

# The Oil That Wasn't There

Projections of America's oil and gas resources have been revised downward. Some experts say oil production may have already peaked.

by John H. Douglas

Every area of American economic policy, from environmental protection planning to hopes for energy independence, relies in some way on estimates of U.S. oil and gas resources. But these estimates have been overoptimistic, the

Interior Department's Geological Survey (USGS) now admits, and their revision may have far-reaching consequences as the nation tries to free itself from dependence on imported fuels.

The most dramatic reduction comes in estimates of offshore petroleum resources along the Atlantic coast, where

a major leasing program is now being studied. The USGS once expected some 48 billion barrels of petroleum liquids to be found there, but their latest estimate has fallen to 10 to 20 billion barrels. Similarly, estimates of natural gas resources have been revised from 220 trillion cubic feet to 55 to 110 trillion. No wells have yet been sunk in the area, but exploratory drilling off Canada's Atlantic coast has yielded disappointing results, leading in part to the current revision.

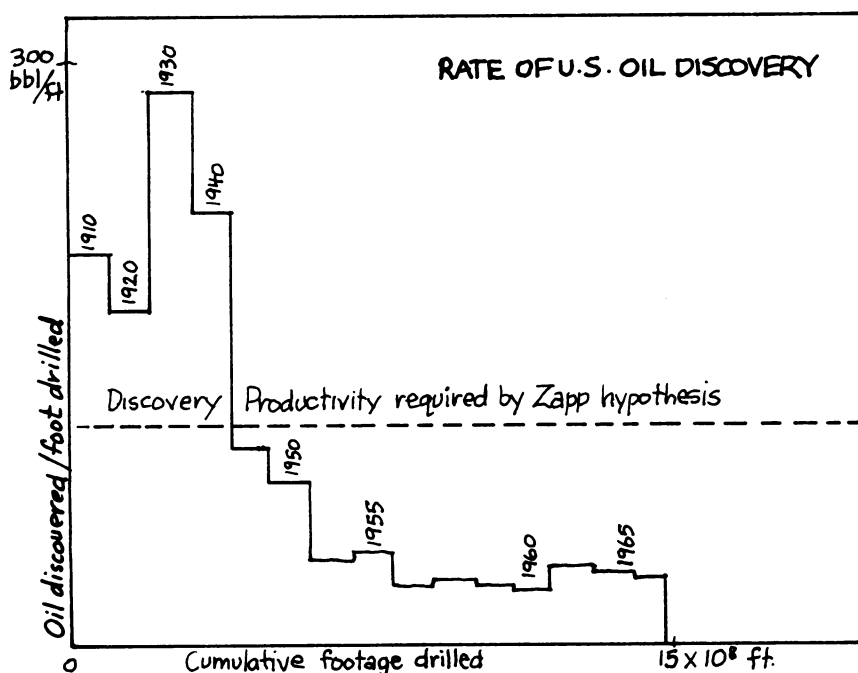
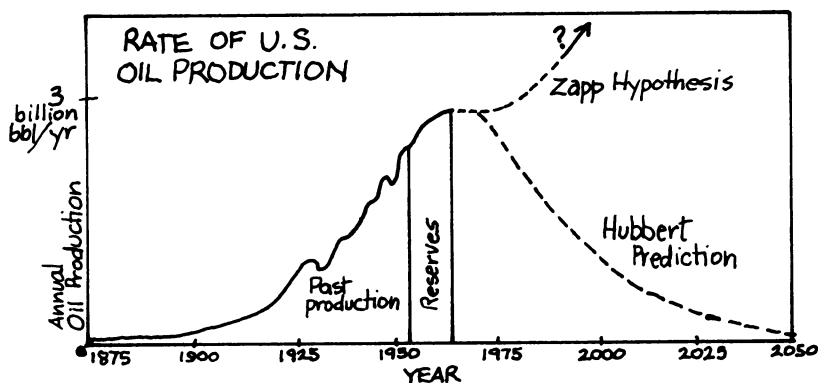
In the past, estimates were produced somewhat haphazardly by independent groups of scientists within USGS. The most widely quoted figures were published in 1968 by the man who now leads USGS, V. E. McKelvey. The new estimates represent an attempt to standardize the procedure and take into account a range of uncertainty, based on variable productivity of new sites. In almost every category, old estimates lie near or above the upper end of the range of new estimates.

The USGS now expects ultimate production of American petroleum liquids, offshore and onshore, to lie in the range 390 to 610 billion barrels, compared with the old estimate of 601. Natural gas production should lie in the range 1,840 to 2,950 trillion cubic feet, compared with the old expectation of 2,740. (Estimates include past production, "recoverable reserves" based on specific geological knowledge of an area and "recoverable resources" based on guessing what an area's geological structure is like before actually drilling.)

Announcement of the revisions was pointedly low key, emphasizing the acquisition of new data and pointing out that rising petroleum prices might soon add presently unprofitable deposits to the "recoverable" list. Interior Secretary Rogers C. B. Morton said prospects of finding new offshore oil deposits were "still bright" and called the outer continental shelf a "great frontier" for petroleum exploration.

"They're just whistling Dixie," replies one Administration observer who has followed the course of USGS predictions. Neither methodology nor information has changed that much, he says, only "their figures have suddenly become important."

Some scientists believe that even the lower range of the new estimates is still far too optimistic. A leading spokesman for this group is noted geophysicist M. King Hubbert, a dissident at USGS, who sticks to the predictions made over a decade ago by the National Academy of Sciences Committee on Natural Resources, which he chaired. American crude oil production, the committee told President Kennedy, is likely to be limited to 175



Predictions of U.S. oil and gas production have been based on the assumption that the rate of discovery of new resources would remain constant (the "Zapp hypothesis"). But discovery rates have already fallen (below) and production has already peaked (above), indicating possible shortages ahead.

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# Biomedicine

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## Gonorrhea and toilet seats

Some two million Americans were treated for gonorrhea in 1973. Most physicians and public health authorities claim that virtually all gonorrhea cases are contracted through sexual intercourse. There is growing evidence, however, that this venereal disease may be transmitted through rest room fixtures.

In 1973 Claes Henning and Lisbeth Jakobsen of Sundsvaal Hospital in Stockholm reported that after dripping strains of gonorrhea bacteria on a toilet seat, wash basin, electric light switch and other inanimate objects, they were able to isolate the bacteria from the objects four hours later. But some American scientists doubted that the gonorrhea strains they used were pathogenic. Their research report did not indicate that the strains were.

Now Val C. Schwartz, an-18-year-old high-school science fair winner from Doraville, Ga., has shown that the gonorrhea strain that is the most pathogenic, Type 1 *N. gonorrhoeae*, can be recovered from toilet seats, flush handles, faucet handles, door knobs, light switches and towel swatches up to an hour after contamination.

The challenge now facing scientists is to inject human volunteers with bacteria recovered from bathroom fixtures. If the volunteers contract gonorrhea, that will be substantial proof that gonorrhea can be contracted through fixtures.

## A urine test for cancer mutagens

Many of the chemicals that trigger cancer (carcinogens) may well be chemicals that cause gene mutations (mutagens). But it has been impractical both technically and monetarily to identify these carcinogenic mutagens with mammal tests. Now William E. Durston and Bruce N. Ames, biochemists at the University of California at Berkeley, have devised a test that they believe "will detect a high

percentage of the environmental chemicals that cause cancer and mutations in man." It is a simple method for the detection of mutagens in urine.

Durston and Ames propose in the March PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES "that the method be used for the screening of human urines in order to detect mutagenic metabolites of drugs and of dietary components."

## Monitoring for crib deaths

Some 10,000 American infants die annually from "sudden infant death," or "crib death." The victims appear to have suffocated, but for no apparent reason since their faces are uncovered. An oxygen shortage is one possible explanation.

Ronald Kane, an electrical engineering student at the University of Michigan, is designing two devices that would monitor infants in the crib and alert parents to dangerous changes. The devices are designed to give parents time to call a doctor or to give artificial resuscitation or heart massage.

One of the devices Kane is working on is a short-range transmitter, which would be enclosed in a nonirritating pad and attached to the chest of an infant. It would send out information on the child's condition in the form of radio signals to a receiver adapted to an FM radio. The receiver would decode the signals and sound an alarm when they indicate a hazardous situation. The other device is a remote sensor, to be placed inside the mattress of a crib. It would pick up an infant's heartbeat, breathing and movement. The sensor has the advantage over the transmitter in that it does not have to be attached to the baby. Further, the sensor could be wired directly to a decoder-alarm, eliminating the need for an FM radio.

Kane believes that his devices, if produced commercially, could retail for about \$125.

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billion barrels—not the 590 eventually predicted by USGS—and gas is limited to 1,000 trillion cubic feet—not 2,650. (The current USGS term "petroleum liquids" tends to inflate estimates by including an additional 15 percent of nonoil products.)

The fate of the American petroleum industry rides on which set of numbers is correct, for the Academy figures imply a dire consequence: The committee predicted that discoveries of new oil fields had already peaked in 1957, that oil "reserves" would reach a maximum in 1962 and that peak production would occur around 1969. In fact, the peak of reserves did occur in 1962 and peak production was reached in 1970, one year late. A similar schedule of gas depletion was put forth and now seems to be running two years early, with peak production now expected this year or next. Even the addition of a possible 30 billion barrels of crude oil in Alaska, discovered since the committee's report was made, could shift the schedules only a couple of years. As for the highly touted offshore

wealth of the Atlantic coast, Hubbert told SCIENCE NEWS, "It looks like mighty thin pickin's." (SCIENCE NEWS has learned, however, that other major oil discoveries have been reported from the eastern portion of Prudhoe Bay. If the presence of oil is confirmed, the discovery might substantially change the resource picture.)

At the heart of the controversy lie two conflicting assumptions. Obviously, production depends both on how many wells are dug and on how many fields are left to tap. USGS tends to emphasize the former, assuming that enough oil is left to accommodate the steady drilling of new wells (the so-called "Zapp hypothesis," after the USGS scientist who for years dominated the oil prediction scene). Hubbert subscribes to the contrasting theory of Donald F. Hewett, a leading geologist of the 1920's, who said every depletable resource goes through a similar cycle of increasing then decreasing production, accompanied by almost steadily decreasing rate of new discoveries. Since the 1930's, Hubbert points out,

the rate of petroleum discovery has decreased rapidly and steadily, rather than remaining constant as required by the Zapp hypothesis.

The revision of USGS figures comes from partial abandonment of the Zapp hypothesis, Survey scientist Richard F. Meyer explained to SCIENCE NEWS. But he emphasizes that the present revision is only a first estimate, and that exploratory drilling off the Atlantic coast and in the Gulf of Alaska will be needed before anything really definitive can be said about these two key regions.

Before the "fuel crisis" heated up and when the old, plentiful resource estimates were still in vogue, the United States was still expected to have to import some two-thirds of its petroleum by 1985 (SN: 5/19/73, p. 343). Now, should prices continue to rise and Hubbert's predictions prove to be correct, "Project Independence" could be seriously jeopardized and the country could find itself in a fuel import crisis much earlier than expected. □