

From forest to fuel: The mounting crisis

While America frets over the price of oil, another fuel crisis is accelerating over much of the developing world. One third of the human race still relies on firewood as its principle source of fuel, and the wood they use accounts for half the timber cut in the world. Now the rising price of petroleum and ever-increasing numbers of people have exacerbated the assault on the planet's forests, bringing long-range consequences for food production and the environment that will increasingly affect developed countries as well.

In the first formal paper issued by the Worldwatch Institute, Lester Brown's Washington-based research organization, Erik P. Eckholm draws new attention to this little-recognized problem. Denuding the earth's great forests, both for fuel and for timber, Eckholm says, "lies at the heart of what will likely be the most profound ecological challenge of the late 20th century." Not only is another vital resource endangered, but cropland is lost through erosion, deserts expand, flooding increases and soil fertility drops because of increased leaching.

The problem is most severe on the Indian subcontinent and central Africa, but areas as close to home as the Caribbean are beginning to feel the pinch. In the Sahel, one-quarter of a family's meager income may now go to buying wood for fuel. The once heavily forested Himalayan foothills of Nepal are now so barren around remote villages that journeying to gather firewood and fodder may take a whole day.

But the most subtle danger results from the substitute fuel to which many desperate families finally turn when all the wood is gone: dried cow dung. Using these wastes as fuel rather than returning them to the land to provide nutrients for crops has become so severe in India that the loss is equivalent to one-third the country's chemical fertilizer use. In addition, soil structure is damaged by loss of the organic bulk that keeps it porous.

Eventually a vicious cycle results. Falling soil productivity causes clearing of even larger tracts of forests, often on steeper terrain where productivity and erosion will be even more of a problem. In much of Asia, the rising silt load is beginning to threaten reservoirs and irrigation projects. The rising frequency and severity of flooding in Pakistan, India and possibly Bangladesh is also being blamed in part on denuded watersheds.

London was suffering from coal-pollution as early as the 13th century because of a firewood scarcity (see note p. 203). In a chapter for an upcoming book, Eckholm traces the history of deforestation back to the Phoenicians of the Middle East and the Plains Indians of America, who burned great forests to extend the range of the buffalo. By now, he concludes,



Eckholm: "Ecological challenge."

people have reduced the world's original forested area by at least one-third and perhaps one-half.

Some governments are beginning to take action, but the task is particularly

difficult because of local politics and age-old traditions. Eckholm told a Washington press conference that mainland China probably has the most extensive reforestation program, but even with strict government control and intense local involvement, he says, the program is only about 10 percent effective. Most of the trees get rooted up for fuel or otherwise destroyed before they reach maturity.

Another partial solution involves new technologies that depend on essentially infinitely renewable resources, such as solar energy or bio-gas plants. (Unlike petroleum, firewood can be reproduced, but the length of time required to grow a forest makes wood an only partially renewable resource in the short-term.) The problem with most alternate technologies is that the capital investment lies beyond the reach of most poor families, or involves radical changes in lifestyle. A solar cooker, for example, might cost one-third the annual income of a family and not provide heat for the evening meal.

Still, the problem must be attacked soon, or in Eckholm's words, "India will find itself with a billion people to support and a countryside that is little more than a moonscape." □

A marker for lung cancer

During the past few years, investigators have been identifying biological markers that would help them diagnose cancers and monitor progress in treating them. An example of a very specific marker they have found is the hormone calcitonin. An unusual thyroid tumor, medullary thyroid carcinoma, secretes this hormone in abnormally high levels; elevated levels of calcitonin in the blood invariably indicate the presence of this thyroid malignancy.

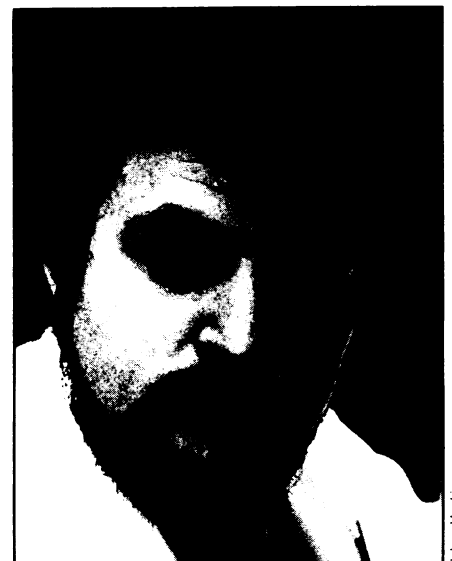
Two more ubiquitous yet less specific markers have also been identified—the CEA and AFP proteins. If the CEA protein is found in a person's blood in high levels, it suggests that he may well have cancer, particularly cancer of the colon. If the AFP protein is found in his blood in high levels, it suggests that he has cancer of the liver (SN: 6/9/73, p. 367).

Still another cancer marker—for lung cancer—has now been identified by Stephen B. Baylin, a physician at the Johns Hopkins University School of Medicine, and his colleagues. The marker, Baylin hopes, will eventually assist in the diagnosis and treatment of this common and nearly always fatal form of cancer. His findings are in press with the *NEW ENGLAND JOURNAL OF MEDICINE*.

Several years ago, Baylin and his co-workers found that the enzyme histaminase is elevated in the blood of patients with medullary carcinoma of the thyroid. Since data suggested that this unusual thyroid tumor might be embryologically related to the second most common form of lung cancer—small-cell carcinoma of the lung—Baylin and his colleagues set

out to study the levels of the enzyme in the blood and tissues of patients with small-cell lung cancer.

Using two different, sensitive tests, they examined the levels of the enzyme in the blood of 25 patients with small-cell lung cancer, in the blood of 63 healthy persons and in the blood of 20 patients with large-cell lung cancer (the most common form of lung cancer, not believed to be of the same origin as small-cell lung cancer and medullary carcinoma). In one test, 33 percent of the patients with small-cell lung cancer had levels significantly elevated over those for healthy persons. In the other test, 26 percent did.



Baylin: The enzyme has therapy potential.