THE VOICE OF SCIENCE ON CAPITOL HILL

# F.A.S. PUBLIC INTEREST REPORT

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## TARAPUR: RETHINKING NON-PROLIFERATION STRATEGY IN SOUTH ASIA

It became evident in the 1950's that the secret of the atomic bomb could not be kept. Efforts to prevent the proliferation of nuclear weapons turned to a non-proliferation treaty which most nations would sign.

In the seventies it became evident that stronger action would be necessary in those hard-core cases that could not be resolved by rhetoric or a bandwagon approach. These involved states which considered themselves to have national security problems to which the bomb was somehow relevant. There were Arab states that thought the Israelis had a bomb and, in any case, wanted a bomb to pressure Israel (e.g. Iraq and Libya). There was the Taiwanese and South Korean desire for a bomb to dissuade northern neighbors from violent takeover. There was the South African desire to strengthen its geopolitical hand. And there was, of course, the Indian-Pakistani rivalry.

It was obvious to bystanders that few if any of these conflicts could really be usefully influenced by the possession of a nuclear weapon. Nevertheless, to the states involved, there was sufficient motivation to move ahead.

The U.S. response to this new stage in non-proliferation prospects was to put some teeth into its policy in 1977 and 1978. Under the Non-Proliferation Act of 1978, no help with nuclear reactors would be provided to states unless they commited themselves to eschew nuclear explosives and to permit International Atomic Energy Agency (IAEA) safeguards on all peaceful uses of nuclear energy. In addition, the Symington and Glenn Amendments to the 1977 International Security Assistance Act call on the President to terminate all economic and military aid to non-nuclear weapon states receiving nuclear technology outside IAEA channels, or detonating a nuclear weapon.

Predictably even this has not been enough in the several cases where states are more concerned about their neighbors than they are about any pressures which the U.S. would likely generate.

The Indian-Pakistani issue is such a case. This month, the Senate must debate whether to continue to supply 38 tons of enriched uranium to the Indians for use in their Tarapur Atomic Power Station designed to generate electricity in the Bombay region. From the point of view of the Nuclear Non-Proliferation Act, the Indians have done everything possible to deserve a cutoff.

a) They detonated a nuclear explosive device on May 18, 1974 under the thin cover of "peaceful purposes" and refused to sign the non-proliferation treaty;

b) They refused the IAEA "full-scope" safeguards which the Act demands over "all peaceful nuclear activities" and, indeed, struggled, with some success, to limit the application of safeguards even where U.S. assistance was given.

c) They refused any "strict undertaking" not to detonate more nuclear explosives and, it is widely believed, violated (or legalistically distorted) a previous obligation not to use Western assistance in their work on their first nuclear device.

Nevertheless, the Administration wants to carry through on the sale with a waiver of the Nuclear Non-Proliferation Act provisions because it senses that its bargaining position is too weak; it fears that the Indians *might* in response:

a) reprocess U.S.-supplied spent fuel that is still in India for subsequent recycle of the plutonium in its reactors; this would set a world-wide reprocessing precedent we oppose as an important step toward nuclear proliferation.

b) remove the Tarapur facility from IAEA safeguards; such removal has again, never been done.

c) violate its agreement with us not to use materials supplied for Tarapur for nuclear explosion.

In sum, it fears that India could ignore U.S. strictures and simply, in response, roll back existing agreements. On the other hand, supporters of U.S. non-proliferation efforts have ample reason to fear that the Nuclear Non-Proliferation Act—if not U.S. non-proliferation policy generally—is about to be destroyed on the rock of Indian resistance unless strong action is taken. And if the Indians react badly in response, they see ample American capacity to retaliate with an American opinion primed to back up a tough line.

What neither side in this debate has yet admitted, however, is the depth of the non-proliferation problem at issue. The Indian explosion of 1974 has made Pakistan feel that it must have a bomb. Pakistan has been reported in the press to be working on two different methods of securing the necessary material: a centrifuge method and a reprocessing plant. And the Pakistani efforts have further reinforced Indian interest in its own bomb. Meanwhile, the Chinese nuclear arsenal provides another reason for Indian proliferation. And the Soviet action in Afghanistan provides the Pakistanis with another motivation to have its nuclear weapon lest an Indian-Soviet alliance dismember Pakistan.

Something new has to be added. In general, the U.S.

*Continued on page 2*

*Continued from page 1*

**must begin to base its non-proliferation policy on the interest of the regional parties themselves in avoiding proliferation rather than on *U.S.* interest in preventing *them* from moving ahead. This is also more consistent with the Indian and Pakistani sense of injustice that such nuclear powers are pressuring poorer non-nuclear powers into foregoing nuclear weapons. We propose that what U.S. leverage exists over Pakistan and India be used to draw them into serious and sustained talks on the control of their incipient arms race. And, in order to create a fruitful context for such talks—recognizing that the nuclear pressures come not only from each other but from regional superpowers—that the U.S. stand ready subsequently to explore separately with the Soviet Union and the People's Republic of China the possibility that U.S., USSR and PRC assurances might support whatever the Indians and Pakistanis might need to underpin their agreement.**

**In other words, the U.S. should be asking the Indians and Pakistanis upon what terms they might forego nuclear weapons and then offering to help guarantee those terms. The U.S. ought to have enough leverage to get talks along these lines started even where it fails to have the strength to insist to the powers separately that they restrain themselves. In particular, FAS recommends that the uranium sale to India be viewed as a prime example of the leverage we have, and used to secure Indian involvement in such talks. If, in the face of this leverage, the Indians were nevertheless unwilling even to discuss the matter with the Pakistanis (who have called for a South Asian nuclear free zone) it is hard to avoid the conclusion that the sale of Tarapur fuel would utterly destroy our non-proliferation efforts by exposing them as totally without force.**

**This effort to start the Indians and Pakistanis thinking about their demands upon each other (and others) to maintain a non-nuclear status captures what hope now remains of control of nuclear weapons on the Indian subcontinent. And there is some hope left. Nuclear weapons are not particularly relevant to such territorial disputes as those in Kashmir. And the military forces of India and Pakistan may be civilized enough in dealing with each other to so recognize. Indeed, much of the proliferation problem springs from Indian interest in playing a major nuclear power role, and Pakistan's interest in not being forced consequently to bargain from a felt position of inferiority. The subcontinent incentives for nuclear weaponry are therefore not great.**

**Meanwhile the costs and risks are obvious of building nuclear weapons and being confronted with them in turn by a neighbor. And both nations have an interest in securing guarantees from their larger northern neighbor against the use of force. The Indians might be able to secure from the Chinese, and the Pakistanis from the Soviets, some guarantee of non-violation of frontiers in return for non-nuclear status. Certainly the Chinese and the Soviets have an interest in restraining the number of nuclear powers in their region.**

**So the outlines of a bargain exist. But the bargain can be negotiated only by the subcontinent powers themselves. Tarapur's real significance may lie in announcing the last clear chance for avoiding a nuclear arms race in the subcontinent. All efforts, including in particular the Tarapur leverage, ought be directed at catalyzing a lasting regional solution, designed by the regional powers themselves.**□

***—Reviewed and approved by The FAS Council***



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## NUCLEAR REGULATORY COMMISSIONER GILINSKY:

**What principally motivates proponents of the export is their concern over what India might do if we fail to ship the fuel. This has been most clearly stated in a recent article by Mr. Bundy, which has been referred to here today . . . The argument, in short, is that possession is nine-tenths of the law. The Indians have the spent fuel and we cannot risk giving them a pretext for claiming that they are free of their obligations. We have no choice, it is argued, but to accept the Indian interpretation of our agreements.**

**The trouble with this logic is that it argues for the continued export of fuel until the expiration of the United States-Indian agreement in 1993, no matter what. We should therefore be clear that we are not talking here about two shipments, we are probably talking about a permanent exemption."**

**But in considering whether the new law can survive a waiver in this most symbolic case, it may be well to remember—as has been pointed out here several times—that the origin of the act lay in large part with the 1974 Indian explosion . . . My own conclusion is that we should stick with the act.**

## COUNCIL DISSENT

Council Member George W. Rathjens dissented from the editorial on Tarapur. Dr. Rathjens, who was officially involved in these matters for some recent months as Deputy to Ambassador Gerard Smith, believes that the U.S. would be in default on its obligations to sell the fuel if it did not do so on the original terms (and without the subsequently added conditions of the Nuclear Non-Proliferation Treaty).

He questions also whether the U.S. has the leverage to insist that the Indians negotiate with the Pakistanis on a nuclear-free zone in the continent and, indeed, suggests that efforts to require them to do so might be counterproductive.□

## COMPILATION OF CONSERVATION LEGISLATION

A survey and report of this year's Congressional activities on energy conservation has been prepared by F.A.S. Persons desiring a copy of this 9,000-word report should send $1.00 to F.A.S., 307 Massachusetts Avenue, N.E., Washington D.C. 20002□

## HANS J. MORGENTHAU DIES

F.A.S. sponsor Hans Morgenthau died on July 21. An incredibly prolific and active political scientist, Professor Morgenthau had been an F.A.S. sponsor since January, 1971 and was a frequent contributor of ideas and suggestions.

Among new sponsors recently added are Lipman Bers, Columbia University mathematician, and Nobel prize winners Sheldon Glashow (Harvard University physicist) and Herbert Simon (Professor of Computer Science and Psychology, Carnegie-Mellon University).□

## PROGRESS ON THE COMPREHENSIVE TEST BAN

On August 5, 1980, ACDA released a progress report agreed upon by the U.K., U.S.S.R., and U.S.A. on the test ban talks they are holding. It proclaimed "significant accomplishments" but "technically complex and politically sensitive" problems left to be worked out, with no timetable in view.

According to the summary, the Soviet Union, Britain and the United States are discussing the prohibition of all nuclear "weapon" test explosions.

But a moratorium on nuclear explosions for peaceful purposes would go into effect with the treaty until such time as arrangements could be worked out to permit or prohibit such explosions. The treaty itself would go into effect when 20 nations ratify it. Those permanent members of the U.N. Security Council who were signatories to the treaty would be able to veto any amendments to it otherwise desired by a majority of signatories.

For verification, the parties are planning cooperative seismic monitoring measures in which all parties will exchange seismic data to assist them in their national technical means of verification, with which means all parties agree not to interfere. The parties are negotiating the installation and use by all parties of high-quality national seismic stations; evidently, this means seismic stations on Soviet territory which would yield data to the U.S. and U.K. A committee of experts will develop detailed arrangements for the standards the data should meet, the form it should be in, and so on.

But there will also be the right to request an on-site inspection (and the right to refuse to permit one). The final treaty will detail procedures for on-site inspections and describe the role to be played by the host party during an inspection.□

## FAS ELECTIONS, 1980

In the April elections, Frank von Hippel, who had been serving as Vice Chairman and Acting Chairman since June, 1979, was elected Chairman for a two-year term beginning June, 1980. In a spirited contest between two energy specialists at Berkeley, John Holdren defeated Arthur Rosenfeld for Vice-Chairman.

Elected to four-year terms on the FAS Council were Earl Callen (American University), Barry M. Casper (Carleton College), Lee Grodzins (MIT), Henry Kelly (SERI), Robert Pindyck (MIT), and George Silver (Yale).

Robert Solow, one of the world's most distinguished economists and a long-time FAS Sponsor, agreed to replace John Holdren as FAS Treasurer.

John Edsall having requested rotation from his position as Secretary, the Council approved the appointment of George Silver, former Deputy Assistant Secretary of Health, to replace him.□

## "NEW" WAR-FIGHTING DOCTRINE

As the September newsletter went to press, National Security Council (NSC) staffers were telling reporters about a forthcoming speech by Secretary of Defense Harold Brown, on the implementation of his "countervailing" targeting strategy. On August 10, he explained his policy in a message to the North American Alliance. The message talked of "more flexible" capabilities through the ability to make "limited responses" that would put "unacceptably high" costs in terms of what the Soviet leadership values most: "political and military control, military power both nuclear and conventional, and the industrial capacity to sustain military operations."

This speech punctuated the technological drift toward counterforce capabilities, on both sides, against which FAS has struggled for at least two decades. As before, overemphasis on "deterrence" has led to overlooking the costs of permitting the military contest to move into counterforce targeting. Thus, notwithstanding our armory of 10,000 nuclear warheads at the ready, Harold Brown uses as his justification:

> ". . .we cannot afford to risk the Soviet leadership's entertaining the illusion that nuclear war could be an option—or the threat of nuclear war a means of coercion—for advancing Soviet interests."

But he overlooks the fact that the most likely nuclear war is one that arises as a "war nobody wants" rather than as a lapse of deterrence, and that these kinds of war will start easier, and be harder to stop, under the conditions he is encouraging. Attacks on military targets must be made quickly and so rapid escalation is encouraged. And attacks on command posts make the subsequent nuclear war impossible to stop. For both these reasons, American counterforce targeting undermines American security more than it helps.

In some ways, the present period is analogous to that of 1962 when, at Ann Arbor, Secretary McNamara announced that he would target missiles in an effort to move away from targeting only cities. Then, as now, an abundance of U.S. warheads made it inevitable that the Administration would target Soviet military targets. Then, as now, some spokesman will explain the strategy as more humane. But then, as now, it tended only to induce the Soviet Union to prepare to fire its nuclear weapons more quickly, and at U.S. command and control centers. Spasm war is made more likely.

The present period is different, however, in that the Soviet Union now is already threatening to destroy U.S. land-based missiles. Much of the U.S. doctrinal emphasis on "countervailing strategies" is therefore based on the political, if not the strategic, need to match the Russians. In particular, today, the Carter Administration needs a hard-line policy in anticipation of a hard-fought election. After all, the Republican Party Platform calls for precisely what Brown is saying and it attacks the Carter Administration for not saying it:

> "Our objective must be to assure the survivability of U.S. forces possessing an unquestioned, prompt, hard-target counterforce capability sufficient to disarm Soviet military targets in a second-strike. We reject the mutual-assured-destruction (MAD) strategy of the Carter Administration which limits the President during crises to a Hobson's choice between mass mutual suicide and surrender. . ."

The Soviet threat to attack U.S. land-based missiles does more, unfortunately, than just encourage the U.S. to threaten, in response, the same *offensive* strikes. The U.S. is also being encouraged to fire swiftly for *defensive* reasons. The vulnerability of the land-based missiles encourages their being fired on warning of attack. If the MX missile were built, this might not be necessary but, as noted in the June FAS Report, there is a high likelihood that the MX *basing scheme* will be defeated, eventually, in Congress, but that the MX *missile* will survive Congressional scrutiny. If so, it is likely to be deployed in the existing Minuteman missile holes in which it has, thoughtfully, been designed to fit exactly. In order to explain this large expenditure of new weapons in old vulnerable holes, something new would have to be said and this appears likely to be "firing-on-warning."

(The Defense Department has also already asked for funding to improve communications between 200 of the Minuteman holes and its airborne command post. The number 200 has probably been chosen with a view to better command and control of the 200 planned MX missiles should they be placed in the Minuteman holes. These 200 missiles would have 2,000 warheads between them and it would be, from DOD's point of view, very desirable to be able to retarget so many warheads from the air rather than, simply, to fire them.)

Of course, the most serious consequence of these hair-trigger doctrines is the encouragement to Soviet forces to fire quickly themselves. Faced with the repeated and emphasized doctrine of counterforce attacks, they would have to prepare their own even more sizeable and, soon, even more vulnerable, land-based force to fire quickly. And faced with the threat to their command and control, they would have to give orders to lower-level authorities to fire at will if command and control broke down. Nothing

*Continued on page 5*

*Harold Brown*

*Continued from page 4*

could be more subversive of our security.

It is becoming increasingly evident in America—and presumably also in the Soviet Union—that command and control of nuclear weapons during war would be extremely difficult if command and control centers were attacked. For example, assuming only that Washington, D.C. were destroyed at the outset of a war, all persons in the Presidential line of succession (viz. the 16 persons between the President and the Secretary of Education) would be either destroyed or unreachable for a considerable period. The Pentagon would be put out of action at once as well. In that event, orders would reach Minuteman missile sites, strategic bombers and nuclear submarines from sources in the military command authority such as SAC command if it were not also put out of action by a deliberate effort to confuse our command and control. (This is, after all, exactly what, according to news reports, we are planning to implement in response—attacks on Soviet command and control.)

The ultimate recipients of these messages to fire—the persons in the Minuteman launch centers, for example—would have no way of knowing whether the orders to fire came from legitimate higher authority, because so much of it would have been destroyed. This presumably explains why, in October 1975, a Minuteman control officer, Major Harold Hering, was abruptly removed from his post for simply asking in his training class: "How will I know that the order is authorized?" This question is simply unanswerable, and represents for the Air Force a difficulty better left buried.

Unfortunately, the trends toward firing quickly, on warning of attack, will exacerbate this difficulty by shrinking the time alloted for decision-making, and by persuading launch-control officers and other elements in the command line that time is really of the essence. This is a far cry from the boasts of Kennedy Administration strategists that they had built a retaliatory force which—being able to ride out any enemy attack—could avoid inadvertent firings, and could respond deliberately and selectively.

As an illustration of the problem, consider the situation in which a terrorist destroys Washington with a nuclear weapon. Will this propensity to fire quickly lead to *U.S.-Soviet* nuclear war and the destruction of the industrialized world? This scenario is growing in importance as the hair-trigger readiness to fire increases and proliferation spreads.

The dangers of firing U.S. missiles quickly, on 30-minute warning of enemy launch—rather than on confirmed multiple detonations of enemy missiles—were made abundantly clear recently by a series of computer failures. On November 9, 1979, a false alarm was transmitted by North American Air Defense Command to military commands and federal agencies. On June 3, 1980, and again on June 6, false signals of a Soviet missile attack were fed to Strategic Air Command bombers which caused them to start their engines. The latter failures were said to have been caused by an integrated circuit component costing between $10 and $100.□

## A MYSTIC FOR PRESIDENT?

On July 13, an article appeared suggesting that Ronald Reagan was superstitious, consulting a horoscope and believing in clairvoyance. The relevant paragraphs of the article were as follows:

> "Reagan says he follows the daily zodiacal advice for his sign in the horoscope column of Carroll Righter. Reagan, born Feb. 6, 1911, is an Aquarian.
>
> 'I believe you'll find,' he said, 'that 80 percent of the people in New York's Hall of Fame are Aquarians.' He cites Abraham Lincoln, Franklin Roosevelt and Adlai Stevenson, but he is three days off on George Washington, a Pisces.
>
> Does Reagan *rely* on an astrological chart?
>
> 'No, but I'll tell you a curious story. I remember that Jeane Dixon, who was all for me in one part of her mind—she was always gung-ho for me to be president—but in that foretelling part of her mind, she said back in '68, 'I don't see you as president. I see you here at an official desk in California. And because you're at that desk some right things happen in Washington, but you're not there to do them.'
>
> He said the prediction came to mind one day when he was talking with a member of Richard Nixon's staff. 'He told me that Nixon would be in debates with his Cabinet about a course of action—they'd use the labels, a conservative course of action—and Nixon would say, 'Damn it, they're doing it in California and it works!' And he'd get his way.' "

Ms. Angela Fox Dunn confirmed the accuracy of this story as printed in the *Post* and said that Mr. Reagan is "mystical" and that her original title for the article was "The Politics of the Heart."

On calling Ms. Jeane Dixon for further confirmation, FAS had a 25-minute phone call in which these points were made. Ms. Dixon met Mr. Reagan at the home of her

*Continued on page 6*

*Ronald Reagan*

*Continued from page 5*

brother, Redskin football player Ernie Pincker. This was before Reagan ran for governor in '62 or '63. She says now that she advised Mr. Reagan that his "ultimate destination on this earth" was to be president and that he was the reincarnation of someone who had been a great American and a great leader. While Mr. Reagan was president he would "evolve to a higher level"; she told him, "America must have you."

Ms. Dixon said that Mr. Reagan had never formally consulted her, but that she wrote him letters from time to time and that they had become friends after that meeting. Mr. Reagan, she said, responds to her "from time to time." She "would not expect him" to consult her when he was president, but she would just continue to write him letters.

With regard to the article, she had not known of his interest in astrology; she was basically a clairvoyant, among other things, although she knew astrology. She said Mr. Reagan had "visions" but, on questioning, seemed to change that to the fact that he was "a man of vision" with an intuitive feel for things. She would be "supporting Mr. Reagan all the days of my life."

Ms. Dixon said that she "loved" scientists because "my father was a scientist and I think they are so great." (On inquiry, she said her father was "in the patent world" in electrical matters.)

The prospect of a president who was getting—and appreciating—help from Ms. Dixon induced FAS to write Mr. Reagan asking him to clear this up, if possible. The following scientists signed the observation below which, embodied in a longer letter, was sent to Mr. Reagan for clarification.

> We are gravely disturbed at a newspaper report of July 13, 1980 indicating that the Republican Party candidate, Ronald Reagan, believes in astrology, and in fortune telling, as in the excerpt below from an article by Angela Fox Dunn writing for the *Los Angeles Times Syndicate*. We urge Mr. Reagan to clarify his position on this subject because, in our opinion, no person whose decisions are based, even in part, on such evident fantasies can be trusted to make the many serious—and even life-and-death—decisions required of American Presidents.
>
> Signed:
> Julius Axelrod, Nobel laureate
> Owen Chamberlain, Nobel laureate
> Herman Feshbach, President of the American Physics Society
> Robert Holley, Nobel laureate
> Salvador E. Luria, Nobel laureate
> George B. Kistiakowsky, Science adviser to President Eisenhower
> Burton Richter, Nobel laureate□

## A STUDY IN ERROR

On September 24, 1979, Harbridge House, a Boston-based management consulting and research firm, related a study on "Energy Conservation and the Passenger Car." The *New York Times* newspaper summary was headlined "U.S. Fuel Standards Questioned." It said the analysis "adds up to a major challenge" to the assumptions underlying the Energy Policy and Conservation Act of 1975 which mandates automotive efficiency standards.

The *Times* reporter reached this conclusion on the basis of the first of eight "detailed conclusions" put forward by Harbridge House, in its executive summary of its report,

> *"Congress originally expected the value of the energy conserved through the automotive fuel economy program to vastly exceed the costs involved; it now appears likely that the costs may exceed the savings."* (italics in the original)

The complete backup for this statement in the Executive Summary is as follows:

> "The 1974 report to Congress by the U.S. Department of Transportation and U.S. Environmental Protection Agency was primarily responsible for the formulation of the Energy Policy and Conservation Act. This report estimated that in order for the automakers to achieve a 33 percent gain in the overall fuel economy levels of new cars over a five-year period, an incremental annual investment of approximately $200 million would be required. It is now evident that just the capital investment associated with increasing corporate average fuel economy levels from 19 mpg in model year 1979 to 20 mpg in model year 1980 will be on the order of $2.5 billion to $3.0 billion. During the entire lifetime of these 1980 cars the fuel saved, based on retail gasoline prices of $1 per gallon, will be worth approximately $3 billion."

Little did the *Times* realize that, in fact, this "detailed conclusion" had no backup in the weighty report and the calculation embedded in the above paragraph makes an elementary error, which, if corrected, would reverse its conclusions. The study was done for General Motors.

What follows is the sad but amusing tale of the efforts of Chairman Frank von Hippel to get Harbridge House to admit this error. Despite phone calls, letters, and accidental encounters which led, in due course, even to a Congressional investigation, Harbridge House, in testimony, hardly felt itself obliged even to be responsive to the complaint.

The error made by Harbridge House resides in assuming that the $2.5 billion to $3.0 billion investment alleged necessary to increase corporate average fuel economy from 19 mpg in model year 1979 to 20 mpg in model year 1980, would have no other value except in saving fuel for *1980* model year cars. In fact, the investment moves Detroit closer to meeting higher later year standards as well which saves more gasoline. Thus, the 1981 year model and 1982 year model, etc. will have better mileage also as a result of the investment.

If, for some reason, one does not wish to include such

*Continued on page 7*

*Continued from page 6*

savings in calculations related to the 1980 model conversion, then the savings associated with converting from the model year 1980 to model year 1981 cars would have to be credited with having improved the 1981 model efficiency all the way from the 1979 model standard (19 mpg) to the 1981 model standard (22 mpg).

Put another way, the Harbridge House Study ignored what might be called the benefits of longer than one year tooling lifetime and the carry-over value of the R & D involved. It acted as if a Detroit investment of $3 billion had to pay for itself in one year.

A graph by von Hippel, below, used round-number assumptions (10,000,000 automobiles per year, and 100,000 miles per automobile lifetime) to show the large difference in savings that result if the error is not made.

Von Hippel, who had been forced to buy the report for $50, called Harbridge House Vice President and author of the report John Schnapp about a week after the report came out, but got no satisfaction. After a chance encounter between von Hippel and Chairman of the Board Charles D. Baker, Harbridge House did finally send a substantive letter of December 7. Mr. Schnapp's response was that:

> "As I understand your argument, you are saying that if, for example, the capital investment required of the auto industry to produce its 1980 generation of cars is of the order of $3 billion primarily to improve the fuel efficiency of that generation from 19 MPG to 20 MPG, and if the auto industry continued making nothing but the 1980 generation of cars indefinitely, the nation would continue accruing the energy conservation benefits of the 1980 generation over the 1979 generation indefinitely."

After this correct formulation of the error, Mr. Schnapp observed that the value of the future benefits would have to be discounted since the outlays required were incurred at once. He said Chairman Charles Baker had concluded that, with a 12.5% deflator, the return on investment of these funds would be "less than 6%."

A subcommittee of the House Committee on Interstate and Foreign Commerce, chaired by Bob Eckhardt of Texas, happened to be having hearings on Government financed cost-benefit analysis. It called von Hippel and Schnapp, along with a consultant to the study named Dr. Eugene Goodson, who is Director of the Automotive Transportation Center at Purdue University, and a DOT-associated Administrator Barry Felrice.

What followed had a frustrating quality. Felrice testified only about a *second* Harbridge House study done for the Government (rather than for GM) and hence he did not officially confirm von Hippel's criticism although, after the session, he said: "I agree with von Hippel that many factors were not taken into account." His complaint was that Harbridge House had: "concluded without any analysis we could see that all the problems of the industry were the result of regulation."

Goodson, however, was on the spot. A former chief scientist for DOT, he had earlier confirmed to von Hippel, by phone, that the Harbridge House study was in error. Among other statements at that time, he had even claimed that he had pointed out the error in question in his assignment as a Harbridge House consultant. (He had not intended that his comments be made public but the Committee did make them available; they did not highlight this error.)

Goodson began by seeking to belittle the significance of these or any other reports. He suggested, in effect, that no one should take any of these reports too seriously. For von Hippel to call Harbridge House's analysis a mistake might be "too strong." It might be an error from the national accounting system point of view but not from that of a manufacturer. It was true that if you get a better engine in production, it "continues to give benefits." If one is concerned about the matter from a point of view of national policy then "it's an error." He advised FAS later that it was "not a mistake of commission but a mistake of omission" and that von Hippel's analysis was "equally flawed" because it used, in its hypothetical calculations to prove its point "constant sales" of 10,000,000 cars per year.

Since the Harbridge House statement referred to the expectations of Congress on the "value of the energy conserved" not on the cost-benefit calculations of the industry, the accounting point of view *was* specified.

Mr. Schnapp's testimony simply described the 30 year old Harbridge House and its conflict-of-interest rules and attitudes, without any reference to the dispute. While the prepared remarks made no reference to the correspondence with von Hippel, Mr Schnapp, in response to Congressional questions, contented himself with saying obscurely:

> "Von Hippel was not sensitive to, and may not have been aware of the fact that, of every dollar that Ford allocates for capital investment, $.60 to $.65 will flow back in 1981-1982."

Ranking Minority Member Lent, who had earlier opened his remarks by saying that it would be "interesting to hear Harbridge House's response" to the allegations of inac-

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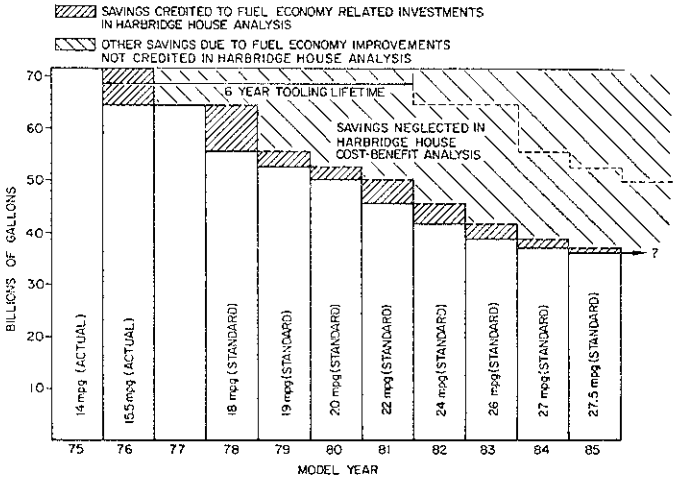


Figure 1: Lifetime Gasoline Commitments for Each Model Year (10 million automobiles per year, 100,000 miles per automobile)

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curacy failed in several efforts to elicit just that from Mr. Schnapp.

In sum, it was, of course, impossible to roll back the newspaper stories based on the Harbridge House error in analysis. Still more discouraging, even an alert public interest scientist, and the coincidence of an on-going relevant Congressional investigation, were not sufficient to straighten out the error, or even to get a responsive answer from the analysts. Conceivably the Committee report on the matter will produce a definitive result but this will be still less widely reported than the hearings themselves.□

## OPENING WEDGES TOWARD CHEMICAL WARFARE

*Unsubstantiated charges that the Soviet Union is using lethal chemical warfare agents in Afghanistan and Laos, supported by a common assumption that the Soviet Union has a long-standing chemical warfare program, have led some Congressman blandly to assume that the U.S. should have new chemical warfare weapons. In that connection, FAS adopted the following resolution.*

**A critical decision that would make poison gas warfare and the proliferation of chemical weapons more likely is being made almost entirely without executive branch review, congressional deliberation, or public discussion. In an obscure section of the huge FY 1981 military construction bill, the House of Representatives has approved construction of a factory in Pine Bluff, Arkansas to produce 155-mm binary nerve gas artillery projectiles.**

**The munitions would contain two relatively non-toxic nerve-gas precursors, in separate canisters, which can be shipped and stored separately. Upon firing, the precursors mix and react to form the nerve gas GB. The gas is identical to that contained in the approximately one million militarily equivalent 155-GB artillery projectiles the Army already has on hand, a supply adequate for months of large-scale chemical warfare. Contrary to a common misconception, this stockpile is not significantly deteriorating or becoming obsolete.**

**The ostensible argument for the binary projectiles is that they would be safer to handle. Actually, by making the manufacture, storage, and deployment of chemical weapons much more acceptable to weapons producers, logistics officers, and other military commanders, binaries will, over time, make chemical weapons more attractive to military establishments, both ours and those of other nations. No nation has yet produced binary gas weapons. For the U.S. to pioneer this development is militarily unnecessary and short-sighted from the standpoint of U.S. national security. The FAS urges that the Senate withhold approval of the House action and that the Administration, so far disturbingly silent, exert its leadership to this end.**

*—Reviewed and approved by The FAS Council*

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