must be reviewed by the courts if a manufacturer feels he has been unfairly treated. In short, if a manufacturer objects to an EPA ruling, the agency must seek a court injunction to put the ruling into effect. If EPA doesn't go to court, the ruling would be nullified.

Although that provision may seem like a huge loophole through which smart corporate lawyers can emasculate the legislation, many observers feel that in fact it will be relatively easy for the EPA to obtain an injunction. All that would be required, according to the bill, is a showing that the compound "may present an unreasonable risk of injury to health or the environment", or that it "may reasonably be anticipated to enter the environment in substantial quantities", or that there has been insufficient testing for the hazards to be "reasonably determined or predicted".

Thus, the wording is so general that EPA should have a fairly easy time in proving its case, a fact which made the provision acceptable to environmentalists. "We don't like it", Ms Billings said last week, "but we recognise that it is the best we could get". Similarly, the chemical industry sees some merit in the provision. James Hanes, chief counsel for Dow Chemicals, who has been one of the most outspoken opponents of the bill, told *Nature* that the idea "at least gives the industry the chance to contest the decision out in the open", though he noted that "I don't really see the courts requiring an overwhelming burden of proof here".

If EPA obtains its injunction, it can then specify what tests it requires, and the industry would then be in the position of having to prove that a product is safe before placing it on the market.

Priorities committee

As far as existing chemicals are concerned, the bill requires the setting up of an inter-agency committee charged with the task of drawing up a list of chemicals whose toxicity is open to

question. The committee will assign priorities to chemicals and, within 12 months, the EPA Administrator is required either to issue orders for testing the top 50 compounds, or to explain why he feels testing isn't necessary.

The bill will clearly place a huge burden on EPA, which is required to go through masses of data on thousands of chemicals, decide which need testing and which should be allowed on the market, go to court to obtain injunctions, and exercise considerable judgment on what actions are necessary. Therein lies the bill's greatest potential weakness, according to many observers.

To carry out this Act, the bill authorises expenditures of only \$10 million this year, rising to \$12.6 million next year and \$16 million the year after. Those figures should be compared with the \$125 million which EPA was budgeted to enforce the Clean Air Act, or the \$200 million a year budget of the Food and Drug Administration. It is difficult to see how EPA can effectively enforce the Toxic Substances Act with such small resources, and some observers have suggested that the upshot will be that EPA will be forced to concentrate on a few chemicals and allow many to slip through the net.

Monetary matters have also been a major source of concern to the chemical industry throughout the long Congressional fight over the bill, though for different reasons. There have been numerous studies of what the bill may cost the industry in terms of testing facilities, legal costs and administrative requirements. Large-scale animal tests are very expensive to conduct—according to estimates given in testimony before a House committee by officials from DuPont, for example, a complete battery of tests can cost up to \$500,000. Such figures have thus led to arguments that the bill will stifle the development of important chemicals which may only have a short production run. Some of that concern

has, however, been reduced by the provision exempting research chemicals from the bill.

Assessing the cost

As for the total impact of the bill on the industry, Dow Chemicals has so far come up with the highest figure, estimating that the legislation will cost chemical manufacturers up to \$2,000 million a year. The MCA thought that the cost would probably lie between \$360 million and \$1,300 million, while EPA suggested that it would only be about \$80–140 million.

Whatever the cost may turn out to be, it will be relatively small compared with the massive total sales volume of the industry, or with the costs of treating cancers and other diseases related to environmental factors. The large cost of animal tests, moreover, should provide a strong incentive for industry to develop accurate, short-term *in vitro* tests, such as the system developed by Dr Bruce Ames at the University of California. Already, many large firms are looking closely at such systems, and are using them as rapid screening devices, essentially to develop priorities for animal tests.

It now remains to be seen whether or not President Ford will sign the bill. If he refuses, he not only runs the risk of the matter developing into a campaign issue, he would also probably do the chemical industry more harm than good. This bill swept through the Congress with support from both Democrats and Republicans, there is certainly strong public pressure for such legislation—especially since the panics over PCBs, vinyl chloride and so on—and the polls now indicate that the Democratic majority in the Congress will be much stronger next year. All those considerations suggest that an even tougher bill would emerge from the next Congress if this bill expires. That is one reason why the chemical industry has decided to give this bill at least its lukewarm support. □

USA

Science Court on guard

A number of prominent scientists and government officials met last month to discuss a proposal to establish a 'Science Court' in the United States, to examine complex scientific issues which have a bearing on public policy. The proposal (see box) has recently been receiving considerable publicity in the United States. Wil Lepkowski reports from Leesburg, Virginia

At first blush, the idea of a Science Court sounds a bit intriguing if not a mite exciting: a forum of distinguished scientists and engineers gathered together in court for sifting, filtering, and distilling contradictory facts into one sparkling supernatant of truth. The world of political decision-making is so messy, proponents of the science court assert, that officials would welcome a little plain, unvarnished truth from a

forum that has no political stake in public issues.

This is a fairly accurate, if not precise, description of the idea behind the science court, which is mainly the invention of Dr Arthur Kantrowitz, president of the Avco Research Laboratories. For about a decade, Dr Kantrowitz has been tirelessly giving on and off the cuff speeches on the need to establish such a court and, after a good deal of effort, he finally succeeded in securing government support for a colloquium on the subject. It was held last month at the Xerox Cor-

poration Training Center in Leesburg, Virginia.

About 300 people came, representing law, science, engineering, industrial management, government administration, social science, and general subjects. No one from the humanities was observable, unless one counts anthropologist-oracle Margaret Mead. Dr Mead was the sole bearer of mirth into what was otherwise a dull, juridical gathering. She was in general kind, affirmative, but at one point called the affair a publicity meeting. That may be unkind to Dr Kantrowitz, who in sincerity is outranked by no one. But the whisperings around Washington in that small circle called the science policy community (not to be confused with the working scientists) is to give Kantrowitz his day and let the whole idea collapse under its own unworkable pretensions.

Nothing was really decided at the colloquium. Individuals theorised how it might work, what might be the snags, how the right panels of experts would be picked according to the issue under debate, who would choose the experts, how information would pass between the court and the regulatory agency subscribing to it, what the procedures would be for cross examination, how the public would participate, whether the system already works well enough. In short, the meeting was a *mélange* of speculation. It is probably accurate to say that Dr Kantrowitz, who heads a science court task force set up by a now-disbanded White House science advisory committee, will get a little money to do a science court experiment with a regulatory agency. That's what he intends to do. In fact, the colloquium's point was to hash over the elements of such an experiment.

Two concrete issues were discussed around which an experiment might be devised: food additives and nuclear power. Both issues have enjoyed and lamented over huge outpourings of fact, opinion, and acrimony over many years. In both cases the matter boiled down to the free flow of information—facts withheld by government and industry that no science court could pry loose. And anyway, one could make a fairly substantial case for the "fact" that science courts already exist—through panels serving regulatory agencies, through the National Academy of Sciences, through existing legal courts, in other words through a system within the American democracy that, after all is said and done, does indeed spot the scallawags.

It is certain that the experiment will be tried. The President's science adviser, Guyford Stever, gave it cautious endorsement. Even the Commerce Secretary, Elliot Richardson, said it might as well be tried, although

Science court: specifications

A top-level science advisory committee, established by President Ford last year to prepare the way for the re-establishment of a White House science policy office, recommended that the Science Court idea should be given serious consideration. It established a task force, chaired by Dr Arthur Kantrowitz, which has drawn up the following specifications for the court:

Initiation

1. The experiment will begin with agreements between the Science Court Administration (SCA), the host institution and the funding institution concerning the plans for the experiment.
2. The first step will consist of contacts with regulatory agencies and others to search for a suitable issue. The first issue will be presumed to be bi-polar and will be presumed to be a value laden decision which must be made by the agency and in which the scientific facts are apparently in doubt.
3. An agreement with the regulatory agency to supply necessary legal powers for uncovering non-public information if necessary.

Organisation

4. The SCA, equipped with an issue and funds, will seek Case Managers (CMs) for each side of the issue. The work of the CMs will be funded by the SCA.
5. The SCA will issue procedures, suggested referees, and a panel of prospective judges.
6. The CMs will review these suggestions. The experiment will go forward only after both CMs agree on the referee, the judges and the procedures. A signed agreement to proceed will commit the SCA, the funding agency, the regulatory agency, the CMs, the judges, and the referee.

Suggested procedures

7. The CMs formulate a series of factual statements which they regard as most important to their cases. Such statements must be results or anticipated results of experiments or observations of nature.

The statements should be ranked in order of importance assigned by the CM.

8. The judges examine each statement to determine that it is a relevant scientific fact.

9. The CMs then exchange statements. Each side is invited to accept or challenge each of the opponents statements.

10. The list of statements accepted by both sides will constitute the first output from the SC.

11. Challenged statements are first dealt with by a mediation procedure in which attempts are made to narrow the area of disagreement or to negotiate a revised statement of fact that both CMs can accept.

12. The mediated statements are added to the SC's output. Those statements which remain challenged are then subjected to an adversary procedure.

13. CMs prepare substantiation papers on statements remaining challenged and transmit these to the judges and the opposing CMs starting with the first (most important) challenged statement.

14. The substantiation is cross-examined by opposing CMs and judges and contrary evidence is presented and cross-examined.

15. A second attempt to negotiate a mediated statement is made and if successful this statement is added to the Science Court's output.

16. If this is not successful the judges write their opinions on the contested statement of fact.

17. This procedure is repeated for each of the challenged statements.

18. The accepted statements plus the judges' statements constitute the final output of the procedure.

it shouldn't be confused with a court of law. Stever did imply, however, that one shouldn't expect too much.

The mythology behind the science court concept does deserve an analysis that the colloquium did not consider. The question concerns reasons why the science court idea is deemed so urgent as to have a whole colloquium called to discuss it. Industrialists seem to want it because they are convinced that strident opposition to technology by environmentalists are stifling their own freedom to make fair profits. Scientists and engineers seem to be for it because it gives them the chance to establish order in forums often run emotionally. Environmentalists and public interest figures are against it because they fear their positions will be muted by a scientific elite that has little feeling for human needs. And lawyers are against it because they feel court procedures, if done right, hear all sides to a case, within human limits of patience, tolerance, and intelligence.

On the scope of reality, the science court seems of little importance beyond a possibly interesting intel-

lectual exercise. Regulatory agencies make literally dozens of decisions daily. Hundreds of scientific panels are called to aid in those decisions—little courts, if you will. The National Academy of Sciences runs a series of Science Forums every few weeks or so in which the public actually does debate with scientists the validity of scientific findings relevant to public issues. The administrators of the Science Forum aren't pretentious enough to believe their procedures heavily influence decisions. But some follow-up studies do indicate that the debates raise the personal and collective consciousness to a degree satisfactory to anyone wise enough to understand that people aren't swayed very easily.

The trouble is that no one quite knows what to think of the Science Court. It is a difficult target to attack because the subject is virtuous. Many simply don't feel it is worth much. One might call the feeling the accumulated wisdom of those who have been through the course of using scientific facts in the pursuit of the common weal. □