

M. Sweeney, the public hearing examiner, finds that as a "finding of fact", DDT "can have a deleterious effect on freshwater fish and marine organisms when applied directly to water" and that "the theory of biomagnification would seem to be adequately demonstrated in the case of fish, giving rise to concern over use of pesticides with a persistence such as DDT". Similarly, the scientific advisory committee, which met under the chairmanship of Dr James Hilton of the University of Texas and which issued its report in September last year (see *Nature*, 233, 299; 1971), concludes that "there is sufficient toxicological

information on DDT in aquatic species to indicate that reduction and prevention of contamination of water sources is a problem of major concern", and Mr Ruckelshaus concludes that "the evidence presented by (the EPA's) Pesticides office and the intervenors, EDF, compellingly demonstrates the adverse impact of DDT on fish and bird life".

Nevertheless, Sweeney argues that the pesticide has found its way into water in the past chiefly through misuse, and concludes "while it is necessary to maintain a vigilant concern over the possibility of serious damage to our important aquatic life, it is questionable whether the evidence presented in this case supports a finding that, at present and foreseeable future levels, the use of DDT would cause damage to aquatic life sufficient to justify complete cancellation". Ruckelshaus, on the other hand, argues from the same body of facts that the manufacturers' "assertion that there is no evidence of declining aquatic or avian populations, even if actually true, . . . does not refute the basic proposition that DDT causes damage to wildlife species".

The question of whether or not DDT is a carcinogen provides the starkest difference of opinion between Sweeney on the one hand and Ruckelshaus and the scientific advisory committee on the other. The manufacturers of DDT argued in the public hearing that animal studies have so far not been able to prove that DDT is carcinogenic, and although Sweeney acknowledges that there is "no showing of any evidence that man himself is not safe from cancer from the present dosages to which we are exposed", he continues, "really, it can't seriously be contended that the fact that DDT has NOT been proven NOT to be carcinogenic in man, is a logical basis (*sic*) for advocating a complete ban on all future uses of DDT".

The scientific advisory committee, on the other hand, while admitting that "the possibility of . . . carcinogenesis is low", argues that "the evidence (from animal studies) to date clearly shows that DDT induces hepatomas and suggests that it may be carcinogenic". And Ruckelshaus argues that although there is no evidence of carcinogenicity from limited studies of workers in DDT manufacturing plants, the data from animal studies indicate that "DDT presents a carcinogenic risk". In short, Ruckelshaus has accepted that the doubt is great enough to call for a ban, while Sweeney suggests that until there are more convincing data available, a ban on DDT is not justified. So far, the courts have agreed with Mr Ruckelshaus and there is little likelihood that there will be a change of heart.

## NATIONAL SCIENCE FOUNDATION

### The Axe Falls

by our Washington Correspondent

It is now certain that the National Science Foundation will have less money to spend next year than it had bargained for. Last week, the Senate followed the lead of the House of Representatives by voting to give the foundation some \$650.2 million to spend in the 1973 fiscal year. The money is made up of \$619 million in new appropriations and \$31.2 million left over from previous years. The foundation's plans require expenditures of \$674.7 million.

The NSF's budget is contained in a bill appropriating money to several agencies, which was passed last week by the Senate and last month by the House of Representatives. Although the bill must go to a conference committee to iron out some differences of opinion between the House and the Senate, the figure is no longer in doubt, since both agree on the total funding for the foundation. One aspect of the budget which must be agreed on, however, is the proportion which is earmarked for science education and graduate student support. The House of Representatives has instructed the NSF to spend a greater proportion of its budget on these activities than has the Senate.

Although the appropriations bills do not tell officials of the foundation where they should apply the knife, it is clear from the report of the House Appropriations Committee, which was responsible for recommending the budget figures to the rest of Congress, which portions of the foundation's activities it would like to see trimmed. The report states: "A new emphasis has developed in the National Science Foundation programmes in recent years. This appears to put more emphasis on techniques and methodology and less emphasis on fundamentals and substance. The often expressed concern of knowledgeable individuals that the foundation may assume the role of directing instead of supporting research in our nation appears to be evolving in the RANN program, and in other new approaches that are proposed in the budget. . . . The Committee is concerned that this new support and promotion of short term goals is indirectly cutting into support of established and basic programs, such as institutional and graduate student support."

## CHRONOMETRY

### Absolute Time?

YET another adjustment in radio time signals will be made at midnight on June 30, a consequence of the changeover to atomic time as a basis for international time keeping on January 1 of this year.

Greenwich Mean Time is based on the diurnal rotation of the Earth and because the Earth is slowing down at the rate of three thousandths of a second a day, the second based on GMT is not sufficiently accurate for several scientific purposes.

Uniform time is obtained from atomic clocks which were standardized by being made to correspond to GMT in the year 1900 but absolute atomic time now differs from GMT by ten seconds. The change on June 30 will add another second to this difference.

There is an agreement that the time signals based on atomic clocks, will not be allowed to diverge greatly from GMT, but since January GMT has increasingly diverged from the signals based on atomic time, so that the difference now is between 0.6 and 0.7 seconds. To bring the two time scales closer together, radio time signals everywhere will be retarded by one second on June 30—thus making the relative difference between GMT and the time signals 0.3 to 0.4 seconds, a time difference that will now decrease as the Earth continues to slow down.

According to the Royal Greenwich Observatory it might be necessary to carry out another adjustment at the end of 1972 but this can not be accurately predicted because of the uncertainty of the slowing down of the rotation of the Earth.