Establishment of rules restricting the movement of tankers, and especially supertankers, represents another approach to tanker safety that is beginning to receive attention. After the wreck of the *Amoco Cadiz*, the French Cabinet is reported to have adopted a regulation requiring tankers to remain at least 7 miles off the coast instead of 5, as at present. CEQ also has suggested that mandatory routes should perhaps be established to keep supertankers away from rocky shores and narrow passages.

The administrator of NOAA, Richard A. Frank, has told *Science* that his agency's marine sanctuary program could be expanded in response to the problem of tanker safety. With the establishment of such sanctuaries by NOAA, which could only act with the concurrence of states whose coastal waters would be affected, tanker traffic could be either restricted or prohibited in certain hazardous and environmentally sensitive areas. Some actions of this kind are also possible under the Ports and Waterways Safety Act of 1972, as Secretary of Transportation Brock Adams recently demonstrated by at least temporarily banning tankers of over 125,000 dwt from Puget Sound; the secretary acted after the U.S. Supreme Court held that the federal law was preemptive and that a ban on large tankers imposed by the state of Washington could not stand.

Congress may have a particularly important opportunity to advance the cause of tanker safety now as it moves to complete action on the long-unresolved issue of oil spill liability. The IMCO conferences on this problem, held in 1969 and 1971, produced agreements deemed so inadequate that the Senate has not bothered to ratify them. What seems called for is a liability and compensation program that would provide not only more generous compensation in the event of spills but also strong economic incentives for the tanker industry to emphasize safety in the design and operation of its ships. "This has never been stressed enough," says Frank, who before coming to NOAA last year was with the Center for Law and Social Policy (CLSP), a Washington-based public interest law group.

James N. Barnes, the CLSP attorney who has been speaking for several of the national environmental groups on the tanker safety issue since Frank's departure, believes that no limit should be placed on the liability of tanker owners for damages. Last year, the House of Representatives, no doubt influenced by industry arguments that insurance simply would not be available without a liability ceiling, passed a bill that would limit the liability in a single incident to $30 million. Claims for damages in excess of that amount would be met from a compensation fund to be raised mainly by a 3-cent-per-barrel fee levied on oil delivered by tanker to bulk purchasers.

But Barnes points out that, with the help of government "reinsurance" plans, private underwriters are already providing insurance against the potentially catastrophic losses that could result from calamities such as urban riots and floods. In his view, such underwriters could make insurance available at prices that would be acceptable to all tanker owners except those with bad safety records or substandard ships. As for the latter, he said, "driving [them] out of business is a desirable goal and one which a per-barrel tax cannot achieve."

Whatever the response of IMCO and the U.S. government to the tanker safety and oil spill problem, the *Amoco Cadiz* incident underscores with stark emphasis the fact that nothing has yet been done to keep this problem from assuming ever larger and more catastrophic proportions. An adequate response may require all of the previously cited remedies—better tanker construction and operating standards, stiffer inspections, prescribed tanker routes and marine sanctuaries, and oil spill liability laws that make tanker safety economically compelling. Without a concerted national and international effort to these ends, the devastating black tide that has visited Brittany is likely to visit many other shores, again and again.

—LUTHER J. CARTER

A Tangled Tale from the Biology Classroom

The following letter was sent to the White House and given to Amy to reply to. She dropped it on her way to school and it was picked up by a tourist from Princeton, who delivered it to Science.

—N.W.

Dear President Carter

The name of my school is the Harvard Medical School. You may have read in the newspapers that there was a boy here called Charlie Thomas who used to do experiments with recombinant DNA during biology class and who was told to stop them last December by the grown-ups at the National Institutes of Health.

Now the National Institutes of Health has written a bad report card about Charlie, it is called the Schriver report. But the prefects at my school have written another report which shows that Charlie and our committee had lots of good excuses for what they did, and that boys at other schools may have done just the same, it was just that Charlie got caught which isn't fair. I want to explain in this letter why nobody is really to blame for what happened and that it wasn't a big deal anyway because nobody could have got hurt.

Basically it is all the fault of the boys at another school. I should not mention their name but it is the University of California San Francisco. In the biology class there they wanted to do an experiment so much that they did it even after they had been told by one of the other boys that it would be breaking the NIH rules. When the prefects there found out, they didn't do anything about it for a long time and then they said it was basically the NIH's fault that the rules had gotten to be broken.

A senator in Congress called Senator Stevenson was very cross with the boys at UCSF. He made them come all the way to Washington and was very mean to them. He said things like, "You say you don't want legislation. If there is legislation, you gentlemen would be the authors of it." (He meant they had been so naughty he might actually have to write a law to say the rules had to be kept.)

The senator was also mean even to the grown-ups at NIH. So when it got out that Charlie might be in trouble the NIH people said he had to stop working in his lab at once until their Mr. Schriver found out what the matter was.

Here is what our prefects at Harvard say happened, basically. They say,

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The web of misunderstandings that led to the interdiction by the NIH of Professor Thomas's recombinant DNA research could have been broken at many stages along the way by appropriate action of any of the participants. That it was not may be ascribed in the final analysis to the unprecedented nature of an untried and complicated supervisory process.

What I think this means, President Carter, is that it wasn't our school's fault or Charlie's fault or anyone's fault in particular, it was just a general fault, all spread about among everybody involved like raspberry jam at a tea-party, and in any case the rules were too complicated even for very clever boys like us to understand.

The funny thing about the rules being too complicated, though, and I can't quite explain this, is that they weren't written by grown-ups, like most rules are, we wrote them ourselves. There was a group of boys all from different schools, called the NIH recombinant DNA committee, and our Charlie Thomas was one of the members. There was also a girl on the committee called Betty Kutter. She squealed on Charlie by writing to DeWitt Stetten, the chairman of the committee, during the time the committee was writing its rules. An experiment then being done in Charlie's lab, she said, "clearly strongly violates both the intent and letter of all recent drafts of the guidelines."

Charlie nearly got into hot water but he wrote to Stetten that it was all OK because the experiments were being done in a P3 lab, and Stetten said that was alright then.

It's a pity that we don't have a P3 lab in our school and never have had. But you see, Charlie was so very sure it was a P3 lab that it really wasn't his fault that later everybody else at our school said it wasn't.

When the committee had finished writing its rules, the NIH sent out a letter to all the schools in the country. The letter said that everybody had to send a piece of paper to NIH saying they understood the rules and would obey them. What the letter said exactly was, "At the present time the institution must submit a Memorandum of Understanding and Agreement (MUA) for each ongoing project involving recombinant DNA technology." The MUA had to be with the NIH by 15 November 1976. Also it had to say that the lab had been certified as a P2 or P3 lab or whatever was needed for the experiment. You may think that is clear but I will explain later why it isn't.

Now in Charlie's case there were these problems:

One, he didn't file an MUA by 15 November 1976, in fact he didn't send an MUA at all to the NIH until 9 December 1977, a whole year later;

Two, his laboratory wasn't certified at all until 9 May 1977 when it was certified as P2;

Three, he was doing P2 experiments in his lab all the time up until December 1977 (he stopped his P3 work in July 1976, the same time as the rules came out),

Four, he did not state on his grant renewal applications to the NIH that he was doing any recombinant DNA work, as he should have done;

Five, he told the school biohazards committee that his NIH grant had been held up, even though it hadn't been, so that the committee assumed he was not doing recombinant DNA research when in fact he was.

Why all this came about is that Charlie insisted that the committee say his lab was a P3 lab. The committee didn't want to but Charlie stamped his foot and the boys on the committee were perhaps a little afraid of him but anyway they didn't like to say yes and they didn't like to say no. So everything got held up and the right bits of paper didn't get filed and all this mess was created because of the deadlock between Charlie and the committee.

Now, here are our excuses. About not filing the MUA, we say it was basically the NIH's fault for not making it absolutely crystal clear that, if by any chance your MUA was late, you had to stop your experiment. You see, the NIH said the MUA had to be in by 15 November 1976 *but they didn't say what you should do if it wasn't*. Naturally Charlie thought he could go on doing his experiments just as long as his MUA had still not been filed. Now you might say, if there was any doubt at all about whether experiments could continue, why didn't Charlie or one of the prefects at our school pick up the telephone and ask the NIH? Well, we just didn't think of doing that.

Also there is another reason. Everybody knew that Charlie was doing recombinant DNA experiments except for the members of our school's biohazards committee. You see Charlie, as I mentioned before, told the committee the NIH had held back his grant because of his lab not being P3; he hoped that way to make the committee hurry up and say it was P3. (Charlie admitted to our prefects that he "misspoke" here). Now this meant that some members of the committee thought he wasn't doing any recombinant DNA work because he didn't have the money. Other members of the committee say they didn't know if he was or not. Now here's a funny thing. The members of the committee who thought he wasn't doing recombinant DNA say it would have been wrong if he had been, but the members who didn't know if he was or not say they assumed it would have been OK as long as his MUA was still pending. Either way, no member of the committee ever, ever said to Charlie, "Charlie, right now are you doing any recombinant DNA work in your lab?"

Our school's committee certified Charlie's lab as a P2 lab in May 1977 only because another boy there wanted to do some P2-type experiments. When Charlie was told in June that he definitely couldn't do P3 work he said he was fed up and quitting and was going to another school called Scripps where he is now. Eventually our school's committee sent in the MUA for him in December 1977. But just before we mailed it off, somehow or other an interfering person in Washington asked the NIH a question about Charlie's research and the NIH found there was no MUA on file. Without that there wouldn't have been any of this trouble.

President Carter, even though the rules weren't exactly followed, nobody could have got hurt in any way by what happened. It's just that the rules are very new and complicated for us to understand, even though we are the cleverest boys probably in the whole country. Anyhow, we promise it will never happen again and we will be on our best behavior and work very hard in biology class and do great things like curing cancer, when we grow up.

Sincerely yours

CAPTUS MELIUS FACIAM
Harvard Medical School

Last December Harvard Medical School biologist Charles A. Thomas was told by the National Institutes of Health to halt his recombinant DNA research. The reason was an allegation that Thomas had failed to file an "MUA," a document the NIH requires from all recombinant DNA researchers (*Science*, 6 January).

Both the NIH and Harvard Medical School have now released the reports of their respective inquiries into the episode. The NIH report was prepared by James W. Schriver, director of the NIH Division of Management Survey and Review, the Harvard report by a six-member faculty committee, of which Konrad E. Bloch was chairman.