC die, nor so high as to "force a premature choice among several concepts and possible products."

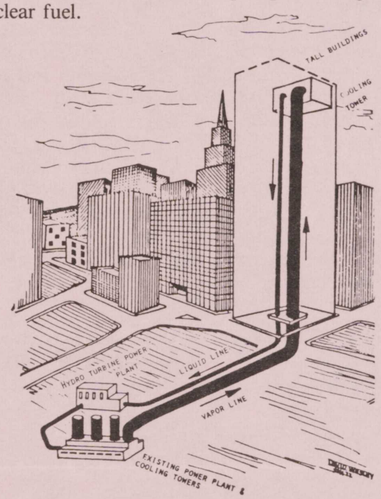
The report does not mention one of the biggest obstacles facing OTEC: the solar-energy enthusiasts' attitude toward it, which ranges from cool aloofness to active hostility. Solar energy? Yes, if it comes in piddling amounts that only the better people can afford — the ones who have the clout to let the other taxpayers subsidize their solar collectors. But solar power by the thousands of megawatts? That's not at all what Jane Fonda or Amory Lovins have in mind when they talk about solar energy. To their nostrils that would stink of the idea that *everybody* could have a right to life, liberty, and the pursuit of happiness. . .

[*More:* OTA Report as above, stock no. 052-003-00536-1, $2.20 from US Govt. Printing Office, Washington, DC 20402.]

AND TGUC INTRODUCED. . .

Ocean-Thermal Energy Conversion (OTEC) involves a thermal gradient utilization cycle (TGUC), but there are other thermal gradients around than the one between deep and surface ocean water. This has been pointed out by Sidney Parker of Lennox Industries in Ft. Worth, Tex.; for example, the earth gets warmer downward, and the air gets colder upward. So why not use the earth's heat to drive pumped storage? During peak hours of electric power consumption, water would run from a storage reservoir through hydraulic turbines to produce electric power as usual, but the water would be pumped back into the reservoir by TGUC:

Some 3,000 ft below the surface, where the temperature is 150°F, a heat exchanger boils a liquid with low boiling point (ammonia) and sends the vapor through a vapor line to the surface reservoir, where a second heat exchanger condenses it. As the liquid returns to the lower level, it drives hydraulic turbines pumping the water back into the reservoir: pumped storage without fossil or nuclear fuel.



Much the same scheme can be used in a city, utilizing the thermal gradient between the waste heat of a power plant and the cold air on the top of a tall building (right). This time the turbine is not used for pumping, but for generating more electricity.

Other schemes of this type were discussed by Parker (who holds two US patents on TGUC) at the 5th Energy Technology Conference in Washington, DC, last March (a highly interesting conference whose proceedings take up 1063 pages, just published as *Energy Technology V*, $38.00 from Government Institutes, Inc., 4733 Bethesda Ave. N.W., Washington, DC 20014).

Since OTEC, which has been worked on for many years by several large companies, does not look overly encouraging, it is doubtful that TGUC, with its much smaller power capacities, could become competitive with orthodox forms of energy conversion; but it's an idea worth knowing about.

ACHTUNG! DAS SOLARMOBIL

The solar automobile shown in our June issue is not meant as a means of transportation. But the contraption top right is. It was proudly shown to the German press in June by the Baden-Württemberg Union for the Protection of Nature and the Environment. 144 photocells on 16 sq.ft of canopy drive a motor with a chain transmission to the front hub. The cost, not counting the unmodified tricycle, was something over $4,000; and

the effect is to move *das Solarmobil* at a cruising speed of 5 mph on level terrain, though a 3% incline will force the driver into low gear at less reckless speeds, and when the sun hides behind a cloud, the thing usually comes to a halt. Why not always? Because it will continue to run if it is on a downhill slope.

Alas, what the good *Umweltschützler* (environmentalists) failed to consider is the energy that went into the solar additions with which they disfigured a perfectly good tricycle. The figures and tables for solar power (applied to more useful tasks than brainwashing a bunch of ignorant journalists) are now available in a pioneering paper by Dr S. Baron of Burns & Roe, Inc.* The net energy break-even times are long for all types of solar energy, but particularly so for photovoltaics (because of their energy-intensive manufacturing process), and sometimes they don't make it at all. A 900 MW photovoltaic plant would take 15 to 20 years to produce the energy that went into its production, if it were located in the US sunbelt. In the Midwest or Northeast, it would fail to break even in net energy over its 30 years' life.

Now throw away the vast economies of size inherent in a 900 MW plant compared to a piddling 1/3 HP motor, and remember that German latitudes pass through this continent deep inside Canada; it is then clear that the *Umweltschützler* are no less ludicrous than their American brethren, for they emerge from the bottom line of the net energy balance sheet as a bunch of clowns who, in their jargon, "rape the earth, plunder its resources, and pollute the environment."

Not much, though. These petty mini-rapists do not seem capable of inflicting any damage beyond the mutilation of an occasional tricycle.

* *Solar energy — will it conserve non-renewable resources?* From AIF, 7101 Wisconsin Ave., Washington, DC 20014

NUCLEAR NOTES

• A rabid anti-nuclear campaign by the media is in full swing, from *Penthouse* all the way down to ABC and the *Saturday Review*. The main tactic is Goebbelsian — constant repetition of