

then Commissioner of Works. Thanks to Ayrton's removal because of an unrelated embarrassment, the scientific establishment escaped the humiliation of being rendered publicly accountable for their stewardship of public funds.

The most sensitive piece of 'externalist' historical writing comes from the American Charles Rosenberg, who describes the strategies of agricultural researchers returning from Germany in the 1850s. Here, we find cultural context, administrative constraints, and personal self-estimation, woven together very beautifully.

But the reader is not permitted to tarry on these familiar scenes; the anthropology of science beckons. Early nineteenth century Madagascar, its rulers anxious for 'magicians' to provide the tools of power, attracted a mixture of industrial, political and clerical entrepreneurs. This early "Technical Assistance Programme" failed to Europeanise the culture, though in a half century it did cause its decay.

Politics and changes in the weather

Weather Modification in the Public Interest. By R. G. Fleagle, J. A. Crutchfield, R. Johnson and M. F. Abdo. Pp. ix+88. (University of Washington: Seattle and London, July 1974.) £2.85; \$5.95.

ANY good work of science fiction depends on one or two critical, and possibly fantastic, assumptions from which all the rest follows logically. In a similar way this study by Fleagle and his co-authors depends on the assumption that weather modification will become possible on a substantial scale, with reasonably predictable outcomes. Given this, the book discusses logically the political, legal, administrative and management structure which will be needed to control weather modification.

Some weather modification has already been demonstrated as practical—the clearing of cold fogs, for example—but that has raised few administrative problems. The seeding of orographic clouds to increase the snow and rain over mountains has also been practised for many years, apparently with some success, but that has not raised serious legal problems. If, however, a government agency could modify or divert hurricanes, or if it initiated cloud seeding on a grand scale then no doubt greater problems would arise.

There is a danger that the reader of this book who lacks a strong meteorological

background will be led to believe that the potential of weather modification is much greater than has so far been proved, which may lead him, or her, to accept as necessary the somewhat elaborate organisation recommended in the book.

In the few legal actions brought in the United States under the quite extensive legal framework already established, none of the plaintiffs has been able to establish a cause-effect relationship between the actions of the weather modifier and the alleged results. This points to the premature nature of any elaborate legal or administrative framework.

On the other hand, the well-briefed meteorologist will find much of interest in the history of weather modification in the United States and in the views of the authors on future developments.

Whether or not one accepts the view that weather modification will be used on a wide scale in the future, an activity which currently involves the expenditure of around \$20 million of public funds in the United States certainly deserves public discussion. Furthermore, it is well to recall also that almost \$3 million is spent annually on cloud seeding by American companies operating abroad. The international aspects cannot be ignored: the effects may be greater on international relations than on climate.

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