

Gas from coal: Progress in technology and funding

Natural gas is in short supply. In Washington, D.C., a gas-rationing program is to go into effect, and other cities face the same shortages. Because of its nonpolluting qualities, especially in power plants, demand for natural gas is growing at an annual rate of about 7 percent. The El Paso Natural Gas Co. estimates that the United States will need 93 billion cubic feet of natural gas daily in 1980, compared with reserves and other sources that can guarantee only 63 billion cubic feet.

For some years, the production of synthetic gas from coal has seemed the most promising approach to the problem. But the promise of nuclear energy plus apathy on the part of Congress and the executive have traditionally resulted in short shrift to research, development and demonstration of coal gasification. Neither Government nor industry has wanted to spend much money—despite the nation's vast coal reserves. But in the past six months, this situation appears to have been reversed dramatically, as both Government and industry commit large resources to coal gasification.

Long before natural gas was avail-

able, gas companies made gas from coal, mainly in urban plants, and the basic process is little changed. Coal is reacted with steam to form carbon monoxide, hydrogen and some methane. The gas thus produced has a relatively low heating value and the added liability that CO is poisonous. But the CO and hydrogen can be reacted to form more methane and the gas can thus be upgraded to make it nearly the equal of natural gas in safety and heating value. It is this "methanation" step that is most difficult and is still not fully proved. But hearings last week before the Senate Interior Committee made clear that most technolo-

Environmental advertising: A question of integrity

Environmentalists have frequently charged that corporations tend to see the environmental crisis as principally a public relations and advertising problem.

Whether or not the allegation is true, a new report published by the Council on Economic Priorities clearly outlines facts showing that much corporate advertising on environmental themes is irrelevant or even deceptive. Further, the report documents another key fact: that a large percentage of the environmental advertising comes from companies that are the worst polluters. These include electric utilities and steel, petroleum, paper and chemical companies. And although the automobile industry is not cited as one of the major environmental advertisers in CEP's survey, many instances are cited of deceptive auto company environmental ads.

CEP was founded by two securities analysts as a nonprofit firm providing information on the practices of U.S. corporations in five major social areas, including the environment. It has been cited favorably in the *Wall Street Journal* and *BUSINESS WEEK*, and Congressional staffers report that it is a reliable information source. But the new study speaks for itself; it simply places advertising claims in apposition with documented truths and allows the reader to draw his own conclusions.

For instance, a Ford Motor Co. ad in a recent *READERS DIGEST* environmental supplement (which is the subject of a major part of the CEP study) says, "As far back as 1961, Ford made changes on some of their cars to curb [hydrocarbons] by installing their first antipollution device." The device alluded to is positive crankcase ventilation (PCV).

Here is what the CEP report says about it: ". . . The PCV program was neither innovative nor voluntary. . . . Ford and all other automobile manufacturers were required by a December 1959 California state law to install proven air pollution control devices on its cars. . . . PCV valves were well known then and had even been used in World War II on military vehicles. . . . In order to comply with this law, Ford agreed to install the valves." Further, says CEP, the valves were installed only in cars going to California; not until 1963, when public pressure had mounted, did Ford (and other auto companies) install them on all cars.

General Motors fares little better than Ford in the analysis. A GM ad boasts of reductions in hydrocarbon and carbon monoxide emissions. The ad, however, fails to note that the reductions were for prototype cars, not cars randomly selected from assembly line production. CEP's claim that only about half the 1971 cars on the road actually meet emission standards is sustained by a recent report from the California Air Resources Board which shows that 61 percent of 1971 Chryslers and 62 percent of 1971 Fords failed at least one emission standard. GM did a little better—only 38 percent of its cars failed. (Foreign cars performed even worse than U.S. vehicles.)

CEP divides the objectionable advertising into three categories: Ads that have no real relevance to environmental problems and use environmental concern as a gimmick (bottled water ads which suggest purchasers somehow contribute to a solution of water pollution problems); ads that mislead by stating broad generalities that omit certain

necessary qualifications (ads by associations of can and bottle manufacturers that tell the reader accurately enough that cans and bottles are only a small percentage of urban solid waste but neglect to mention that they are the most intractable part, because they do not biodegrade and cannot be incinerated); and, finally, ads, such as the GM and Ford ones, that it labels downright deceptive.

Apart from the question of ad credibility, the CEP report raises a fundamental question about the relationships between pollution and advertising. The *READERS DIGEST* supplement stresses the theme that people in general cause pollution and that corporations are merely responding to their desires. Valid as this argument may appear, it is fair to ask to what extent advertising too often creates demands for products that meet no real human needs or meet them poorly and that, additionally, place a heavier load on an already overloaded environment. The CEP report only touches on this question, and undoubtedly detailed behavioral studies of the impact of advertising are required. But one thing CEP does establish is that much environmental advertising attempts to lull people into a belief that the real need for a clean environment is being met. The reality is that often it is not.

There is one optimistic note in the CEP study: Many corporations and corporate executives, say the authors, simply refuse to join the environmental ad game. Such advertising, the advertising manager of a large corporation is quoted as saying, "is not the proper vehicle for serious discussion needed at this point. I would have to call it just commercial exploitation."

gists believe methanation will be feasible and that coal gasification is clearly the best way to augment natural gas supplies.

The hearings were aimed primarily at describing what is happening today in coal gasification; they also dispelled the notion, hinted at by Sen. Henry Jackson (D-Wash.), that because companies plan early commercial coal gasification using proven technology, there is no need for large-scale R&D. It became obvious that the proven technologies will not be adequate for many purposes and that the new ones must be developed.

The two commercial ventures, now in the late planning stages, will both use the proven Lurgi process, developed first in Europe. El Paso Natural Gas plans to have a plant in operation in New Mexico by 1976 producing 88 million cubic feet daily. Additional stages will be built for a total capacity of 264 million cubic feet in 1978. A consortium of Texas Eastern Transmission Corp., Pacific Lighting Service Co. and Utah International Inc. (the coal supplier) plans a 250-million-cubic-foot plant for possible startup in late 1975. Eventual capacity of the plant, also in New Mexico, might be 1.2 billion cubic feet daily. El Paso vice president Edward Walsh admitted that the methanation step for the process is still not proved. But even without it, he said, the lower-BTU gas produced by the Lurgi process could be added to natural gas without marked detriment to its quality. Texas Eastern vice president George H. Ewing, however, said his company is confident that methanation is feasible.

But witnesses stressed that the Lurgi process is applicable only to certain types of coals—such as those in New Mexico—and that new processes for other parts of the nation are desperately needed. The first large-scale Federal-industry R&D program (with the gas industry) was announced in August (SN: 8/7/71, p. 90). Another joint program, this time with the coal industry, was announced two weeks ago when the industry's Bituminous Coal Research Inc. signed a contract with the Interior Department's Office of Coal Research for a \$25 million pilot plant.

Ewing estimated that Lurgi-process gas will cost about \$1 per thousand cubic feet, compared with 35 cents for natural gas in the pipeline. But some of these cost differences will be offset in large Eastern cities where gas can be made from nearby coal and where other fuels are even higher priced. And the FMC Corp. reported at the hearings that it has a process that may bring the price down by producing synthetic petroleum along with the synthetic gas. □

Synthesis of amino acids from gases known in space

The discovery of an increasing number of organic molecules in interstellar space has led a number of scientists to suggest that the first chemical steps in the evolution of life may have taken place in the interstellar clouds. A most significant next step beyond the compounds now known would be the formation of amino acids. So far no amino acids have been discovered among the interstellar gases, but from the Lamont-Doherty Geological Observatory of Columbia University comes a report that amino acids have been synthesized from gases known to be in interstellar space.

Goesta Wollin and David B. Ericson took a mixture of methanol, ammonia and formaldehyde and a mixture of ammonia, methanol and formic acid and subjected them to ultraviolet radiation. Without being cooled or condensed the gases reacted to form liquids, which then crystallized after different periods of irradiation. The ammonia-methanol-formaldehyde reaction yielded chiefly glycine and glutamic acid with small amounts of aspartic acid, threonine, serine, proline, isoleucine and leucine. The other mixture gave an even larger number of amino acids including aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, valine, isoleucine, leucine, tyrosine and phenylalanine.

Wollin and Ericson stress that this is the first time that amino acids have been produced in an experiment that started out with all reactants in the gaseous state. In earlier experiments in which similar mixtures generated amino acids, one or more of the reactants was in the liquid state. (The earlier investigators were trying to mimic conditions that might have existed on earth early in its history; they were not aware of the existence of the interstellar gases.) Of course the density of the gases used in the laboratory is many orders of magnitude greater than the density in the interstellar clouds. Wollin says that instead of days a similar reaction might take thousands of years in space, but showing that it can be done starting from gases indicates that it is possible there.

The two investigators also point out that this is the first time that amino acid synthesis has been accomplished without water; previous experiments were all conducted in the presence of water. The accomplishment raises the suggestion that life could have evolved in the absence of water and increases the number of places in the universe where life might hypothetically be present. Wollin and Ericson suggest that ammonia, which has solvent properties similar to those of water, could assume

the function of water in some alien life system. Ammonia has chemical properties that are toxic when it is introduced into the physiology of life as we know it. Therefore a life form with ammonia as its general solvent, says Ericson, would be a somewhat different form of life with a different metabolism, but it could be based on amino acids we know here. □

Australopithecus, a long-armed short-legged, knuckle-walker

The eastern shore of Lake Rudolf in Northern Kenya has been the site of many fossil finds that are helping to document the evolution of early man. Richard E. Leakey, son of archaeologists Louis S. B. and Mary Leakey, has completed his fourth season there. Speaking in New York last week about the most recent finds at Lake Rudolf, he said they will shed new light on interpretations of man's past.

Leakey believes two distinct hominid populations, *Australopithecus* and *Homo*, co-existed at Lake Rudolf from 1 million to 2.6 million years ago. Sufficient data are now available to begin to consider possible evolutionary trends among these populations.

Australopithecus limb bone fossils have been rare finds, but Leakey now has a large sample. They portray *Australopithecus* as long-armed and short-legged. He was probably a knuckle-walker, not an erect walker, as many archaeologists presently believe. "There is a vast area of study," Leakey says, "to be gone into before definitive conclusions can be made but there is now material available for such a study and evidence to suggest that previously held notions on australopithecine locomotion are subject to review."

In addition to these finds, Leakey has *Homo* fossils that he says make "clear that the hominid form and the australopithecine form at East Rudolf are contemporary." The *Homo* specimens have a uniformity of morphological traits so different from the uniformity within the australopithecine material that Leakey feels confident they must be included within genus *Homo*.

Leakey's confidence, however, is somewhat limited. He had previously suggested that two Rudolf skulls were more than 4 million years old. But in his talk last week, he said that preliminary reports on the geology of the area were incorrect and that the skulls were now dated at only 2 million years.

Not wanting to make a similar mistake and not wanting to start any arguments, Leakey emphasized that all his statements were based on preliminary reports. □