THE VOICE OF SCIENCE ON CAPITOL HILL

# F.A.S. NEWSLETTER

FEDERATION OF AMERICAN SCIENTISTS — Founded 1946
A national organization of natural and social scientists and engineers concerned with problems of science and society.

SPECIAL ISSUE ON
AUTOMOBILE POLLUTION CONTROL

Vol. 26, No. 5 May, 1973

## FAS PROPOSES FURTHER LEGISLATION ON AUTOMOBILE EMISSIONS

**We have no complaint with Environmental Protection Agency (EPA) Administrator William D. Ruckelhaus' decision to suspend, for a year, the statutory standards for automobile emissions for 1975 given the difficult situation in which he found himself. The U.S. Court of Appeals had instructed him to balance the harm to the economy, resulting from stoppage of automobile production, against the environmental damage that would result from granting a one-year suspension. This one-year delay, if not prolonged, coupled with the interim standards EPA imposed, will give rise to little additional pollution—although this addition makes it somewhat more difficult for certain urban areas to meet the Clean Air Act Standards.**

**Instead, our concern arises from EPA's emphasis upon the oxidation catalyst proposed by Detroit, and by EPA's lack of reference, in its announcement, to the system advanced by Honda, using the stratified charge. We have serious doubts that the catalyst system is a satisfactory long-term solution to the emission problem.**

**The National Academy of Sciences recently concluded:**

> **"The system most likely to be available in 1976 in the greatest numbers—the dual catalyst system—is the most disadvantageous with respect to first cost, fuel economy, maintainability and durability. On the other hand, the most promising system—the carbureted stratified charge engine—which may not be available in very large numbers in 1976, is superior in all these categories."**

**In short, the "quick-fix" invented by Detroit is, predictably, not the best long run solution. One better method, the stratified charge system, already exists. There may be others. What to do?**

**We believe that additional amendments to the Clean Air Act should lay down further performance standards for the technology submitted by Detroit. The Clean Air Act has been successful in galvanizing action in Detroit. We must now ensure that the final result is a workmanlike effort that protects the consumer against excessive costs and breakdowns while maintaining the pollution standards.**

**In particular, we believe that the consumer deserves:**

> **1. To be assured that the technological solution will last for the life of the car—for example, 80,000 miles—without replacement of major system components.**
>
> **2. To be assured that the technological solution will not fail without the driver's knowledge. In the absence of such assurance, expensive nation-**

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*Approved by the Federation Executive Committee, the above statement was reviewed and endorsed by the following FAS members or outside consultants whose experience and expertise bear on various aspects of this problem. Their credentials appear on page 2. (Further observations of the Executive Committee appear on page 6 under "Policy Implications.")*

Dr. James A. Fay
Dr. Irvin Glassman
Dr. Richard Garwin
Dr. Harold S. Johnston

## THE PROBLEM

Automobiles produce several different pollutants including carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NOx) and lead compounds.

Lead compounds result from the widespread use of tetraethyl lead as a gasoline additive to prevent knocking and maintain a high octane rating. Lead poisoning can lead to such varied problems as mental retardation, sterility, infant mortality, fatigue, loss of appetite, constipation, or disturbances of the central nervous system. Lead persists in the body and in the environment for a long time. In urban areas, such as New York City, children can be afflicted with lead poisoning through ingestion of lead from sidewalk dirt, and possibly through ambient air concentrations. It is possible that 1% of New York City children are suffering from lead poisoning of one kind or another. And a high percentage of hyperactive children have elevated levels of lead in their blood. Ninety per cent of lead in the atmosphere comes from motor vehicles using leaded gasoline.

The solution to the problem of lead poisoning is to remove most or all of the lead from the gasoline. EPA is

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**wide public inspection systems will have to be set up and time-consuming periodic visits to them by the owner will be necessary to verify the working of the emission controls. Alternatively, provision would have to be made for expensive recall systems if surveillance of the inservice fleet showed failure to meet the standards.**

**We recognize that the catalyst may not be able to fulfill these standards. But the stratified charge system will. And, while the stratified charge system may cost about $100 a year for each of five years (some believe much less) the catalyst system may require as much as $270 a year, for five years, over the costs of a 1970 model vehicle. Presumably, all consumers want a clean environment but they should not be forced to pay more than is necessary to achieve it. The law should, in some way, protect the public's interest in economy, dependability and efficiency.**

**EPA is now reviewing the standards for NOx and is considering recommending that they be relaxed because of new technical information. If so, the catalyst system necessary may not be so greatly inferior in fuel economy as it would otherwise be. But other systems such as the Wankel incur fuel penalties. And the controls now imposed on automobiles to alleviate pollution have already resulted in greater fuel consumption. In short, the emission problem is inextricably mixed with the problem of fuel economy.**

**We should protect ourselves against wastage of fuel that would otherwise result from anti-pollution devices. And, while we are doing so, we might as well begin to encourage the conservation of fuel. It is evident that fuel economy is going to be important not only to the consumer but to the nation's balance of payments.**

**We propose, therefore, that legislation occupy itself also with fuel economy standards. At the very least, automobiles should display stickers describing the mileage they achieved under controlled tests by impartial observers. Just letting the consumer know what the true cost of his purchase will be can be an effective stimulus—to individuals and to Detroit—to save fuel.**

**Over and above this approach, a combination of regulation and user taxes could be invoked. Technological solutions to the emission problem that required significant increases in fuel consumption could be prohibited if more efficient alternatives were available. User charges on gasoline consumption could encourage the sale and purchase of smaller cars. Conceivably, emission taxes set at a suitable level could provide a needed economic incentive to meet and even exceed the emission standards.**

**In short, we have come to question whether, as presently arranged, market mechanisms will lead to the best emission-control devices and will maintain fuel economy, much less actually conserve on fuel. It took a consent decree to end what may have been a Detroit conspiracy in restraint of emission technology. It took the Japanese to show the way in applying the stratified charge—something Americans originally invented. Therefore, we would not be surprised if it required more legislative nudges of one kind or another to persuade the automobile industry to complete the job satisfactorily and to do its bit to conserve resources.**□

## CREDENTIALS OF CO-SIGNERS

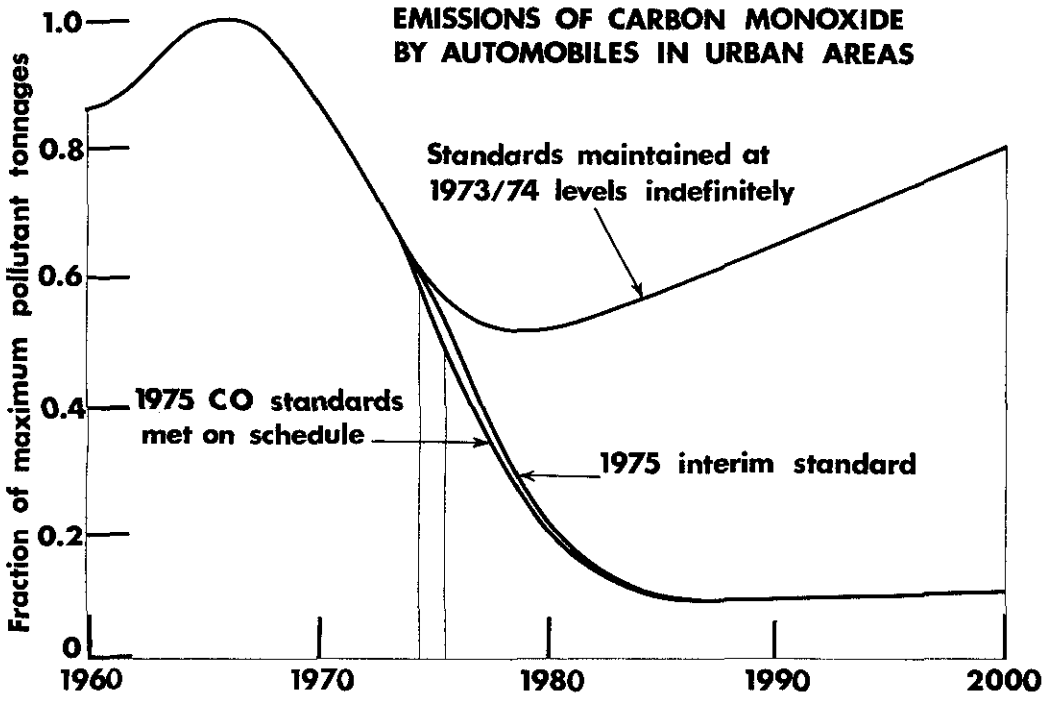
Dr. James A. Fay: Professor of Mechanical Engineering, MIT

Dr. Richard Garwin: IBM Fellow, Thomas J. Watson Research Center; long-time former Member of President's Science Advisory Committee

Dr. Irvin Glassman: Director of Center for Environmental Studies and Professor of Aerospace and Mechanical Sciences, Princeton University

Dr. Harold S. Johnston: Professor of Chemistry, University of California at Berkeley

All four of the above were members of the National Academy of Sciences Committee on Motor Vehicle Emissions whose report played a central role in the events related in this newsletter.




**THE PROBLEM,** from Page 1

now requiring that about 80% of the gasoline sold in 1975 must be lead-free. A special additional urgency attaches to removing lead from gasoline by 1975: the catalyst system discussed below as a solution to CO and HC pollution would be undermined by the presence of lead in the gasoline. (The lead acts as a "poison" for the required catalysts and destroys their effectiveness.) And these catalyst systems are to be employed by 1975. The cost of removing the lead is likely to be about 1¢ a gallon, but this may be recouped by better maintenance of parts of the car easily fouled by lead.

The remaining pollutants at issue cannot be eliminated by changing the character of the fuel. They arise as unburned byproducts of the combustion process. Their quantity depends upon the ratio of air to gasoline. In theory, the required amount of air to burn gasoline—the so-called stoichiometric ratio—is 14.7 pounds of air to each pound of gasoline. If less air is provided and the mixture is rich, carbon monoxide (CO) and unburned hydrocarbons (HC) are produced. On the other hand, if more air is provided, the leaner mixture produces oxides of nitrogen.

Thus, with the existing internal combustion engine, there is a trade-off between these pollutants that can be controlled by manipulating the richness of the fuel mixture. This trade-off affects the efficiency of the car. Maximum fuel economy arises at a ratio of air to gasoline that is close to that of the 14.7 ratio. But maximum power arises at a lower ration, about 12:1, in which CO and HC are present.

### Dangers of Carbon Monoxide

Carbon monoxide can induce heart attacks in large concentrations and angina pectoris (heart pains) in lesser concentrations. In still lower concentrations, it can induce changes in the electrocardiogram (EKG) tests and this too is considered an adverse health effect. The standards set for CO under the Clean Air Act are designed to permit no more than about 50% of the concentrations that might provide heart pains. EPA believes that the CO standards provide a "small margin of safety" for persons with compromised circulation of the heart. (The ambient air standards were supposed to protect not only ordinary citizens but citizens such as bronchial asthmatics and emphysematics who, in the normal course of daily activity, are exposed to the ambient environment.)

CO blood levels of non-smokers in crowded cities are now below the 2% level that EPA has set for good health. Some measure of the carbon monoxide standards is provided by the fact that cigarette smoking produces a "carboxyhemoglobin" saturation level in the blood of 3%-7% as compared to 1% for non-smokers. It is believed that 3%-5% concentrations can produce angina pectoris in sensitive members of the population. In short, the standards are designed to keep the ambient air well below what smokers tolerate by choice.

As far as is known, the hydrocarbons are not a health problem per se. But, in the presence of sunlight, they can react with oxides of nitrogen (NOx) to produce photochemical smog—or more commonly "smog." Smog irritates the eyes, stings the nose, reduces visibility, exacerbates respiratory diseases and is suspected of more serious adverse effects. On the basis of isolated studies, or suggestive results of one kind or another, it appears that smog in sufficient quantities might cause lung disease, congenital defects, impaired defense mechanisms, and so on.

The formation of smog depends upon the ratios of hy-

drocarbons and oxides of nitrogen present. In Los Angeles, in 1970, the automobile industry sought to reduce HC and CO emissions by manipulating the air-fuel ratio—permitting, as a result, a 50% greater emission of NOx. The greater ratio of nitrogen oxides to hydrocarbons created still more smog than had existed before despite the reductions of HC.

Nitrogen oxides can have adverse effects on health quite apart from their role in forming smog. One or two studies suggest that nitrogen dioxide can increase susceptibility to respiratory diseases, or their severity and frequency. A recent study suggests that nitrate particles may aggravate asthma.

### How the Solutions Work

The Detroit solution, the catalytic converters, are inserted between the engine and the tailpipe. The converters contain catalysts such as platinum, palladium, or vanadium. One converter would be designed to turn carbon monoxide and hydrocarbons into water vapor and carbon dioxide, which are harmless. The other catalytic converter would be used to reduce nitrogen oxides into nitrogen and oxygen. (Other complementary emission control efforts would include recirculating exhaust gas, and improving the carburetor and choke to provide better control over the air-fuel ratio.) A fundamental problem with the converters is determining how long the catalyst will remain active. If it begins to fail, there is no easy way for the driver to know.

The single catalyst system is expected to cost about $225 per year for five years, and the dual catalyst system may cost $270 per year for five years, considering both purchase price, maintenance, and losses in gas mileage.

The stratified charge solution of Honda is a clever method of resolving the conflicting demands of reducing CO and HC emissions on the one hand (which requires a lean mixture) and reducing NOx emission on the other (which requires a rich mixture). The air-fuel mixture is kept rich near the spark plug so that it will ignite readily. Subsequently, the fire spreads to a lean mixture throughout the combustion chamber. Since the reductions obtained by the stratified charged engine arise from its structure, the method is unlikely to fail without a failure in engine performance. Consequently, the owner will become aware of it. Nor does this method require periodic change of any catalyst. Nor is there expected to be any degradation of fuel economy.

The Mazda automobile, built by Toyo Kogyo, has a third solution: the rotary (Wankel) engine combined with a thermal reactor that burns up the exhausts after they leave the rotary engine. Mazda is showing a 30% reduction in fuel economy. However, the Wankel engine seems to provide good performance and high acceleration.

Thus far, various devices and changes required on 1973 models have resulted in about 7% less mileage per gallon (than the 1968 model uncontrolled cars). This is comparable to the 5%-6% loss in mileage due to the introduction of automatic transmissions. (Air conditioners in traffic can cause a 20% increase.)

It is interesting to note that the production of pollutants is now normally measured in grams per mile. Measured in this way, large cars do not necessarily pollute more than small ones, though they obviously consume more fuel.

## DETROIT'S CHANGE OF HEART

**"Included in their testimony before this subcommittee in 1964, the industry definitely looked down its nose at the catalytic converter. They said they would clean up the engine. They weren't interested in add-ons. They weren't interested in promoting the hardware sales of these independent companies. They were going to clean up the engine."**

*—Senator Edmund Muskie, April 18, 1973*

**As of now, the Big Four (automobile companies) seem more inclined to look to Congress and the courts than to a Japanese car-maker to solve their dilemma.**

*—The New York Times, Sunday, April 15, 1973*

### Administering the Clean Air Act

On the last day of 1970, Congress amended the Clean Air Act to require 90% reductions in hydrocarbons and carbon monoxide—to be achieved in 1975 cars and light trucks relative to emission levels in the 1970 year models. By 1976, a comparable 90% reduction of NOx emissions was to take place.

The purpose of these amendments was to apply statutory pressure on the automobile manufacturers, who had been extraordinarily slow in concerning themselves with automobile pollution. As of 1970, automobile pollution had been in excess of 60% of the entire air pollution problem and perhaps more than 80% of the air pollution in urban areas. Far from trying to cope with this problem, the automobile manufacturers had conspired to delay the development of emission control devices. (A Justice Department suit against them in 1969 had been settled by a consent decree.)

The congressmen who designed the law felt that the Environmental Protection Agency would be unable to withstand the pressure of the automobile industry. A congressional mandating of the standards to be achieved might get action.

Congress had no idea, however, whether the technology would be available to carry out the standards they had mandated. That was left to the automobile industry. In case Detroit could not meet the standards, a one-year suspension could be authorized by the EPA Administrator but only if four conditions were satisfied:

> "Only if he determines that (i) such suspension is essential to the public interest or the public health and welfare of the United States, (ii) all good faith efforts have been made to meet the standards established in this subsection, (iii) the applicant has established that effective control technology, processes, operation, methods, or other alternatives are not available for sufficient period of time to achieve compliance prior to the effective date of such standards and (iv) the study and investigation of the National Academy of Sciences conducted pursuant to subsection (c) of this section and other information available to him has not indicated that such technology, processes, or other alternatives are available to meet such standards."

### The First EPA Hearings

The law permitted automobile companies to file for suspension within one year of the passage of the act, and it required an Administrator decision within 60 days. Thus, applicants could file for suspension of the guidelines by January 1, 1972. A few months after that date, the applications began. By April 5, 1972, Volvo, International Harvester, Ford, Chrysler and General Motors had applied for an extension.

EPA denied the extension on May 12, 1972. It invoked the clause which required the applicant to establish that the technology was not available.

In effect, EPA extrapolated optimistically from a variety of incomplete test data to show that the technology might well exist. It examined the test data on about 500 test cars run by the five applicants (and by others) on five principal types of control systems: noble metal monolithic catalysts, base metal pellet catalysts, noble metal pellet catalysts, reactor system, and various reactor/catalyst combinations. Unfortunately, only one car had met the standards—and it had been driven far less than the 50,000 miles required by the standards.

EPA adjusted the automotive company data, in trying to determine what the state of technology might fairly be said to be. It raised test data emission where the automobile companies had used lead-free gasoline—EPA assumed that gasoline would not be that lead free in 1975. EPA reduced emissions on data from manufacturers that had eliminated nitrogen oxide at the cost of possible reductions of the HC and CO. It argued that NOx reductions were not required until 1976. EPA also increased emissions by invoking a "durability factor" to take account of the increase in emissions that might be expected as the car wore out during its lifetime. EPA even increased emissions to take into account the shift from hand-tuned prototypes to actual production vehicles. Finally, EPA reduced emissions by invoking the possibility of replacing the catalysts once during the 50,000 mile life of the car thus increasing its efficiency. These are complicated adjustments.

The automobile companies went to court; they noted, among other things, that the National Academy of Sciences had argued, in an interim report, that:

> "the technology necessary to meet the requirements of the Clean Air Act Amendments for 1975 model year light-duty motor vehicles is not available at this time."

On February 10, 1973, the U. S. Court of Appeals remanded the decision to the EPA Administrator with instructions. It cautioned him that "legislative firmness does not necessarily require a 'hardnosed' approach to the application for suspension . . ." and assigned to him the burden of producing a "reasoned presentation of the reliability of his methodology." It argued:

> "We think the vehicle manufacturers established by a preponderance of the evidence, in the record before us, that technology was not available, within the meaning of the Act, when they adduced the tests on actual vehicles: that the Administrator's reliance on technological methodology to offset the actual tests raised serious doubts and failed to meet the burden of proof which in our view was properly assignable to him . . ."

The Court permitted EPA's Administrator to set interim standards short of complete suspension of the guidelines if it wished. And it sent the case back for review with injunction to consider the public interest, and to report back in 60 days.

Five days after the Court's decision, the National Academy of Sciences released its second report on the ongoing progress of automobile emission technology. Where the earlier report had argued that the technology was "not available at this time," the new report concluded:

> "that achievement of the 1975 standards may be technologically feasible and that achievement of the 1976 standards is likely but may not be attainable on the established schedule."

(The complete report appears in the Congressional Record of February 28, 1973, beginning on page S3617.)

Less noticed, however, was the Academy approach to the relative merits of different solutions. By this time, the oxidation catalyst was not the only method in the picture. Now there were two approaches possible. The Japanese manufacturer had developed a quite different approach—the dual carbureted stratified charge engine. And they had incorporated it into small size engines. Suggesting that this new approach raised a "major quandry," the Academy committee on motor vehicles emissions concluded:

> "As compared with the catalyst-dependent systems now being emphasized by the major manufacturers, this system offers the promise of lower initial purchase costs, greater durability in service and significantly greater fuel economy."

What was the quandry? The Academy was concerned that the automobile industry, ponderous and pressured by time limits, would move inexorably down the road of the catalyst system at great cost to the consumer with a system that might not work. It suggested that:

> mass production of what are presently deemed to be relatively fragile catalyst-dependent systems, of unproved reliability in actual service, may engender an episode of considerable national turmoil.

### Second Round of Hearings

EPA began its hearings under the court's order. General Motors testified that "if everything works according to schedule," they could adopt the catalytic system but "our experience tells us serious unforeseen production problems are very probable." Since predictions should be based on high mileage tests, there was "no reasonable basis" for concluding that GM could comply with existing regulations by 1975. GM therefore asked for the one year's suspension while offering to put the catalyst on California cars as a kind of proving ground.

Ford testified that "substantial numbers of catalyst-equipped vehicles in actual customer use will sustain converter failure" and wondered if sufficient quantities could be produced in any case. Ford also offered to try out the system in California if a delay were provided.

The Japanese Honda Motor Company testified about its startling new development, the stratified charge engine. Honda said it could meet the 1975 standards and intended to do so. The cars had been tested over hundreds of thousands of miles of varied conditions. In addition, it argued:

that automobiles incorporating its system could be mass produced by any automobile manufacturer; that its method would be applicable to large engines in the near future; that there would be no sacrifice in fuel economy or performance; and that it saw no reason why it could not meet the 1976 standards as well with the same technology. Unlike the case of the catalyst, lead content in the fuel would not foul the stratified charge.

Honda planned to sell 250,000 cars in the United States with the stratified charge engine. It had modified a Chevrolet-Vega and was "currently modifying a V-8" engine of a company other than theirs—later found to be a Chevrolet Impala. Honda offered either to sell its system, or license others to apply it. Honda was already, in February and March, working with General Motors under a "confidential disclosure agreement to expose its technological advances." Honda thought that it would be "very difficult" for American companies to adopt Japanese technology in time to meet the 1975 standards but that it might be possible, by 1976, to do so with a "limited number" of cars.

Meanwhile, the Academy of Sciences testified that a majority of its committee thought that a year's delay might be "prudent."

### Ruckelshaus Grants Suspension

On April 11, the sixty days allotted by the Court of Appeals were up. William D. Ruckelshaus gave the automobile companies the one-year suspension. He imposed interim standards moving the country 50% of the way to the 1975 standards but not so far as to require nationwide application of catalytic converters. In California the interim standards were tighter, moving the state two-thirds of the way to the 1975 standards.

The most curious aspect of the decision was the great emphasis placed on the catalyst technology and the extent to which EPA ignored the stratified charge system of the Honda. Ruckelshaus argued that he had three choices: to force the use of catalysts on all domestic cars by 1975, to phase in the catalysts in 1975 for widespread use in 1976, or to relax the standards.

Ruckelshaus concluded that "the oxidation catalyst is workable and that the catalyst is the technology that *must* be used if statutory standards are to be met by 1975 or 1976 (italics added). The real issue, he concluded, was how to "insure catalyst technology is effectively implemented on all cars." His solution was to require the catalyst in California fot 1975 and give the year's delay.

In short, although only Honda testified that *it* could meet the standards, its system was nowhere mentioned. Asked why his earlier doubts about the catalyst had been resolved so promptly and dramatically, Ruckleshaus said he thought it was "effective" and he repeated several times his faith that the "marketplace " would produce the best technology. He argued that the jury was out on the best technology, called the Honda engine a "very good, if not superior" technology, but said that the Government has been developing a similar stratified charge engine that might work. He admitted that Honda seemed to provide "significant fuel economies." Ruckelshaus called the predictions made by some automobile companies of massive failure of the catalyst in consumer hands "very remote."

### Hearings Before the Muskie Subcommittee

On April 16-18, the Muskie Subcommittee of the Senate Public Works Committee held three days of hearings at which EPA testified about its decision. Perhaps the most significant development of these hearings was the likelihood that NOx standards would be relaxed. EPA testified that $NO_2$ was a "significant problem" only in Los Angeles and Chicago. EPA thought the ultimate standards might be somewhere in the range of 3.2 to 1.1 grams per mile—3.2 is close to the present standard. The EPA director noted that the fuel penalties involved in the catalyst were associated with the effort to hold NOx emissions down.

The reassessment of NOx standards evidently stems from reconsideration of data taken in a Chattanooga school district. This data, upon which the $NO_2$ standards seems to be primarily based, were in error in calculating ambient air concentrations. There is also uncertainty however concerning the measurement of the adverse health effects attributed to $NO_2$.

### Overall Air Pollution Guidelines

The 1975 standards for automobile emissions were only part of the Clean Air Act's efforts to clean up the air. It included overall reductions in air pollution of which reductions in automobile induced pollution were to play a part. It was recognized by EPA that 38 cities in 21 states had special problems which would require strenuous efforts even if automobile pollution limits were achieved by 1975. On April 15, 1973, the 43 states and cities at issue were to submit plans for EPA approval indicating how compliance would be effected. EPA had suggested such things as gasoline rationing, emission controls on older automobiles, restrictions on automobile use in cities and so on.

By the deadline, only 11 cities and states had submitted plans that envisaged compliance even by 1977; 27 cities and states had not submitted a plan. EPA testified subsequently that air quality standards would require some transportation and land-use control in areas which, in the aggregate, represented over 40% of both population and automobiles. It was evident that for cities, if not for cars, the 1975 "earliest possible deadline" for cleaning up the air had turned out to be too early.

### Policy Implications

The struggle over the standards is a highly political contest. On the one hand, there are automobile manufacturers who often seem to care not at all about the pollution of their product. It is widely assumed that they will try to break the Clean Air Act.

On the other hand, there are surprisingly powerful environmental groups whose aim is to uphold the Act and who consider cleanup of the air an overriding priority.

Caught in the middle are a handful like Senator Philip Hart, whose fate it is to be a conscientious Senator from Michigan. After voting for the Clean Air Act in 1970, Senator Hart urged a second look at the standards. Suggesting that the "public health and economy might be better served by a more flexible time-frame," Senator Hart noted that it was impossible to do a cost-benefit analysis because no one knew exactly what health benefits would result.

Air pollution will decline until 1980 no matter what is done simply because old cars without post-1970 controls will be replaced. During that interval, cheaper and more reliable methods than the catalyst—such as the stratified charge—could be phased in, which would then provide, a few years later, the sharper emission reductions now mandated.

Opponents of this view are not so concerned about the delay in reaching ultimate ambient air standards as in the possibility that any relaxation might permit Detroit to destroy the regulations entirely.

Supporters of temporary delay then warn of the danger that Detroit might be unable to switch from the catalytic converters it had rushed to provide—why foist upon the public merchandise that may be both shoddy and expensive? Won't this hurt the environmental movement in the long run as well as the public?

One answer, in turn, to this objection is the statement adopted on page one—regulations that make the catalytic converters unacceptable.

But, obviously, no one proposal or suggestion can resolve the political Indian wrestling in which all will be intently engaged for the foreseeable future.□

## BIOMEDICAL FUNDING PETITION LEADS TO COUNCIL RESOLUTION ON CONVENTION ACTIVITIES

In late February, FAS began circulating a petition on behalf of biomedical funding to 40,000 researchers. Signed by nine eminent scientists (eight of them Nobel prize winners in physiology and medicine), it urged renewed support for basic research and the reinstitution of training and fellowship grants.

FAS activity stirred a great deal of interest throughout the biomedical community. Subsequently, Dr. George Pappas, Executive Director of the American Society for Cell Biology, invited the FAS Director to speak at a meeting on the subject to be held during the April convention of the Federation of American Societies for Experimental Biology (FASEB). Dr. Stone agreed, with the thought that more signatures might be rounded up at the convention—normally attended by about 15,000 biomedical scientists. FAS began printing suitable material and advised FASEB of its intention to distribute it at the convention.

FASEB turned out to be burdened with anachronistic rulings concerning petition distribution and political activity. Indeed, Dr. Pappas was advised that although he could have a room for the meeting, he could not print posters to advertise it! After prolonged negotiations, FAS was advised that tables with (screened) literature would be permitted but that they could not be manned. This was deemed unworkable by FAS and the negotiations were broken off.

It thus became evident to FAS officials that FAS had been remiss in not earlier challenging restrictions of this kind. In 1970, FAS had criticized disruptive activities at conventions but had never made a statement about the positive ways in which scientists should discuss public policy issues at conventions.

The FAS Executive Commitee thereupon approved—and the FAS Council subsequently endorsed—this observation, released on April 12.

> Scientific societies organizing conventions ought not to claim the responsibility for monitoring the political activity of scientists outside the rooms rented for those conventions. Non-disruptive political activities involving petitions, literature displays, posters, and the like, should be encouraged rather than discouraged, so long as they are circulated in a courteous and nondisruptive manner. The hotel, rather than the scientific society, should have the responsibility for deciding what is courteous and non-disruptive. (This proposal is wholly in accord with the legalities of the situation since the activity takes place on hotel property.) In particular, scientific societies ought not to take it upon themselves to determine the propriety of the literature or petitions being offered.

Despite these difficulties, Dr. Stone attended the FASEB meeting to cover the issue for this newsletter, and to address Dr. Pappas' meeting. Thanks to unknown persons who announced the meeting by leaflet, about 400 persons heard the FAS Director speak, along with Dr. Mahlon B. Hoagland, Philip Siekevitz and Linda Green. The speakers warned of the danger of anti-science attitudes and several suggested that active involvement in science and public policy activities was the best antidote.

Subsequently the FAS Council approved a complementary resolution concerning mailing lists. These lists, along with conventions, are the primary methods for reaching scientists. The FAS mailing-list resolution suggested that societies ought to rent their lists, on a commercial basis, to any group of scientists that wishes to distribute material on science and public policy issues which the scientists can plausibly argue would be of interest to at least some of the members of the society at issue. (Under standard rental practices, the names of society members are not given out under this procedure. Mailings go through a mailing house that does not permit list reproduction.)

Taken together, the two FAS recommendations would free political and tax-deductible societies from the necessity to make political judgments concerning material to be circulated or mailed to their members. In this way, the societies could protect their tax-exempt status, avoid controversy, and yet permit their members to be reached by messages of great interest to many of them. FAS intends to circulate the resolutions to American scientific societies. It suggests that society members urge these rules upon their societies.

## PFEIFFER CREDITED WITH SPURRING AAAS

On December 27, 1972, FAS awarded Matthew Meselson its second annual Public Service Award for a large number of achievements directed toward a prohibition on biological and chemical warfare. However, one of these many achievements was miscredited: Professor Egbert Pfeiffer of Missoula, Montana, rather than Professor Meselson, was instrumental in persuading the AAAS to commission a study on herbicides in Vietnam—a study carried out by Professor Meselson.

## FAS RELEASES WEATHER MODIFICATION PETITION

On March 1, 1973, FAS wrote to the President urging full disclosure of any use of weather modification as a weapon of war by this or past Administrations. The letter was supported by a vote of the FAS National Council speaking for our 4,500 members and a petition signed by 750 non-members. It was released at a press conference on March 8th, at which the speakers were FAS Secretary Herbert Scoville, Jr., former Assistant Director of the Arms Control Agency; and Gordon J. F. MacDonald, former member of the President's Council on Environmental Quality, and a widely quoted author on geophysical warfare.

At this press conference, it was noted that the Pentagon Papers show a reference to military weather modification activities in an official document contained therein. (The entire press release and letter to the President can be found in the Congressional Record of March 8th, 1973, page S4128.)

Subsequently, an Administration response was sent to FAS signed by Dr. John S. Foster, Jr., Director of Defense Research and Engineering. Dr. Foster asserted unequivocally that there was no classified research on weather modification of any kind going on in the Defense Department. He noted, however, that there was classified "work" which had been discussed with the Chairman of the Armed Services and Appropriations Committees.

On April 12, Senator Claiborne Pell inserted this response in the Congressional Record (pg. S7319) and noted that it was ominous to see that what was classified was not research. He concluded "reluctantly" that the activities classified were operational ones and that the United States had used weather modification as a weapon of war. Senator Pell commended the Federation for having pursued this subject and secured this information.

FAS activities in this area were also discussed in connection with efforts to achieve a treaty on geophysical warfare by Congressman Donald Fraser of Minnesota and Congressman Gilbert Gude of Maryland (see the March 28th Congressional Record, pgs. H2225-6 and H2231-3).

## WALL STREET JOURNAL ARTICLE IN ERROR

On March 27, the Wall Street Journal carried an article entitled "Teddy Kennedy's 'Shadow Government' " by Mr. Jude Wanniski. The article stirred considerable controversy and contained several inaccuracies. For example, the Federation's Director was said to have called S.32, Senator Kennedy's National Science Policy and Priorities Act of 1972, a "pork-barrel bill." In fact, he had noted that FAS did not normally lobby for science-funding because FAS was not a pork-barrel operation for scientists. He went on to note that Kennedy's bill, however, was so important to the nation that FAS had made an exception. This is quite the opposite of calling S.32 a pork-barrel bill.

The article also suggested that the President's Science Advisory Committee (PSAC) had been composed of "political operatives for the Nixon Administration." Dr. Richard Garwin took strong exception to this point in a letter written to the Journal on April 6. He pointed out that every one of the twenty members had been appointed by President Nixon; of all of them, only Dr. Garwin had testified before Congress, and many of the men called a "collection of academicians" by the article were in fact industrial executives. (Members will recall that Richard Garwin received the first annual Public Service Award of the Federation, in part for his courage in testifying before Congress while serving as a consultant to the White House.)

Garwin noted that he was in no sense a political operative against Mr. Nixon, having testified for the Administration on its SALT policy, though in opposition to it on the SST. As many FAS officials are aware, Dr. Garwin calls his shots as he sees them. And, as the FAS director can testify, with some regret, FAS received virtually no assistance or cooperation from PSAC members in pursuing FAS public interest lobbying.

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